Chapter 3
Affected Environment

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Chapter 3 Affected Environment

3.1 Introduction

This chapter describes the existing conditions of the physical, biological, cultural, and socioeconomic resources that have the potential to be affected by activities related to the Proposed Action and Action Alternatives discussed in Chapter 2. These resources include those that occur within, are adjacent to, or associated with the project area (i.e., Proposed Action and Action Alternative footprints, as well as those identified during the scoping process (Section 1.8).

3.2 Water Resources

This section describes water resources that may be affected by project activities. Water-related resources evaluated in this section include water quality and surface water features such as perennial, intermittent, and ephemeral streams; wetland areas and springs; groundwater; water use and water rights; and water quantity.

3.2.1 Area of Analysis

Proposed Action

The direct effects area of analysis occurs within the project area plus a three-mile buffer to allow for impacts that may go beyond the project area. This includes the associated access road and power line.

Waste Rock Disposal Site Design Alternative

The direct effects area of analysis for the Waste Rock Disposal Area Design Alternative occurs within the project area (Figure 3.2-1).

Southwest Power Line Alternative

The direct effects area of analysis for the Southwest Power Line Alternative occurs within the project area and within the 400-foot analysis area.

No Action Alternative

The direct effects area of analysis for the No Action Alternative occurs within the approved exploration POO boundary.

3.2.2 Data Sources and Methods

Proposed Action

Existing conditions were evaluated through a combination of literature research and field reports compiled specifically for this project.

Baseline water resources field data collection included wetlands and waters of the United States surveys for the project area, groundwater conditions, and geochemistry of geological resources that would become waste rock or ore under the POO. Existing published sources were reviewed for other aspects of hydrology, including climate, water use, and water rights.

Three hydrographic basins and sub-basins within and adjacent to the project area were analyzed. They include the Newark Valley, Railroad Valley/Northern Part, and Little Smoky Valley/Northern Part (Figure 3.2-1). All three drainages are closed basins with no surface water outlets.

Waste Rock Disposal Site Design Alternative

The data sources and methods for the Waste Rock Disposal Area Design Alternative are the same as those for the Proposed Action.

Southwest Power Line Alternative

The data sources and methods used for the Southwest Power Line Alternative are the same as those used for the Proposed Action, except wetlands and waters of the United States were analyzed using the United States Geological Survey (USGS) hydrologic unit maps.

No Action Alternative

The data sources and methods for the No Action Alternative are the same as those for the Proposed Action.

3.2.3 Existing Conditions

Proposed Action

The project area is located primarily in the Newark Valley drainage and the Railroad Valley Basin/Northern Part (Figure 3.2-1). The Proposed Action would be located primarily in the Newark Valley (Hydrographic Basin 154), with a small portion in the northern end of the Railroad Valley Basin/Northern Part (Hydrographic Sub-Basin 173b). Both are terminal basins that drain to playas. The Newark Valley is approximately 801 square miles in an area with no surface water inlets or outlets, and the Railroad Valley/Northern Part is approximately 2,140 square miles.

Precipitation

Precipitation in the area of analysis falls in the form of rain and snow, with the majority occurring at higher elevations. According to the Western Regional Climate Center (WRCC) (WRCC, 2012), average annual precipitation at the nearest recording station, Eureka, is 11.83 inches, which includes 58.9 inches of snowfall. The Eureka station is at an elevation of 6,545 feet AMSL. In its 2007 report on water resources in the Basin and Range Carbonate Rock Aquifer System (BARCAS), the USGS modeled precipitation in the Newark Valley using the PRISM model; USGS divided the basin into three elevation zones with annual precipitation ranging from 9.36 inches to 10.92 inches (Welch et al., 2007). Elevation in the basin ranges from 5,827 feet AMSL at the playa to 9,656 feet AMSL at Christina Peak.

Figure 3.2-1 Surface Water Features

Surface Water

Surface water features, including streams and springs for the analysis area are shown on Figure 3.2-2. All streams in the analysis area are classified as intermittent in the USGS National Hydrography Dataset (NHD) (USGS, 2012a).

JBR conducted and submitted to the United States Army Corps of Engineers for concurrence, a field survey to determine if any jurisdictional wetlands or other water bodies are present in or near the project area that would be potentially disturbed under the Proposed Action (JBR, 2011a). The field specialists found no wetlands or areas that met the definition of waters of the United States (Environmental Laboratory, 1987). Twelve of the 21 channels shown on USGS topographic maps and examined during the field survey had no defined channels, and all but one defined stream channel were discontinuous and isolated (i.e., there would be a defined bed and banks for a distance, then no defined channel) (JBR, 2011a). The one continuous channel passed through a culvert under U.S. Highway 50. All streams were described in the report as ephemeral. JBR's findings agree with the USFWS National Wetland Inventory (USFWS, 2012) and the USGS NHD (USGS, 2012a) as no areas of hydrophytic plant communities or hydric soils were found.

All of the streams shown on Figure 3.2-1 are classed as ephemeral in the USGS NHD, and none are named, including the braided channel west of the project area (USGS, 2012a). Although not all of these were included in the field survey, the drain areas of similar watershed size with the same climate and other environmental characteristics as those surveyed, thus it is reasonable to assume that they too, would not meet the criteria for waters of the United States. No springs or seeps were identified in the project area during the field survey (JBR, 2011a). The NHD and available literature were searched to determine whether springs or seeps are present within the remainder of the project area and none were found. The nearest spring in the Newark Valley is shown on Figure 3.2-2 and is approximately 0.25 miles west of the project area. It is ephemeral, unnamed, and no flow has been recorded from it (USGS, 2012a). Pavelko (2007) described it as an upland spring in non-carbonate bedrock. Approximately 2.5 miles southwest of this spring, in the Little Smoky Valley drainage, is Soda Spring (Figure 3.2-1); no additional data were found regarding the flow or geology of Soda Spring. The next closest spring in the Newark Valley is approximately 4.3 miles to the north-northwest of the project area; it is unnamed, with no flow data, and situated in unconsolidated sediment (Pavelko, 2007).

Groundwater

There are three aquifers of note in southern Newark Valley: a small, perched alluvial aquifer just west of the project area; an extensive valley fill aquifer; and a deep, regional, carbonate bedrock aquifer.

Recharge to the aquifers is primarily from infiltration of precipitation at higher elevations in the drainage as the precipitation flows down-slope and crosses porous materials on the upper areas of alluvial fans and alluvium underlying drainage channels. Consequently, most recharge is to the alluvial aquifer (Interralogic, 2012a). A smaller amount of recharge occurs through

secondary porosity in bedrock higher in the drainage, which primarily recharges the bedrock (BARCAS) aquifer (Interralogic, 2012a).

The BARCAS Report to Congress (Welch et al., 2007) developed a groundwater balance for the Newark Valley, which estimates both groundwater inflows to and outflows from the basin. The following summarizes components of the Newark Valley water balance:

- Annual groundwater recharge from precipitation is estimated at 21,179 acre-feet (which differs somewhat from NDWR estimates found in the water rights section below);
- Annual groundwater discharge (which does not include anthropogenic use) is estimated at 26,058 acre-feet (also somewhat different from the NDWR estimates);
- Regionally, it is estimated that the Newark Valley gains 5,000 acre-feet per year (afy) from Long Valley, and gains 1,000 to 1,500 afy from the Little Smoky Valley;
- Hydraulic communication between aquifers occurs in some places; and
- Estimated annual anthropogenic groundwater use is 7,185 acre-feet of which 7,085 acre-feet is for irrigation, 25 acre-feet is for stock water, 65 acre-feet is for municipal supply, and 10 acre-feet is for domestic use.

Another USGS report, *Conceptual Model of the Great Basin Carbonate and Alluvial Aquifer System* (GBCAAS) (Heilwel and Brooks, 2011), combines the Newark and Little Smoky valleys into the Newark Valley System. The GBCAAS report shows a high likelihood of a hydraulic connection between the Newark Valley Basin and the Little Smoky Valley Basin along the northernmost section of their boundary, grading to a low likelihood along the southernmost section of the boundary (Heilwel and Brooks, 2011). The report also indicates a potential for groundwater flow from the Newark Valley System to the Railroad Valley.

Several small, east-west oriented drainages originate at the divide east of the project area and drain to the small ephemeral drainages immediately west of the project area, which in turn drains to the larger Newark Basin. Water has not been observed flowing in any of these drainages or in any of ten test pits that were as deep as 14 feet into the alluvium associated with these channels (Interralogic, 2012a).

Figure 3.2-2 Regional Groundwater Hydrology

Perched Alluvial Aquifer

A local, perched alluvial aquifer occurs along the unnamed dry wash west of the project area. Its location can be inferred by the location of the four monitoring wells in Figure 2.3-11, which are numbered MW-1 to MW-4 from north to south. Interralogic supervised the installation of the monitoring wells, which are west of the proposed heap leach pad and borrow areas. The wells were drilled to depths ranging from 29 to 50 feet below ground surface (bgs), through the alluvium and at least three feet into the underlying bedrock. MW-3 was the only monitoring well which produced water. MW-3 was slug tested and found to have a hydraulic conductivity of 0.7 to 0.8 feet per day. The alluvium was described as "very poorly sorted gravel to clay" (Interralogic, 2013a). The underlying bedrock was black shale for MW-2 through MW-4, and basalt for MW-1. Results are shown in Table 3.2-1 (Interralogic, 2012a).

Table 3.2-1 Completion Summary for Shallow Alluvial Wells

Location	Ground Surface Elevation *	Screen Depth *	Screened Geology	Elevation Water Encountered	Potentiometric Elevation *	Hydraulic Conductivity (feet/day)
MW-1	6,223.6	28.3-18.3	alluvium/bedrock	Dry	Dry	N/A
MW-2	6,297.9	44.9*29.9	alluvium/bedrock	Dry	Dry	N/A
MW-3	6,377.4	39.1-24.1	alluvium/bedrock	N/A	6,340.9	0.8
MW-4	6,447.5	36.5-21.5	alluvium/bedrock	Dry	Dry	N/A

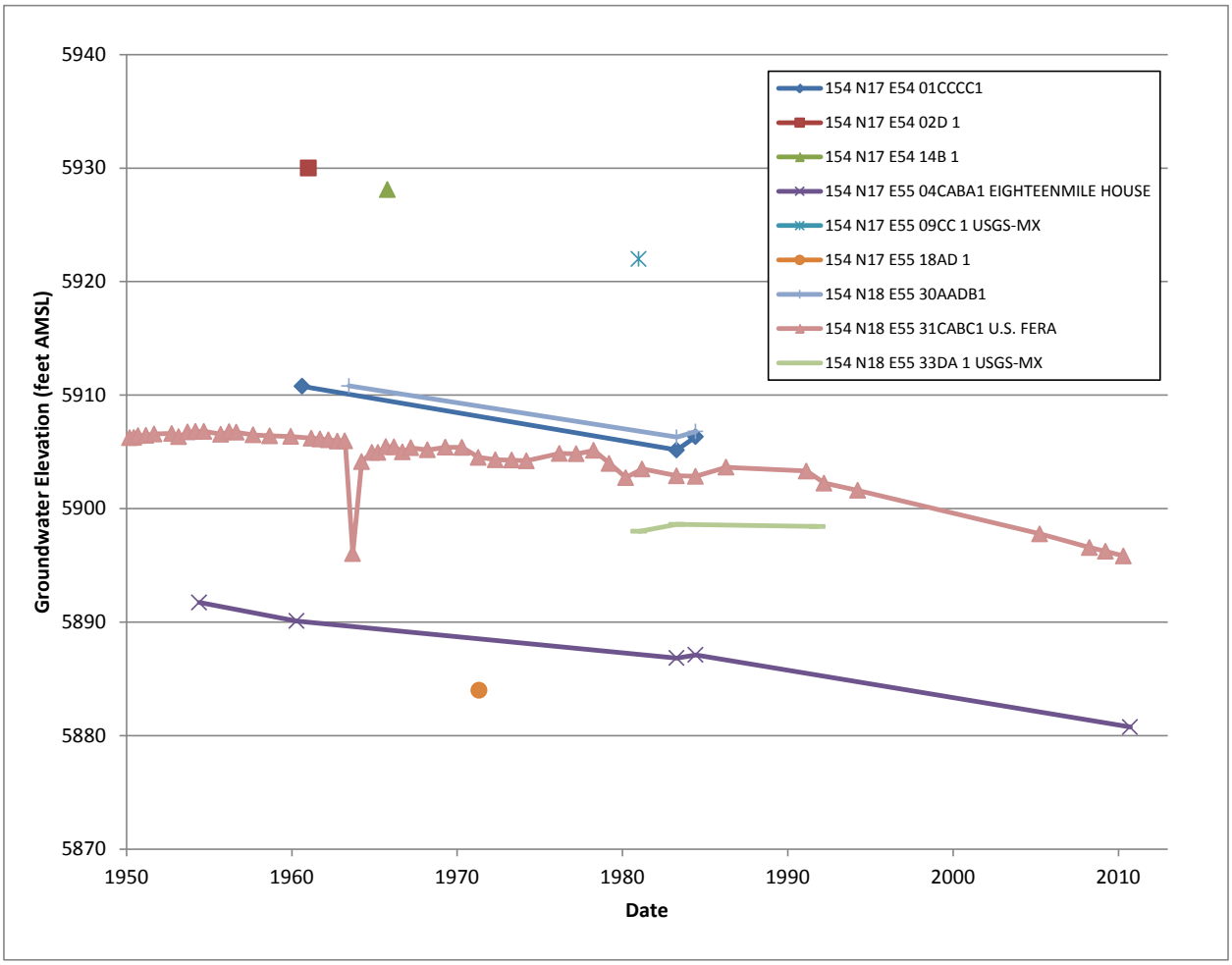
Source: Modified from Interralogic, 2012a
*All depths in feet bgs; elevations in feet AMSL

Basin Fill Alluvial Aquifer

The basin fill alluvial aquifer is composed of sediments shed from surrounding ranges, which are formed of carbonates and other range rocks such as mudstones and volcanic deposits including ash fall and basalt flows (Interralogic, 2012a). Figure 3.2-2 shows the extent of the basin fill aquifer in grayish tan. Water level data used to develop the potentiometric contours in Figure 3.2-2 were obtained from the USGS National Water Information System for wells in the Newark and Little Smoky valleys. Data from historical wells in the Newark Valley near the project area indicate average groundwater levels in the basin fill range from 35 to 128 feet bgs (5,884 to 5,922 feet AMSL). Time series data available for wells in the Newark Valley near the project area suggest that the potentiometric surface has declined approximately 10 feet since the 1950s (Figure 3.2-3) (Interralogic, 2012a).

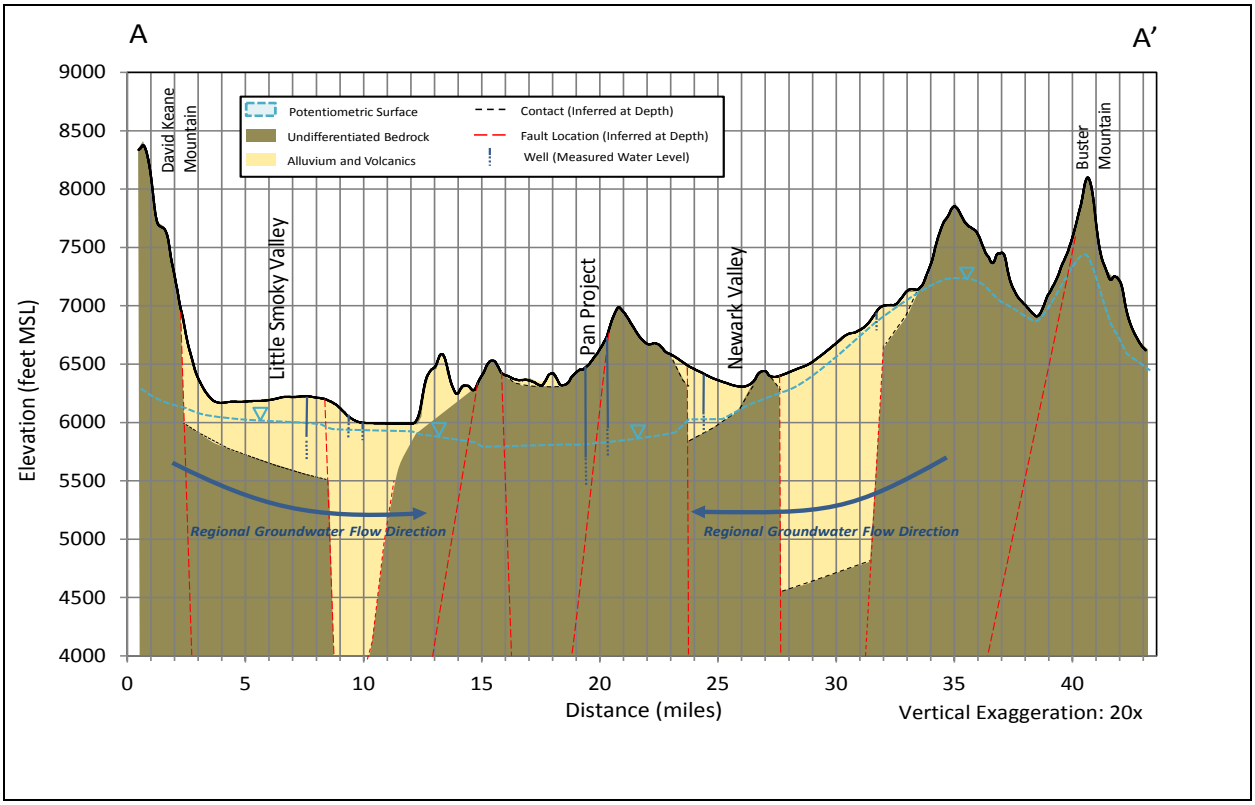
Figure 3.2-2 shows the location of cross-section A-A', which is shown on Figure 3.2-4. Figure 3.2-4 is a conceptual view of the geologic and hydrogeologic structure of an east-west cross-section through the project area based on drill intercepts and interpretation of drill logs (Interralogic, 2012b). Figure 3.2-4 together with Figure 3.2-7 indicates that the majority of wells and associated water rights west of the project area draw from the valley fill alluvial aquifer, which has a higher water level than the bedrock aquifer under the project area.

Figure 3.2-3 Historical Groundwater Elevations in Newark Basin Valley Fill Aquifer Near the Project Area



Source: Interralogic, 2012a

Figure 3.2-4 East-West Geologic and Hydrogeologic Structure

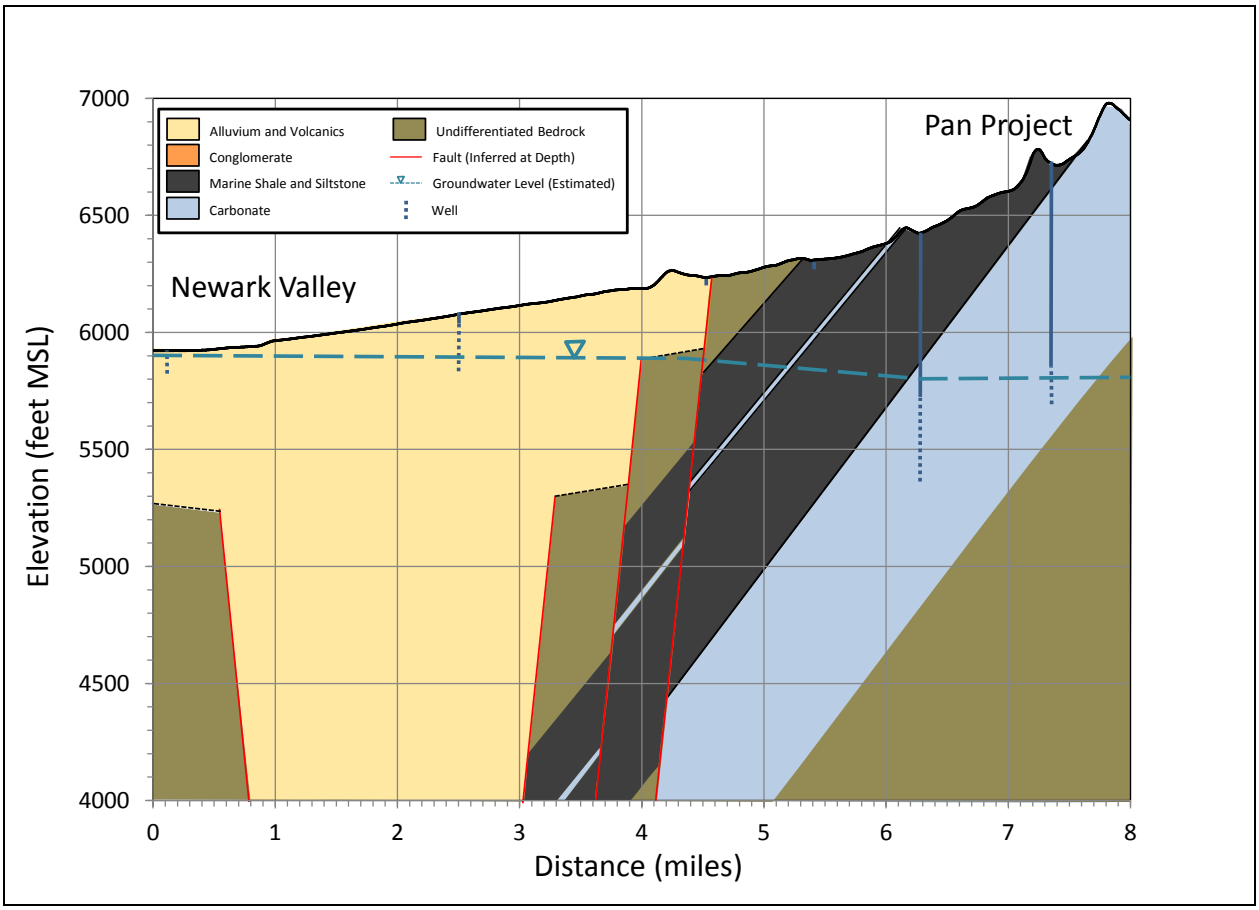


Source: Interralogic, 2012b

Evidence of the limited extent of hydraulic communication between the alluvial and bedrock aquifers is given by the difference in water levels between aquifers, the distance between the aquifers, and the geologic structures and lithology present between the aquifers in the vicinity of the project. This geologic structure is shown on Figure 3.2-5, which is the cross-section B-B' shown on Figure 3.2-2.

Groundwater flow in the Newark Valley basin-fill aquifer is generally from recharge areas along the margins of the valley towards the center of the valley (Welch et al., 2007). Recharge to the basin fill generally occurs either as infiltration or as subsurface flow from the bedrock mountain ranges. In Newark Valley near the project area, a northward component to groundwater flow along the axis of the valley is present with flow toward discharge areas near the Newark Playa (Heilwel and Brooks, 2011).

Figure 3.2-5 Hydrogeologic Cross Section B-B'



Source: Interralogic, 2012a

Groundwater conditions observed in the basin surrounding the project area indicate a hydraulic gradient toward the project area (Figure 3.2-2). Groundwater levels observed in the basin fill aquifer nearest the project area are all above those observed in the carbonate aquifer, with an average difference of 69 feet. This indicates a downward vertical hydraulic gradient from the basin fill aquifer to the carbonate bedrock aquifer beneath the project area; however, low permeability bedrock of the Mississippian Pilot Shale and Chainman Formation, combined with range-front faulting (Figure 3.2-5) likely restricts groundwater flow through these formations. The combined stratigraphic thickness of these units is at least 1,300 feet, with a thickness of over one mile when considering horizontal flow direction between the project area and the valley due to the orientation of the dipping beds (Figure 3.2-5).

Deep Bedrock Carbonate Aquifer

A more extensive carbonate bedrock regional aquifer underlies the perched alluvial aquifer and the basin-fill aquifer. This regional bedrock aquifer is referred to as the BARCAS, and underlies 13 hydrographic areas in east-central Nevada and western Utah. Under the project area groundwater elevation in the BARCAS has ranged from 5,808 to 5,866 feet AMSL, based on data collected from several boreholes in a past Midway condemnation drilling program (Interralogic, 2012a). In the Newark Valley around the project area, the carbonate aquifer

groundwater levels are relatively flat and at elevations between 5,800 and 6,300 feet AMSL; the area has been described as a groundwater saddle with groundwater flowing toward discharge areas to the north and south (Figure 3.2-2) (Interralogic, 2013a). Analysis of both groundwater budgets and potentiometric surfaces of the GBCAAS suggest that groundwater recharge in the southern part of the Newark Valley flows south to discharge into the Railroad Valley (Heilwel and Brooks, 2011).

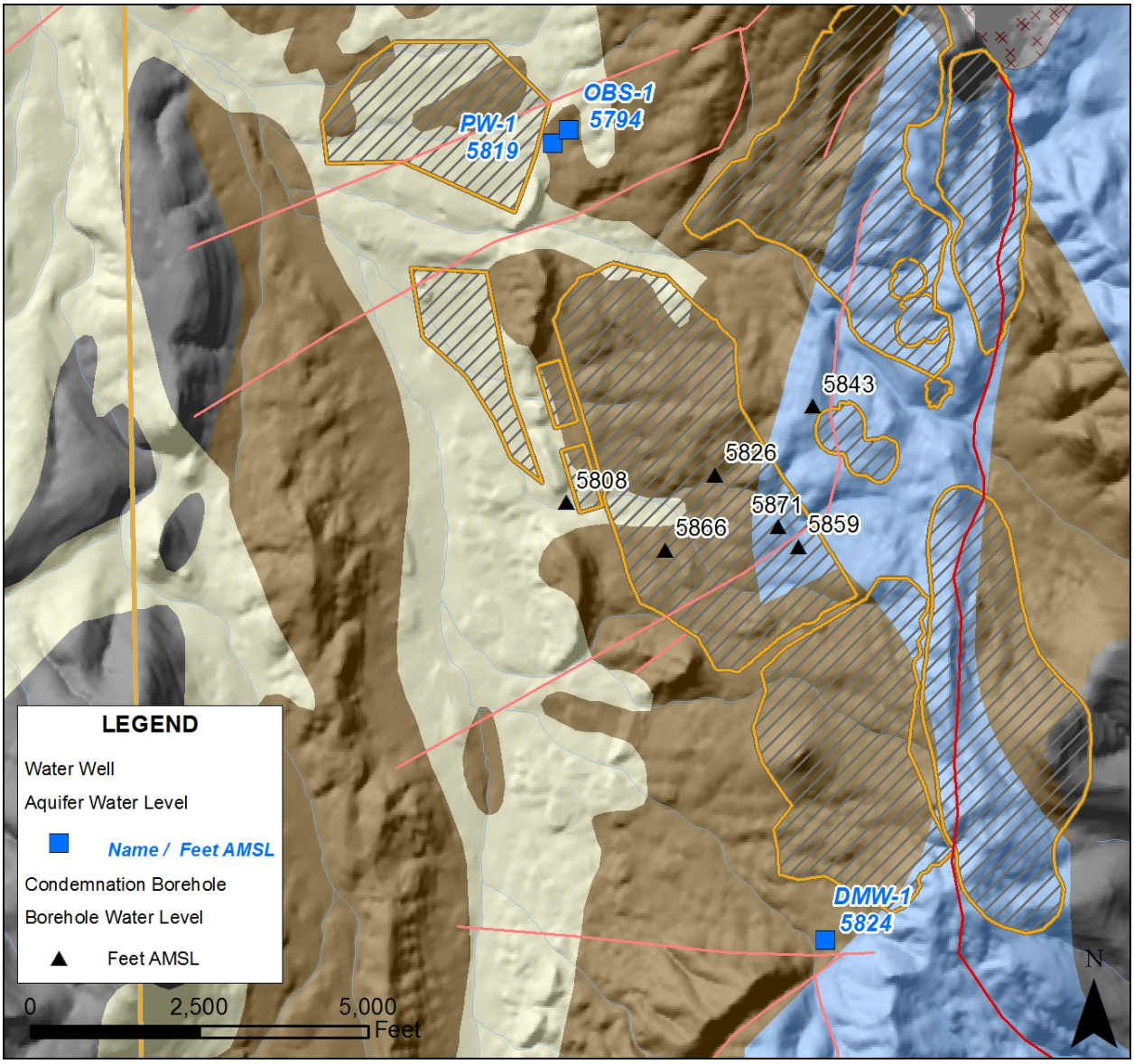
The carbonate aquifer in the project area extends north and south of the project area along the general strike of the carbonate units in the Pancake Range as indicated by the USGS (Heilwel and Brooks, 2011). The carbonate aquifer may be constrained to the east and west by potential flow barriers caused by geologic structures such as faults and low permeability rocks (Figure 3.2-5) (Interralogic, 2012a).

Results of two pump tests completed in September 2012 demonstrate that, at least locally, the carbonate aquifer is highly productive. Groundwater elevations in the carbonate aquifer at the project area showed no consistent gradient across the site (Figure 3.2-6) (Interralogic, 2012a). Site-specific information on the deep carbonate aquifer was generated through the Midway exploration drilling program and the hydrogeologic characterization program. The exploration/condemnation program included advancement of ten deep boreholes where hydrogeologic information was collected. The locations of most of these boreholes are shown on Figure 3.2-6. Three dry boreholes located along the high elevation ridgeline were drilled to over 1,000 feet bgs without encountering water. In the remaining saturated boreholes, static water levels were generally higher than the initial elevation where water was encountered in the borehole, suggestive of confined conditions. Boreholes encountered primarily oxidized lithologic materials over the entire depths, suggesting long-term unsaturated conditions over the borehole depth (Interralogic, 2012a).

A field program was initiated by Interralogic (2012b) in April 2012, with the goals of characterizing hydrogeology in the project area; establishing a groundwater monitoring network; and developing a water supply from the deep carbonate aquifer. Activities included:

- Installation of a deep monitoring well upgradient of the project area (DMW-1);
- Installation of a water supply well and a nearby piezometer (PW-1 & OBS-1, respectively);
- Collection of hydrogeologic information during drilling;
- Measurement of static groundwater levels;
- Testing hydraulic properties of the aquifers; and
- Collection of groundwater samples for laboratory analysis.

Figure 3.2-6 Groundwater Levels in the Deep Carbonate Aquifer at the Project Area



Source: Interralogic, 2012a

Figure 3.2-7 Water Rights Points of Diversion

Three deep bedrock wells were drilled and installed from April 23 to July 6, 2012, to provide baseline groundwater information for the carbonate aquifer as well as a potential water supply for the mine. Summary information for the wells is presented in Table 3.2-2. The difference between water levels in two wells located about 250 feet apart (OBS-1 and PW-1) suggests there is a relatively steep horizontal hydraulic gradient and that lithologic or structural barriers may exist in the aquifer. Observations made during drilling suggest that the aquifer generally has high permeability (Interralogic, 2012a).

Table 3.2-2 Completion Summary for Deep Carbonate Wells

Location	Ground Surface Elevation*	Screen Depth*	Screened Geology	Elevation Water Encountered	Potentiometric Elevation*	Hydraulic Conductivity (feet/day)
DMW-1	6,713.1	1,035-975	limestone	5,726	5,824	21
OBS-1	6,442.9	1,100-950	limestone	5,483	5,794	N/A
PW-1	6,431.9	1,152-851	limestone	5,587	5,819	49

Source: Interralogic, 2012a
*All depths in feet bgs; elevations in feet AMSL

PW-1 is completed as a bedrock water supply well with a casing diameter of 10 inches. OBS-1 is completed as a piezometer with a casing diameter of two inches. At PW-1 and OBS-1, black shale and siltstone of the Pilot Shale were present from below the soil profile to approximately 600 and 500 feet bgs, respectively. Below the Pilot Shale, the Devil's Gate Limestone (i.e., carbonate bedrock aquifer) was encountered. At the PW-1 and OBS-1 locations a significant void was encountered at 760 and 665 feet bgs, respectively. In both boreholes measured water levels were similar to the level of the void, well above the first encounter of groundwater, indicating that the carbonate aquifer is confined. The void was able to take water produced by the formation indicating the void likely controlled the measured water level in the open boreholes. This last observation suggests that water level information from open boreholes at the site, especially where large voids were encountered in the carbonate aquifer, is uncertain and may be of limited use in estimating the stable potentiometric surface of the aquifer. The total depths of PW-1 and OBS-1 boreholes are 1,185 and 1,135 feet bgs, respectively (Interralogic, 2012a).

At DMW-1, black shale and siltstone of the Pilot Shale were present from below the soil profile to 290 feet bgs. Below the Pilot Shale, the Devil's Gate Limestone was encountered. At this location, no voids were encountered in the Devil's Gate Limestone; however, the drillers noted a great deal of fracturing and mineral alteration in some of the geologic samples. Water was encountered at 985 feet bgs and the total well depth was 1,035 feet bgs. Pumping tests of DMW-1 and PW-1 were conducted in September 2012 (Interralogic, 2012a). The test results are summarized here:

- The carbonate aquifer is highly productive demonstrating little drawdown during pumping;
- Hydraulic conductivity averages 35 feet per day; and
- Water level response in OBS-1 suggests that aquifer may be locally and/or partially unconfined.

Water Quality

As described above, project area streams only flow intermittently or ephemerally. Neither public agencies nor private entities routinely sample these types of surface waters, and a records search turned up no water quality data for streams in the project area. Intermittent and ephemeral streams or dry washes in the Great Basin typically convey high sediment loads during periods of runoff from snowmelt and intense rainstorms; this likely applies to all of the project area surface drainages shown on Figure 3.2-1. As streams leave their higher elevation headwaters and flow across the more saline valley flats, they commonly increase in total dissolved solids. However, Nevada's Bureau of Water Quality Planning has not listed any of the streams in the analysis area as being impaired for designated beneficial uses, in either the current approved 2006 303(d) list or the draft 2008/2010 Integrated Report (NDEP, 2012).

Water quality data for the nearby springs mentioned above are lacking. However, Pupacko et al. (1989) reported on water quality for several springs located further north within the same general environmental setting. The data are sparse, but they show that specific conductance ranged from 300 to 600 microsiemens per centimeter (µS/cm) and the dominant ions were generally magnesium and bicarbonate (Pupacko et al., 1989).

Recent site-specific water quality data are available for groundwater, based upon analyses of groundwater obtained from boreholes in the deep carbonate aquifer during the 2011 condemnation drilling program. Interralogic reported that groundwater quality below the project area was good, with a neutral pH and total dissolved solids ranging from 260 to 290 milligrams per liter (mg/L) (Interralogic, 2012a). Interralogic also noted that groundwater was relatively warm at 80 degrees Fahrenheit (°F) and that a few trace metals were at or above the Nevada Profile II reference values (Interralogic, 2012a). These reference value exceedances do not have any regulatory implications for these samples because the samples were not collected as part of a compliance monitoring program associated with a water pollution control permit. The data indicate that antimony, thallium, and iron may be slightly elevated in this area in isolated samples.

More recently, Interralogic installed several monitoring wells throughout the project area (Figure 2.3-11) (Interralogic, 2013a). One of these wells (DMW-1) characterizes the water quality in the deeper carbonate aquifer and four wells (MW-1, MW-2, MW-3, and MW-4) characterize the perched alluvial aquifer. The initial sampling provides baseline groundwater quality data and ongoing monitoring during operations, reclamation, and post-reclamation can be used to detect any impacts to groundwater. Midway sampled DMW-1 and MW-3 in September 2012. Table 3.2-3 shows the analytical results and compares them to the Nevada Profile I results. The Profile I list includes fewer trace elements than the Profile II list and is typically used for groundwater monitoring; however, as mentioned above, these samples are not yet tied to any regulatory permits thus the reference values do not represent compliance limits. NDEP uses the profile lists at its discretion when establishing permit limits for various types of facilities that have the potential to discharge water to groundwater, such as unlined tailings impoundments.

Note that the water quality reported for MW-3 is substantially poorer than that reported for DMW-1. For example, MW-3 had total dissolved solids concentration of 5,500 mg/L versus 280 mg/L for DMW-1. MW-3 also showed exceedances of reference values for arsenic, magnesium, nitrate, selenium, and total dissolved solids. In the DMW-1 sample, only iron exceeded the reference value.

Table 3.2-3 Water Quality in the Shallow Alluvial and Deep Carbonate Aquifers Compared to NDEP Profile I Reference Values

Parameter	Units	Results DMW-1	Results MW-3	Reference Value (mg/L)
pH	S.U.	7.56	7.36	6.5-8.5
Bicarbonate (as $CaCO_3$)	mg/L	230	170	-
Total Alkalinity (as $CaCO_3$)	mg/L	190	140	-
Aluminum	mg/L	<0.045	<0.045	0.2
Antimony	mg/L	<0.0025	<0.0025	0.006
Arsenic	mg/L	<0.0050	0.013	0.010
Barium	mg/L	0.074	0.015	2.0
Beryllium	mg/L	<0.0010	<0.0010	0.004
Cadmium	mg/L	<0.0010	<0.0010	0.005
Calcium	mg/L	37	400	-
Chloride	mg/L	11	110	400
Chromium	mg/L	<0.0050	<0.0050	0.1
Copper	mg/L	<0.050	<0.050	1.0
Fluoride	mg/L	0.53	1.6	4.0
Iron	mg/L	0.98	<0.010	0.6
Lead	mg/L	<0.0025	<0.0025	0.015
Magnesium	mg/L	18	570	150
Manganese	mg/L	0.029	<0.0050	0.10
Mercury	mg/L	<0.00010	<0.00010	0.002
Nickel	mg/L	<0.010	<0.010	0.1
Nitrate+Nitrite, Total (as N)	mg/L	<0.10	22	10
Nitrogen, Total (as N)	mg/L	<1.1	23	10
Potassium	mg/L	6.5	6.1	-
Selenium	mg/L	<0.0050	0.13	0.05
Silver	mg/L	<0.0050	<0.0050	0.1
Sodium	mg/L	33	260	-
Sulfate	mg/L	45	3300	500
Thallium	mg/L	<0.0010	<0.0010	0.002
Total Dissolved Solids	mg/L	280	5500	1000
WAD Cyanide	mg/L	<0.010	<0.010	0.2
Zinc	mg/L	<0.010	<0.010	5.0

Source: Interralogic, 2013a

These differences in water quality reflect the two aquifers. DMW-1 is screened from 975 to 1,035 feet bgs and collects water from the deep carbonate aquifer (Interralogic, 2013a). It is located just south of the proposed south WRDA (Figure 2.3-11). MW-3 is screened from 24.1 to 39.1 feet bgs and collects water from the alluvial aquifer (Interralogic, 2013a). The high total dissolved solids in MW-3 suggest that it is influenced by concentration of evaporite minerals. This local aquifer is upgradient of basin discharge areas where evaporative processes result in evaporite mineral deposits (Interralogic, 2012a). One likely explanation for the high concentrations is that, in low elevation areas, very little precipitation occurs and the recharge rate is close to zero. Under these conditions, weathering residues (i.e., salts) may be formed and reside in the soil until flushed during an extreme precipitation event (Interralogic, 2012a).

Water Use and Water Rights

NDWR regulates water rights in Nevada. They grant permits for use (appropriations) of water rights that allow specific flow rates and volumes of water from groundwater, springs, and streams to be used for specific beneficial uses. NDWR maintains a water rights database and those records were reviewed for information relevant to the Proposed Action. Because there would be no disturbance or water withdrawals in the Railroad Valley Basin or the Little Smoky Basin, those data are not shown in this section. Within the Newark Valley area from T20N to its southern extent, the water rights database contains 115 water rights filings on springs, 10 on streams, and 235 on groundwater (NDWR, 2012) (Figure 3.2-7). Appendix 3A lists these water rights and includes information on their location, source, owner of record, and diversion rate, among other data.

NDWR also provides Hydrographic Area Summaries for individual basins. The summary for the Newark Valley (NDWR, 2012) provides the following information about current water appropriations in the Newark Valley:

- Perennial yield (the amount of water that can be withdrawn from a basin without reducing water storage) for groundwater is 18,000 acre-feet;
- The largest permitted beneficial use of groundwater is 27,473.32 afy for irrigation with mining and milling the second most common use at 1,146.55 afy;
- Of the remaining appropriations in the valley, 253.65 afy are for stock water, 14.45 afy are for industrial use, 11.23 afy are for domestic use, 8.01 afy are for quasi-municipal use, and 2 afy are for wildlife; and
- Appropriations exceed perennial yield by 10,909.21afy.

Appropriated water is not always used, particularly for water appropriated for irrigation. NDWR conducts crop inventories to determine the actual amount of irrigation water that is actually used. The 2011 inventory showed actual usage of water for irrigation at 9,309 acre-feet (NDWR, 2013). Using this number in place of the 27,473.32 acre-feet appropriated for irrigation, but assuming all other appropriations (for other beneficial uses) are used, brings the actual water consumption in the Newark Basin to 10,744.68 acre-feet, which is well below perennial yield for

the basin. Water rights for which the water is actually used are referred to as “wet rights” while water rights which do not get used are referred to as “paper rights”.

Waste Rock Disposal Site Design Alternative

The existing conditions for the Waste Rock Disposal Area Design Alternative are the same as those for the Proposed Action.

Southwest Power Line Alternative

The existing conditions for the Southwest Power Line Alternative are the same as those for the Proposed Action except for the following:

- The Southwest Power Line Alternative includes disturbance areas within the northern portions of Little Smoky Valley drainage and the northern end of Railroad Valley (Figure 3.2-8). Fish Creek in the Little Smoky Valley and Duckwater Creek in the Railroad Valley are the only named streams in the area (USGS, 2012a); and

- The Southwest Power Line Alternative ROW and project area maintenance road was not included in the waters of the United States survey conducted for the Proposed Action; however, a search of the NHD found no crossings of perennial streams.

Surface water features within 400 feet of the Southwest Power Line Alternative analysis area but outside the area of analysis for the Proposed Action are as follows:

- USGS took water quality samples from Fish Creek Springs in 1981 and 2012, which are adjacent to the perennial reach of Fish Creek, upstream of the Southwest Power Line Alternative. Selected results from the two sample years are shown in Table 3.2-4. The results in Table 3.2-3 were selected based on the NDEP Profile I parameters for groundwater at mine sites, which are state water quality standards applied to water quality from mining sources. USGS measured streamflow at the site 13 times between 1987 and 1994; streamflow ranged from 3.60 cubic feet per second (cfs) to 11.7 cfs, with an average of 7.6 cfs.

The Draft 2008/2010 Water Quality Integrated Report [303(d) and 305(b) lists] designated 3.5 miles of Duckwater Creek below the Duckwater Shoshone Reservation (south of the project area) as not assessed. Previous reports had not listed Duckwater Creek (NDEP, 2012).

Groundwater in the two basins that would be in the analytical area for the Southwest Power Line Alternative include the Little Smoky Valley and the Railroad Valley, Northern Part. The following descriptions of groundwater resources in those sub-basins are taken from several sources.

Table 3.2-4 Selected Water Quality Results for Fish Creek Springs from USGS Site Number 391637116021801

Parameter	Units	1981	2012	Reference Value (mg/L)
pH	S.U.	6.7	NA	6.5-8.5
Bicarbonate (as $CaCO_3$)	mg/L	370	NA	-
Hardness (as $CaCO_3$)	mg/L	280	292	-
Aluminum	mg/L	NA	<0.0022	0.2
Arsenic	mg/L	NA	0.0009	0.010
Barium	mg/L	0.090	0.107	2.0
Beryllium	mg/L	<0.001	NA	0.004
Cadmium	mg/L	<0.001	NA	0.005
Calcium	mg/L	65	65.1	-
Chloride	mg/L	8.3	8.58	400
Copper	mg/L	<0.010	NA	1.0
Fluoride	mg/L	0.5	NA	4.0
Iron	mg/L	<0.010	0.0073	0.6
Lead	mg/L	<0.010	NA	0.015
Magnesium	mg/L	28	31.3	150
Manganese	mg/L	<0.001	0.00157	0.10
Potassium	mg/L	7.5	6.81	-
Sodium	mg/L	27	27.2	-
Sulfate	mg/L	31	24.4	500
Total Dissolved Solids	mg/L	374	354	1,000
Zinc	mg/L	0.020	NA	5.0

Source: USGS, 2012b
NA = Not Analyzed

The groundwater in the water balance for the Little Smoky Valley is estimated as follows (Welch et al., 2007):

- Annual groundwater recharge from precipitation is estimated at 4,459 acre-feet;
- Annual groundwater discharge (which does not include anthropogenic use) is estimated at 3,955 acre-feet;
- Regionally, most studies have estimated that the Little Smoky Valley neither gains nor loses water through inter-basin flow of groundwater, although some studies have suggested 1,000 to 1,500 afy flow from the Little Smoky Valley to the Newark Valley; and
- Estimated annual anthropogenic groundwater use is 4,603 acre-feet of which 4,586 acre-feet is for irrigation, seven acre-feet is for stock water, and 10 acre-feet is for domestic use.

Figure 3.2-8 Southwest Power Line Alternative Major Streams

The groundwater water balance for the northern Railroad Valley is estimated as follows (Nichols, 2000):

- Annual groundwater recharge is approximately 61,000 acre-feet;
- Annual groundwater discharge is estimated at 85,000 acre-feet;
- Regionally, it is estimated that 24,000 afy flows into the northern Railroad Valley from Long Valley, Little Smoky Valley, Hot Creek Valley, southern Railroad Valley, and Jakes Valley in varying amounts; and
- NDWR estimates that anthropogenic groundwater use is 26,371 afy of which 24,167 acre-feet is for irrigation, two acre-feet is for commercial use, 71.9 acre-feet is for industrial use, 5.37 acre-feet is for mining and milling, 0.24 acre-feet is for quasi-municipal use, 1,994 acre-feet is for recreation, and 207.6 acre-feet is for stock water (NDWR, 2012).

No points of diversion for water rights are located in the 400-foot analysis area in either the Little Smoky Valley or the Railroad Valley (NDWR, 2008).

No Action Alternative

The existing conditions for the No Action Alternative are the same as for the Proposed Action and include the authorized exploration activities as discussed in Section 2.2.

3.3 Geology and Minerals

Regional Geology

The project area is located within the Basin and Range Physiographic Province, which encompasses the state of Nevada (Eaton, 1979). This province owes its name to the general geologic history common to this part of the country that has given rise to the present-day landscape of alternating generally north-south trending mountains and intervening valleys or basins.

Local Geology

The gold deposits within the project area are located in rolling hills within the core of the Pancake Range, and are hosted in Devonian-Mississippian aged marine limestone and siltstone of the Devil's Gate and Pilot Formations. Four zones of mineralization have been previously identified; these include the North Pan, South Pan, Nana, and Black Stallion zones (MDA, 2005). The two main deposits, North and South Pan, are aligned along the north-south-striking Pan Fault, which is a steeply dipping normal fault. The two smaller zones, Nana and Black Stallion, are located away from the main fault, along large-scale northwest-striking normal faults. All known mineralization is of oxide, non-sulfide bearing type. At this time, the age of mineralization is unknown (Harris, 2009).

The two main zones of mineralization (North and South Pan) are located within the areas designated as North Pan Pit and South Pan Pit, respectively. The geology and mineral resources of these two areas are discussed below.

3.3.1 Area of Analysis

Proposed Action

The direct effects area of analysis occurs within the project area, which includes the associated access road and power line.

Waste Rock Disposal Site Design Alternative

The direct effects area of analysis for the Waste Rock Disposal Area Design Alternative occurs within the project area.

Southwest Power Line Alternative

The direct effects area of analysis for the Southwest Power Line Alternative occurs within the project area and within the 60-foot power line ROW.

No Action Alternative

The direct effects area of analysis for the No Action Alternative occurs within the approved exploration POO boundary.

3.3.2 Data Sources and Methods

Proposed Action

Existing conditions were evaluated through a literature search of reports and other publications, many of which were written as precursors to or in support of this document.

Geological data and information were acquired primarily from geologic maps and reports (Gustavson, 2011; Harris, 2009; MDA, 2005; Hose et al., 1976; and Smith, 1976). Additional data on mining claims, oil and gas leases, and geothermal leases were obtained from BLM's Legacy Rehost 2000 System (LR2000).

Waste Rock Disposal Site Design Alternative

The data sources and methods for the Waste Rock Disposal Area Design Alternative are the same as those for the Proposed Action.

Southwest Power Line Alternative

The data sources and methods used for the Southwest Power Line Alternative are the same as those used for the Proposed Action.

No Action Alternative

The data sources and methods for the No Action Alternative are the same as those for the Proposed Action.

3.3.3 Existing Conditions

Proposed Action

The geology of the project area is shown on Figure 3.3-1 and Figure 3.3-2. The Pan deposit is a tabular, lithologically controlled, disseminated gold mineral deposit that is locally overlain by Tertiary tuffs and flows (Harris, 2009). Individual units are described in the following section and are shown in a stratigraphic column on Figure 3.3-2.

The following describes the lithology (physical characteristics of a rock or stratigraphic unit, including color, composition, and texture) of the project area.

Devonian Simonson Dolomite

The Simonson Dolomite is the oldest unit within the project area. This unit has only been intersected in drill holes and is not exposed on the surface. Thickness is unknown, as only the top portion of the dolomite has been encountered at the proposed South Pan Pit, but ranges from 500 to 1,300 feet thick (Smith, 1976) in White Pine County. The dolomite is a light gray, massively-bedded unit (Harris, 2009).

Late Devonian Devil's Gate Limestone (Guilmette Formation)

The Devil's Gate Limestone and Guilmette Formation names have been used interchangeably along the White Pine County/Eureka County line. For this project, the Devil's Gate name has been retained for consistency with historical references (MDA, 2005). The Devil's Gate Limestone is the oldest rock type exposed at the surface in the northern Pancake Range. The unit typically consists of thick to massive beds of medium to dark gray limestone. Thickness ranges from 1,000 to 2,500 feet, and includes stromatolitic fossil horizons. This unit is the primary host to gold mineralization at South Pan (Harris, 2009).

Late Devonian to Early Mississippian Pilot Shale

The Pilot Shale consists of an upper, very thinly bedded fissile shale and a lower, medium-bedded siltstone. Both units are generally calcareous, with minor to moderate amounts of organic carbon where unaltered. There are infrequent interbeds of silty limestone within the formation. Thickness of the formation ranges from 300 to 900 feet, with structural thickening along the Pan Fault. The Pilot Shale is the dominant host rock for North Pan mineralization zone (Harris, 2009).

Mississippian Joana Limestone

The Joana Limestone overlies the Pilot Shale and is characterized by coarse-grained, medium-gray, limestone beds. The limestone is medium-bedded. The lower Joana can contain calcarenite. Thicknesses in the county range from 90 to 500 feet, although at the project area the unit is typically less than 150 feet thick. None of the project area gold resource is hosted in the Joana Limestone (Harris, 2009).

Mississippian Chainman Shale

The Chainman Shale is composed of dark gray to black thinly bedded fissile shale, with minor interbeds of siltstone. Thickness ranges from 1,000 to 2,000 feet (Smith, 1976); with the lower

range typical in the project area. None of the current gold resource in the project area is hosted in the Chainman Shale; however, the Joana Limestone and lower Chainman Shale are the hosts for gold mineralization at the Easy Junior deposit, located eight miles southeast of the project area (Harris, 2009).

Mississippian Diamond Peak Formation

The Diamond Peak Formation consists of a lower, medium-bedded, coarse-grained, quartz-rich sandstone. This unit is overlain by a thickly bedded to massive conglomerate. The conglomerate is silica cemented, with high iron content. Thickness ranges from 1,000 to 3,700 feet, with the project area thickness around 2,400 feet. There is no known mineralization in this unit (Harris, 2009).

Pennsylvanian Ely Limestone

The Ely Limestone is a medium-bedded, coarse crystalline, medium-gray limestone with interbeds of siltstone and chert. Thickness can range from 1,800 to 3,000 feet, but is typically 2,000 feet in the Pancake Range. There is no known mineralization in this unit (Harris, 2009).

Permian Rib Hill Siltstone

The Rib Hill Siltstone is a thinly bedded, quartz-rich siltstone with sandstone interbeds and calcite cement. Thickness ranges from 800 to 1,400 feet thick. Thickness is unknown in the project area as a full section is not exposed, but based on drilling, is greater than 600 feet. The siltstone is high in iron oxide and carbonate (Harris, 2009).

Permian Kaibab Limestone

The Kaibab Limestone is found in isolated outcrops throughout White Pine County. Thickness ranges from 50 to 200 feet; true thickness within the project area is unknown as only two isolated outcrops of lower Kaibab are present. The unit is a thickly bedded limestone (Harris, 2009).

Cretaceous Intrusive

In the Mount Hamilton area to the east, both the Seligman and Monte Cristo intrusive stocks have been age dated at 90.4 to 128.0 million years. The small intrusive body south of the project area was age dated at 108 million years. Composition ranges from quartz monzonite to granodiorite. A sill of quartz monzonite composition is found intruded along an east-west-strikingfault in the south-central portion of the project area. The mineralization in the White Pine District (Treasure Hill, Monte Cristo) is zoned away from the stocks. Copper, zinc, tungsten, and molybdenite have been discovered in the Monte Cristo stock along fractures and quartz veinlets (Smith, 1976). No known mineralization related to the Pancake stock and related intrusives has been identified (Harris, 2009).

Figure 3.3-1 Proposed Action Geologic Map

Figure 3.3-2 Stratigraphic Column

Tertiary Volcanic Units

Tertiary volcanics exposed in the northern Pancake Range include a lower quartz latite air fall tuff (50-200 feet thick) of the Pancake Summit Tuff (Oligocene) and an upper basalt flow (50-100 feet thick). There are infrequent quartz-rich rhyodacites along the northern portion of the deposit (Harris, 2009).

Quaternary Alluvium

Based on interpretation of satellite imagery, Quaternary alluvium exists in the project area as a number of alluvial fan units of varying age, as well as unconsolidated active wash sediments.

Structural Geology

The project area is dominated by the north-south-striking Pan Fault, which is a high-angle normal fault, with some right-lateral offset component. Based on drill intercepts and interpretation, the fault dips between 80 to 85 degrees east, with at least 3,000 feet of normal displacement. True offset is unknown due to a lack of deep drilling on the east side of the fault to defined marker horizons exposed on the west side (Harris, 2009). Two general cross sections of the site showing the ore bodies are depicted on Figures 3.3-3 and 3.3-4.

On the east side of the fault, Devonian–Permian aged rocks dip steeply east (65-70 degrees) along the Pan Fault, flatten, and roll back along a northwest-trending syncline along the east margin of the project area (Harris, 2009).

The Pan Fault can be tracked north until it becomes covered by Tertiary volcanics at the northern drilled limit of mineralization. To the south, the Pan Fault appears to horsetail into a series of smaller structures. Offset is unknown, as the fault places Devil's Gate against Devil's Gate in this area. A parallel series of faults extend west of the Pan Fault, including the Red Hill Fault and Wash Fault (Harris, 2009).

Several northwest- and northeast-trending structures have been mapped in the project area. These appear to offset mineralization and terminate against the Pan Fault. Normal offset of 50 to 500 feet is noted, especially in the Joana Limestone.

Alteration and Mineralization

<u>Alteration</u>

Alteration consists of silicification, argilization, decalcification, and oxidation. Breccia bodies may be silicified (jasperoid) or argillized and can contain variably altered fragments, including silicified; clay altered, and/or decalcified fragments. The Pilot Shale-Devil's Gate Limestone contact may be argillized and/or decalcified (Gustavson, 2011).

Silicification is generally passive, with zones of moderate to high (jasperoid) flooding along bedding and structures. Silica is dominantly found within the Pilot Shale, with only minor small zones identified in Devil's Gate Limestone. Some quartz veining has been identified at North Pan, especially in association with the Campbell Jasperoid (Harris, 2009).

Clay alteration is generally associated with hydrothermal alteration of minerals and carbonate destruction. Clay along faults and bedding is common in both the Pilot and Devil's Gate (Harris, 2009).

Decalcification of both the Devil's Gate Limestone and calcareous siltstones of the Pilot are common in the mineralization found at Pan. Decalcification results in a sanded, punky texture, especially in the high carbonate units (Harris, 2009).

Oxidation is prevalent throughout the deposit. This has removed the sulphides (pyrite) from the mineralization, resulting in the formation of iron oxides (hematite and limonite). Lisengang banding has formed in association with oxidation and is prevalent in both the Pilot Shale and the Rib Hill Siltstone. The mineralization is strongly oxidized, sulphide minerals are rare, and not associated with the gold mineralization (Harris, 2009).

Mineralization

The project area can be separated into three geographical gold mineralization zones: North Pan, South Pan, and Central Pan. Mineralization is both structurally and stratigraphically controlled, occurring primarily in breccias along the trend of the Pan Fault, within high-angle northwest- and northeast-trending structural zones, and within calcareous shale beds. Collapse breccias in the upper Devil's Gate Limestone and pipe-like breccia bodies that developed within the Devil's Gate Limestone below the collapse breccia zones likely acted as conduits for gold-bearing hydrothermal solution (Gustavson, 2011).

The bulk of the mineralized area contains elevated barite levels, typically above 0.2 percent. Hydrothermal barite veins are present in the southeast portion of the project area in association with the old Cue Ball Barite Mine, briefly worked in the 1970s (Harris, 2009).

Figure 3.3-3 Typical East West Cross Section North

Figure 3.3-4 Typical East West Cross Section South

The mineral resource estimate is summarized in Table 3.3-1. This mineral resource estimate includes all drill data obtained as of September 1, 2011, and was independently developed by a third-party, Gustavson Associates (2011).

Table 3.3-1 Total Pan Mineral Resource

Pan Total Measured Resource			
Cut-Off (ounces per ton)	**Tons**	**Gold (ounces per ton)**	**Ounces**
0.008	30,150,640	0.0173	520,186
0.006	34,013,935	0.0161	546,756
0.004	40,697,193	0.0142	579,238
Pan Total Indicated Resource			
0.008	29,901,186	0.0152	453,351
0.006	35,992,355	0.0138	495,357
0.004	47,529,031	0.0116	550,571
Pan Total Measured Plus Indicated Resource			
0.008	60,051,826	0.0162	973,537
0.006	70,006,270	0.0149	1,042,112
0.004	88,226,224	0.0128	1,129,809
Pan Total Referred Resource			
0.008	1,952,486	0.0170	33,120
0.006	2,457,481	0.0149	36,581
0.004	4,330,080	0.0105	45,261

Source: Gustavson, 2011

Table 3.3-2 shows the estimated amount of mineralized material and waste rock tonnages that would be removed.

Table 3.3-2 Approximate Mineralized Material and Waste Tonnages

Pit	Heap Grade Mineralized Material	Waste Rock	Total
South Pan Pit	35,038	62,152	97,190
North Pan Pit	40,114	60,295	100,409
Black Stallion Pit	2,121	3,137	5,258
South Syncline Pit	257	627	884
Syncline Pit	1,359	838	2,197
North Syncline Pit	286	13	299
Total	**79,175**	**127,062**	**206,237**

Source: Midway, 2012
Amounts are in thousand tons

Geologic Faults and Seismicity

All earthquakes recorded since 1973 that occurred within a 50-mile radius of the project area are shown together with mapped Quaternary faults on Figure 3.3-5 (USGS, 2012c; USGS, 2012d). No major earthquakes (greater than magnitude of 5.0) have been recorded within a 100-mile radius of the project area during that time. Three earthquakes have been recorded since 1973 within the boundaries of the project area. These earthquakes are described in Table 3.3-3.

Table 3.3-3 Historical Earthquakes within Project Area

Year	Latitude	Longitude	Depth (miles)	Magnitude $M_{L(ren)}$
2008	39.31	-155.75	12	3.0
2011	39.27	-115.77	8	3.6
2011	39.30	-115.77	0	4.0

Sources: USGS, 2012c and 2012d

$M_{L(ren)}$ - local magnitude, measured by the University of Nevada Seismological Laboratory

The chance for a 7.0 magnitude earthquake in White Pine County is less than 0.5 percent, a 6.0 magnitude is 1.5 to 2.0 percent, and a 5.0 magnitude is 4.0 to 6.0 percent (Price et al., 2007).

Liquefaction

Liquefaction may occur in fills, swamps, sloughs, bogs, or other areas of loose, unconsolidated, poorly-drained material that have a high water table or are prone to flooding (NBMG, 2012a).

Information on liquefaction is nonexistent in this area because of its remoteness and the lack of information on site specific groundwater conditions. However, because the groundwater table is deep, the liquefaction potential is poor. Monitoring wells are currently being installed in the area, so the potential for liquefaction may better be addressed with the new groundwater information.

Ground Shaking

Ground shaking occurs during earthquakes, and is commonly measured as a percent of the acceleration due to gravity (percent of gravity). According to national seismic hazard maps published by the USGS, the Proposed Action is located within an area where there is a 10 percent chance in the next 50 years that a peak ground acceleration of eight to nine percent of gravity would be exceeded. For the same area, there is a two percent chance in the next 50 years that a peak ground acceleration of 20 to 30 percent of gravity would be exceeded.

Surface Rupture

When an earthquake is strong enough, surface rupture will occur. The Basin and Range Province contains approximately 750 structures that have evidence of Quaternary movement. Fourteen historic earthquakes in the Intermountain Seismic Belt, in the Central Nevada Seismic Belt, and in the Eastern California Seismic Belt have had earthquakes large enough to rupture the ground surface.

Figure 3.3-5 Quaternary Faults and Recent Earthquakes

Within the project area there is a fault zone in the Northern Pancake Range (Pan Fault) that last had a surface rupture approximately 1.8 million years ago (Ma). Adjacent to and surrounding the project area, there are numerous faults and fault zones that have moved at various times during the Quaternary (USGS, 2012e). Table 3.3-4 describes the faults, starting within the project area then, from the north, moving clockwise around the project area. These faults are shown on Figure 3.3-5.

Table 3.3-4 Faults and Fault Zones

Fault/Fault Zone	Age (Yr)	Type	Slip Rate
Unnamed Faults in Northern Pancake Range (Pan Fault)	< 1.8 Ma	Normal	< 0.2
Newark Valley Fault Zone	< 750,000	Normal	< 0.2
Unnamed Fault east of Little Smokey Valley	< 130,000	Normal	< 0.2
Unnamed Fault Zone east of Buck Mountain	< 1.8 Ma	Normal	< 0.2
West Long Valley Fault	< 130,000	Normal	< 0.2
Unnamed Faults northwest of Illipah	< 1.8 Ma	Normal	< 0.2
Unnamed Faults east of Mokomoke Mountains	< 1.8 Ma	Normal	< 0.2
Unnamed Faults east of Pogonip Ridge	< 1.8 Ma	Normal	< 0.2
Unnamed Fault Zone	< 1.8 Ma	Normal	< 0.2
Duck Water Fault	< 130,000	Normal	< 0.2
Unnamed Fault Zone east of Moody Mountains	< 130,000	Normal	< 0.2
Unnamed Fault Zone east of Moody Mountains	< 1.8 Ma	Normal	< 0.2
Eastern Little Smokey Valley Fault	< 130,000	Normal	< 0.2
Rye Patch Fault	< 1.8 Ma	Normal	< 0.2
Fish Creek Range Fault Zone	< 130,000	Normal	< 0.2
Park Range Fault	< 1.8 Ma	Normal	< 0.2
Antelope Range Fault Zone	< 130,000	Normal	< 0.2
Lone Mountain Faults	< 130,000	Normal	< 0.2
Unnamed Faults southwest of Roberts Mountains	< 1.8 Ma	Normal	< 0.2
Western Diamond Mountains Fault Zone	< 130,000	Normal	< 0.2
Western Diamond Mountains Fault Zone	< 1.8 Ma	Normal	< 0.2
Diamond Mountain Fault Zone	< 15,000	Normal	< 0.2
Diamond Valley Fault Zone	< 130,000	Normal	< 0.2

Source: USGS, 2012e

Mineral and Energy Resource Authorizations and/or Leases Occurring in the Project Area

The following lists the resources that could be impacted by the Proposed Action if they occur within or near the project area:

- Mining claims;
- Geothermal resources; and
- Oil and gas leases.

Mining Claims

An LR2000 Mining Claims Geographic Report was used to locate active mining claims in the project area. The following Township, Range, and Sections were searched:

- T17N, R55E Section 23, 24, 25, 26, 27, 34, 35, and 36
- T17N, R56E Section 19, 29, 30, 31, and 32
- T16N, R55E Section 1, 2, 3, 10, 11, 12, 13, and 14
- T16N, R56E Section 5, 6, 7, 8, and 18

Table 3.3-5 identifies the active mining claims that are located within two miles of the project area.

Table 3.3-5 Active Mining Claims

Lead File No.	Case Type	Claimant(s)	Location
NMC 37169	384101	Newark Valley Mining Corp	T17N R55E Sec 25 & 36
NMC 57924	384101	Newark Valley Mining Corp	T17N R55E Sec 36
NMC 61099	384101	Newark Valley Mining Corp	T17N R55E Sec 25
NMC 205565	384101	Newark Valley Mining Corp	T16N R55E Sec 1 T17N R55E Sec 36
NMC 630283	384101	Newark Valley Mining Corp	T17N R55E Sec 23 T17N R55E Sec 24
NMC 815131	384101	Newark Valley Mining Corp	T16N R55E Sec 1 & 2; T17N R55E Sec 24, 25, 26, 35, & 36
NMC 958517	384101	Newark Valley Mining Corp	T16N R55E Sec 1 & 12 T16N R56E Sec 6 & 7 T17N R55E Sec 23, 24, 25, 26, 27, & 36 T17N R56E Sec 19, 30, & 31
NMC 965337	384101	Midway Gold US Inc.	T16N R55E Sec 14
NMC 973511	384101	Midway Gold US Inc.	T16N R55E Sec 14
NMC 977345	384101	Midway Gold US Inc.	T16N R55E Sec 14
NMC 980693	384101	Newark Valley Mining Corp	T16N R55E Sec 1, 2, 3, 10, 11, & 12 T17N R55E Sec 23, 24, 25, 26, 34, & 35
NMC 984556	384101	Midway Gold US Inc.	T16N R55E Sec 10, 11, & 14
NMC 1031802	384101	Newark Valley Mining Corp	T17N R55E Sec 24 & 25 T17N R56E Sec 19 & 29
NMC 1044475	384101	Almaden America Inc.	T16N R56E Sec 8
NMC 1056041	384101	Renaissance Exploration Inc.	T16N R55E Sec 12 & 13 T16N R56E Sec 7 & 18
NMC 1057236	384101	Newark Valley Mining Corp	T16N R55E Sec 1, 2, & 3 T17N R55E Sec 34 & 35
NMC 1074083	384101	RR Exploration LLC	T16N R55E Sec 11, 12, 13, & 14 T16N R56E Sec 5, 6, 7, 8, & 18 T17N R55E Sec 23, & 24 T17N R56E Sec 19, 29, 30, 31, & 32

Source: BLM, 2012b

Geothermal

BLM's LR200 was used to locate any lands nominated for geothermal sale as well as any existing geothermal leases within the project area. The following Township, Range, and Sections were searched:

- T17N, R55E Section 23, 24, 25, 26, 27, 34, 35, and 36
- T17N, R56E Section 19, 29, 30, 31, and 32
- T16N, R55E Section 1, 2, 3, 10, 11, 12, 13, and 14
- T16N, R56E Section 5, 6, 7, 8, and 18

The results of the search were that there were no existing geothermal leases, and no lands identified for the potential of geothermal sale.

Oil and Gas

BLM's LR2000 was used to locate authorized oil and gas leases. The following Township, Range, and Sections were searched:

- T17N, R55E Sections 23, 24, 25, 26, 27, and 34
- T17N, R56E Sections 19, 29, 30, 31, and 32
- T16N, R55E Sections 1, 2, 3, 10, 11, 12, 13, and 14
- T16N, R56E Sections 5, 6, 7, 8, and 18

Table 3.3-6 identifies the authorized oil and gas leases located within two miles of the project area.

Table 3.3-6 Authorized Oil and Gas Leases (Proposed Action)

Serial No.	Location	Section(s)	Total Acres	Case Type
080092	T16N, R55E	1,2,11,12,13	7,565	311121
	T17N, R55E	25,35,36		
086301	T16N, R56E	8,9,16,19,20,21,28	39	315100
	T17N, R56E	28,33		
082638	T16N, R56E	S2 of 4, S2NE of 4, Lot 1 of 4, Lot 2 of 4, W2 of 8, NE of 17, 21	6,081	311121
089049	T16N, R56E	E2 of 19	320	312021
089346	T16N, R56E	E2W2of 19 Lots 1-4 of 19	315.9	311121

Source: BLM, 2012b

Oil and gas resources have been identified in Newark Valley and Long Valley. Two types of oil and gas targets are found in the area: unconformity targets where a structural trap is sealed by volcanics, and upper Paleozoic targets where there is a stratigraphic trap between the Diamond Peak Formation and the Chainman Shale. Oil also occurs in the Pilot Formation at the Yankee Mine and in an oil well located in Long Valley. Potential resources are estimated at 97 million barrels of oil and 59 billion cubic feet of gas (BLM, 2012b).

Waste Rock Disposal Site Design Alternative

The existing conditions for the Waste Rock Disposal Area Design Alternative are the same as those for the Proposed Action.

Southwest Power Line Alternative

The existing conditions for the Southwest Power Line Alternative are the same as those for the Proposed Action with the following exceptions: there is a 12-mile section of the Southwest Power Line Alternative ROW along SR 379 at Fish Creek Road that cuts through Quaternary alluvium (Figure 3.3-6), and this alternative expands the area searched for active mining claims, geothermal leases, and oil and gas leases. The following Township, Range, and Section numbers were added to those already searched for the Proposed Action:

- T15N, R54E, Sections 1, 2, and 3
- T15N, R55E, Section 6
- T16N, R53E, Sections 1, 12, and 13
- T16N, R54E, Sections 6, 18, 19, 20, 28, 29, 33, and 34
- T16N, R55E, Sections 23, 26, 27, 28, 29, 30, 31, 32, 34, and 35
- T17N, R54E, Sections 2, 3, 4, 5, 8, 17, 19, 20, 30, and 31

There are no existing mine claims or geothermal leases or lands nominated for sale along the ROW for the Southwest Power Line Alternative. Table 3.3-7 identifies the authorized oil and gas leases within the sections searched.

Table 3.3-7 Authorized Oil and Gas Leases (Southwest Power Line Alternative)

Serial No.	Location	Section(s)	Total Acres	Case Type
079675	T16N, R55E	30 and 31	800	311121
089037	T16N, R55E	32 and 34	5,093	311121

Source: BLM, 2012b

No Action Alternative

The existing conditions for the No Action Alternative include the authorized exploration activities as discussed in Section 2.2.

Figure 3.3-6 Southwest Power Line Alternative Geologic Map

3.4 Paleontological Resources

Paleontological resources in the project area are the fossilized remains of past life. These remains can include vertebrate animals, invertebrate animals, multi-cellular plants, as well as any imprints made by these organisms. Fossils are considered an important record of ancient life because of their scarcity. They are non-renewable resources and vertebrate, rare invertebrate, and rare plant fossils are therefore considered to be sensitive, particularly vertebrate fossils. Federal requirements for protection of paleontological resources include the 1906 Federal Antiquities Act, Historical Sites Act of 1935, the Federal Land Policy and Management Act of 1976, and BLM Paleontology Resources Management Manual and Handbook H-8270-1 (revised 1998). Unauthorized collection or removal of vertebrate, rare invertebrate, and rare plant fossils from federal land is illegal.

3.4.1 Area of Analysis

Proposed Action

The direct effects area of analysis occurs within the project area, which includes the associated access road and power line.

Waste Rock Disposal Site Design Alternative

The direct effects area of analysis for the Waste Rock Disposal Area Design Alternative occurs within the project area.

Southwest Power Line Alternative

The direct effects area of analysis for the Southwest Power Line Alternative occurs within the project area and within the 60-foot power line ROW.

No Action Alternative

The direct effects area of analysis for the No Action Alternative occurs within the project area.

3.4.2 Data Sources and Methods

Proposed Action

Paleontological resources were investigated through literature searches of available reports and publications. Data was collected and reviewed primarily from the Geology and Mineral Resources of White Pine County (Hose et al., 1976) and a report on desert tortoise fossils found in Cathedral Cave in eastern White Pine County (Jass and Bell, 2010).

Waste Rock Disposal Site Design Alternative

The data sources and methods for the Waste Rock Disposal Area Design Alternative are the same as those for the Proposed Action.

Southwest Power Line Alternative

The data sources and methods used for the Southwest Power Line Alternative are the same as those used for the Proposed Action.

No Action Alternative

The data sources and methods for the No Action Alternative are the same as those for the Proposed Action.

3.4.3 Existing Conditions

Proposed Action

There are geologic formations in and surrounding the project area that are known to or have the potential to contain fossils. Formations identified in the project area include (from oldest to youngest):

Devonian Simonson Dolomite

The second youngest of four members in this unit is a brown cliff member about 50 feet thick and consists of finely crystalline dark- to medium-gray dolomite that weathers to olive gray to pale yellow brown. It contains abundant invertebrate fossils, and, because of the color contrast, the fossils stand out (Hose et al., 1976).

Late Devonian Devil's Gate Limestone (Guilmette Formation)

Much of the Devil's Gate Limestone formation, especially the upper portion, contains biostromes, which are coral stromatoporoids. These are very abundant in certain zones (Hose et al., 1976).

Late Devonian to Early Mississippian Pilot Shale

No known fossils occur in this formation.

Mississippian Joana Limestone

The Joana formation contains echinoderms, bryozoans, foraminifers, possibly algae, and indurated calcareous mud.

In the Pancake Range, the Joana formation also includes beds that are older and thicker than found anywhere else. The upper 150 feet contain beds of crinoidal limestone, large pebbles of chert and limestone, and large crinoidal columns (Hose et al., 1976).

Mississippian Chainman Shale

No known fossils occur in this formation.

Mississippian Diamond Peak Formation

No known fossils occur in this formation.

Pennsylvanian Ely Limestone

The Ely Limestone alternates between limestone ledges or cliffs and gentle slopes. The ledges are medium gray and weather to the same color or to an olive gray. The limestones are entirely organic detrital material composed of marine plants and invertebrate animals that secreted calcium carbonate. The platy limestone contains abundant nodules, concretions, lenses, and

bands of chert, and many brachiopods. One easily identifiable fossil in the middle of the Ely Limestone is the hair coral (*Chaetetes*).

Permian Rib Hill Siltstone
This formation consists mainly of very fine-grained to medium-grained yellowish-gray calcareous sandstone that usually forms gentle slopes. However, there are some thin interbedded light gray dolomite and silty to sandy limestone beds that can form narrow ledges. Some of these limestone beds contain fusulinids and other corals.

Permian Kaibab Limestone
No known fossils occur in this formation.

Cretaceous Intrusive
No known fossils occur in this formation.

Tertiary Volcanic Units
No known fossils occur in this formation.

Quaternary Alluvium
Based on satellite image interpretation, this unit consists of unconsolidated alluvial fan sediments of varying age and active wash sediments. It is unlikely that this unit would support the formation or preservation of fossils.

Five geologic units within the project area are known to or have the potential to contain invertebrate fossils, the Simonson Dolomite, the Devil's Gate Limestone, the Joana Limestone, the Ely Limestone, and the Rib Hill Siltstone. No vertebrate fossils are known to occur in any of these formations and no fossils have been found within these units that are classified as rare or important.

Waste Rock Disposal Site Design Alternative
The existing conditions for the Waste Rock Disposal Area Design Alternative are the same as those for the Proposed.

Southwest Power Line Alternative
The existing conditions for the Southwest Power Line Alternative are the same as those for the Proposed Action except for a 12-mile section of the Southwest Power Line alternative, located along SR 379 at Fish Creek Road, is located within Eureka County. This power line ROW goes through additional Quaternary alluvium.

No Action Alternative
The existing conditions for the No Action Alternative include the authorized exploration activities as discussed in Section 2.2.

3.5 Soils

3.5.1 Area of Analysis

Proposed Action

The direct effects area of analysis occurs within the project area, which includes the associated access road and power line.

Waste Rock Disposal Site Design Alternative

The direct effects area of analysis for the Waste Rock Disposal Site Design Alternative occurs within the project area.

Southwest Power Line Alternative

The direct effects area of analysis for the Southwest Power Line Alternative occurs within the project area and within the 60-foot power line ROW.

No Action Alternative

The direct effects area of analysis for the No Action Alternative occurs within the approved exploration POO boundary.

3.5.2 Data Sources and Methods

Proposed Action

Available data from the Natural Resources Conservation Service (NRCS) and other scientific or governmental sources were utilized to obtain information for this section. Descriptive and interpretive data for third-order soil associations were derived from the *Soil Survey of Western White Pine County, Nevada* (NRCS, 1998). Descriptive and interpretive data for second-order soil associations were derived from *Soil Survey - Pan Project White Pine County, Nevada* (Tetra Tech, 2011) and the *Addendum Soil Survey - Pan Project White Pine County, Nevada* (Tetra Tech, 2012a).

Existing conditions were evaluated through a combination of literature research and field reports compiled specifically for this project as mentioned above. Analysis of existing conditions focused on acreage of soil disturbance, acres to be reclaimed, and suitability of potentially disturbed soils for reclamation purposes.

Waste Rock Disposal Site Design Alternative

The data sources and methods used for the Waste Rock Disposal Site Design Alternative are the same as those used for the Proposed Action.

Southwest Power Line Alternative

The data sources and methods used for the Southwest Power Line Alternative are the same as those used for the Proposed Action except a second-order soil survey was not conducted along the power line ROW.

No Action Alternative

The data sources and methods used for the No Action Alternative are the same as those used for the Proposed Action except a second-order soil survey was not conducted along the power line ROW.

3.5.3 Existing Conditions

Proposed Action

Third-Order Soil Map Unit Descriptions

Third-order soil surveys are performed at an extensive level by observation and interpretation of remote sensing data. The project area covers 22 third-order NRCS soil map units (Figure 3.5-1; Table 3.5-1). Of the 22 soil map units identified within the project area, 11 soils are found within the fenced portion of the project area (Figure 3.5-1). The third-order soil map units located within the project area are shown in bold font in Table 3.5-1.

Table 3.5-1 Summary of Third-Order Soil Units in the Project Area

Map Unit Number	Map Unit Name
104	**Pookaloo–Zimbob–Hyzen association**
111	**Zimbob–Hyzen–Rock Outcrop association**
113	**Zimbob–Pookaloo association**
181	Pyrat–Cowgil–Broyles association
201	**Hyzen–Pookaloo–Tecomar association**
270	**Atlow–Maderbak–Rubble land association**
271	Atlow association
275	**Atlow–Upatad association**
282	Palinor very gravelly loam, two to 15 percent slopes
287	Palinor–Wintermute association
296	**Palinor–Urmafot–Palinor, steep association**
326	Palinor–Urmafot–Roden association
351	**Heist–Tulase association**
480	Pioche–Cropper association
481	Pioche–Segura–Cropper association
632	**Roden–Haarvar association, steep**
633	**Roden–Izar association**
660	Stewval–Rock outcrop complex
751	Uptada–Pookaloo association
800	**Broland association**
1245	Biken–Tulase association
1340	Pyrat–Tulase association

Source: NRCS, 1998

Note: Bold face denotes soils within the fenced area.

The majority of soil resources in the project area are classified as moderately deep and moderately well drained soils. Soil textures are generally loamy with a high percentage of coarse fragments. Slope steepness range from 2 to 75 percent. Soil depths in the project area range from rock outcrop areas with no measurable soil to profiles greater than five feet thick. Deeper portions of the soil profile generally contain a high percentage of coarse fragments, with the high average ranging from 35 to 65 percent pebbles and cobbles (NRCS, 1998).

Second Order Soil Map Unit Descriptions

Second-order soil surveys are performed at an intensive level by using remote sensing data and verifying soil boundaries through field observations at closely spaced intervals. Second-order soil surveys obtain detailed information about the soil resources in order to make predictions of suitability for use and of treatment needs. The second-order baseline soil survey, was conducted in 2011 and 2012 and encompassed approximately 2,652 acres, which includes portions of Sections 23-27 and 34-36, T17N, R55E; and Sections 1 and 2, T16N, R55E (Tetra Tech, 2012a). The second-order soil survey focused on areas of proposed disturbance. Due to a determination that material within Borrow Area 3 would not be suitable for project uses, the area was not inventoried during the second-order soil survey (Tetra Tech, 2012a).

The objectives of the second-order surveys were to:

- Identify, describe and map dominant soil types;
- Characterize physiochemical properties of soils within the proposed disturbance;
- Evaluate the quantity of suitable soils within the survey area to assist Midway in the selection of salvageable growth medium for use in reclamation of mine-related disturbances;
- Preliminarily evaluate soils for potential use as low-permeability barrier material;
- Provide alternatives for selective handling and conditioning of available soil material to improve their suitability as plant growth medium; and
- Provide baseline soil information to assist with project development.

Twenty-three second-order soil units were identified in the project area (Figure 3.5-2). Descriptions of the soil map units delineated are shown in Table 3.5-2.

Figure 3.5-1 NRCS Soil Map Units Proposed Action

Figure 3.5-2 Proposed Action Second Order Soil Map Units

Table 3.5-2 Pan Project Second-Order Soil Survey Map Unit Descriptions and Physical Parameters

Map Unit ID #	Map Unit	Map Unit Component	% of Map Unit[1]	Landform	Depth to Bedrock (inches)	Parent Material	Drainage[2]	Bulk Density (g/cm^3)	AWHC[3] (in/in)	Perm Class[4]	Hydro Soil Group[4]	Surface Runoff Class[5]	WEG[6]	SEH[7]	Root Restriction Depth[8]	Soil Depth Class[8]
1A	Veet Variant, channery sandy loam, 0-6 percent slopes	Veet Variant	80%	Drainage valleys and alluvial terrace	>60	Alluvium derived from the Pilot Shale (dolomitic and calcareous siltstone and interbedded silty shale), limestone and some volcanics	E-W	1.54	0.07-0.16	2-3	A-B	L	3	L-H	D	VD
		Inclusion of soils with less coarse fragments	15%					1.54	0.09-0.02	2-3	A-B	L	3	L	D	VD
		Inclusions of Wrango Variant	5%					1.50	0.04-0.11	2	A	L	2	L	D	D
1B	Veet Variant, gravelly sandy loam, 5-15 percent slopes	Veet Variant	95%	Alluvial fans	>60	Alluvium derived from the Diamond Peak Formation	E-W	1.54	0.08-0.19	2-3	A-B	L	3	L-H	D	VD
		Inclusions of Wrango Variant	5%					1.54	0.04-0.11	2	A	L	2	L	D	D
2A	Izar Variant - Penelas Variant Complex, 0-15 percent slopes	Izar Variant	55%	Nearly level and strongly sloping sideslopes, ridges and summits	<20	Colluvium and residuum derived from the Pilot Shale (dolomitic and calcareous siltstone and interbedded silty shale)	W	1.42	0.07-0.20	3-4	B-C	M-H	3-4L	L	S	S
		Penelas Variant	20%					1.40	0.14-0.20	3-4	B-C	M-H	4L	L	S	S
		Inclusion of soils with less coarse fragments	25%					1.40	0.09-0.19	3-4	B-C	M-H	3-4L	L	S	S
2B	Izar Variant - Penelas Variant Complex 15-40 percent slopes	Izar Variant	55%	Strongly sloping and steep sideslopes and ridges	<20	Colluvium and residuum derived from the Pilot Shale	W	1.42	0.07-0.20	3-4	B-C	H-VH	3-4L	L	S	S
		Penelas Variant	20%					1.40	0.14-0.20	3-4	B-C	H-VH	4L	L	S	S
		Inclusion of soils with less coarse fragments	25%					1.40	0.09-0.19	3-4	B-C	H-VH	3-4L	L	S	S
2C	Izar Variant - Penelas Variant Complex 40-60 percent slopes	Izar Variant	55%	Very steep sideslopes	<20	Colluvium and residuum derived from the Pilot Shale and Diamond Peak Formation	W	1.42	0.07-0.20	3-4	B-C	H-VH	3-4L	L	S	S
		Penelas Variant	20%					1.40	0.14-0.20	3-4	B-C	H-VH	4L	L	S	S
		Inclusion of soils with less coarse fragments	25%					1.40	0.09-0.19	3-4	B-C	H-VH	3-4L	L	S	S
3B	Izar Variant - Rock Outcrop Complex, 15-40 percent slopes	Izar Variant	60%	Strongly sloping and steep sideslopes and ridges	<20	Colluvium and residuum derived from the Pilot Shale	W	1.42	0.07-0.20	3-4	B-C	H-VH	3-4L	L	S	S
		Rock outcrop	20%					NA	NA	NA	NA	VH	8	L	NA	NA
		Inclusion of soils with less coarse fragments	20%					1.40	0.09-0.19	3-4	B-C	H-VH	3-4L	L	S	S
3C	Izar Variant - Rock Outcrop Complex, 40-75 percent slopes	Izar Variant	60%	Very steep sideslopes	<20	Colluvium and residuum derived from the Pilot Shale	W	1.42	0.07-0.20	3-4	B-C	H-VH	3-4L	L	S	S
		Rock outcrop	20%					NA	NA	NA	NA	VH	8	L	NA	NA
		Inclusion of soils with less coarse fragments	20%					1.40	0.09-0.19	3-4	B-C	H-VH	3-4L	L	S	S
4A	Minat Variant - Cowgil Variant Complex, 0-20 percent slopes	Minat Variant	60%	Saddle and broad ridgetop	20-40	Colluvium and residuum derived from altered Pilot Shale (dolomitic and calcareous siltstone and interbedded silty shale)	W	1.42	0.08-0.15	3-4	B-C	M-H	3-4L	L	MD	MD
		Cowgil Variant	25%					1.40	0.10-0.16	3-4	B-C	M-H	3-4L	L	MD	MD
		Inclusion of soils with less coarse fragments	10%					1.40	0.09-0.20	3-4	B-C	M-H	3-4L	†		
		Inclusions of Izar Variant	5%					1.42	0.07-0.14	3-4	B-C	M-H	3-4L	L	S	S
4B	Minat Variant - Cowgil Variant Complex,20-40 percent slopes	Minat Variant	60%	Moderately steep and steep mid-slopes, toeslopes and saddles	20-40	Colluvium and residuum derived from altered Pilot Shale the Diamond Peak Formation	W	1.42	0.08-0.15	3-4	B-C	H-VH	3-4L	L	MD	MD
		Cowgil Variant	25%					1.40	0.10-0.16	3-4	B-C	H-VH	3-4L	L	MD	MD
		Inclusion of soils with less coarse fragments	10%					1.40	0.09-0.20	3-4	B-C	H-VH	3-4L	†		
		Inclusions of Izar Variant	5%					1.42	0.07-0.14	3-4	B-C	H-VH	3-4L	L	S	S

Map Unit ID #	Map Unit	Map Unit Component	% of Map Unit[1]	Landform	Depth to Bedrock (inches)	Parent Material	Drainage[2]	Bulk Density (g/cm^3)	AWHC[3] (in/in)	Perm Class[4]	Hydro Soil Group[4]	Surface Runoff Class[5]	WEG[6]	SEH[7]	Root Restriction Depth[8]	Soil Depth Class[8]
5A	Izod Variant - Lithic Xeric Haplocambids Complex, 0-20 percent slopes	Izod Variant	30%	Nearly level and moderately steep sideslopes and ridgetops	<20	Colluvium and residuum derived predominately from the Devil's Gate Limestone and also from the Joana Limestone	W	1.40	0.12-0.16	3-4	B-C	M-H	3-4L	L	S	S
		Lithic Xeric Haplocambids	30%					1.40	0.09-0.20	3-4	B-C	M-H	3-4L	L	S	S
		Inclusion of shallow soils with less coarse fragments	25%					1.40	0.15-0.18	3-4	B-C	M-H	4L	L		
		Inclusions of moderately deep, fine-loamy soils	10%					1.40	0.15-0.18	3-4	B-C	M-H	3-4L	L	MD	MD
		Inclusions of mod deep soils with calcic horizon	5%					1.40	0.14 - 0.17	3	B	M-H	3-4L	†	MD	MD
5B	Izod Variant - Lithic Xeric HaplocambidsComplex, 20-40 percent slopes	Izod Variant	30%	Moderately steep and steep sideslopes and ridgetops	<20	Colluvium and residuum derived predominately from the Devil's Gate Limestone and also from the Joana Limestone	W	1.40	0.12-0.16	3-4	B-C	H-VH	3-4L	L	S	S
		Lithic Xeric Haplocambids	30%					1.40	0.09-0.20	3-4	B-C	H-VH	3-4L	L	S	S
		Inclusion of shallow soils with less coarse fragments	25%					1.40	0.15-0.18	3-4	B-C	H-VH	4L	L		
		Inclusions of moderately deep, fine-loamy soils	10%					1.40	0.15-0.18	3-4	B-C	H-VH	3-4L	L	MD	MD
		Inclusions of mod deep soils with calcic horizon	5%					1.40	0.14 - 0.17	3	B	H-VH	3-4L	†	MD	MD
5C	Izod Variant - Lithic Xeric Haplocambids Complex, 40-60 percent slopes	Izod Variant	35%	Very steep sideslopes	<20	Colluvium and residuum derived predominately from the Devil's Gate Limestone and also from the Joana Limestone	W	1.40	0.12-0.16	3-4	B-C	H-VH	3-4L	L	S	S
		Lithic Xeric Haplocambids	30%					1.40	0.09-0.20	3-4	B-C	H-VH	3-4L	L	S	S
		Inclusion of shallow soils with less coarse fragments	25%					1.40	0.15-0.18	3-4	B-C	H-VH	4L	L		
		Inclusions of moderately deep, fine-loamy soils	10%					1.40	0.15-0.18	3-4	B-C	H-VH	3-4L	L	MD	MD
6B	Izod Variant - Rock Outcrop Complex, 15-40 percent slopes	Izod Variant	65%	East facing, moderately steep and steep sideslope	<10	Colluvium and residuum derived from Devil's Gate Limestone	W	1.40	0.12-0.16	3-4	B-C	H-VH	3-4L	L	S	S
		Rock outcrop	20%					NA	NA	NA	NA	VH	8	L	NA	NA
		Inclusions of soils with less coarse fragments	15%					1.40	0.15-0.18	3-4	B-C	H-VH	3-4L	L	S	S
6C	Izod Variant - Rock Outcrop Complex, 40-60 percent slopes	Izod Variant	65%	Very steep west facing sideslope	<10	Colluvium and residuum derived from Devil's Gate Limestone	W	1.40	0.12-0.16	3-4	B-C	H-VH	3-4L	L	S	S
		Rock outcrop	20%					NA	NA	NA	NA	VH	8	L	NA	NA
		Inclusions of soils with less coarse fragments	15%					1.40	0.15-0.18	3-4	B-C	H-VH	3-4L	L	S	S
7B	Abgese Variant, very cobbly loam, 15-40 percent slopes	Abgese Variant	90%	Moderately steep and steep sideslopes and topslopes	20-40	Colluvium derived from basalt	W	1.40	0.10-0.20	3-4	B-C	H-VH	3-6	L	MD	MD
		Shallow soils on summits and ridgetops	10%					1.40	0.07-0.20	3-4	B-C	H-VH	3-4L	†	S	S
7C	Abgese Variant, very cobbly loam, 40-60 percent slopes	Abgese Variant	90%	Very steep sideslopes	20-40	Colluvium derived from basalt	W	1.40	0.10-0.20	3-4	B-C	H-VH	3-6	L	MD	MD
		Shallow soils on summits and ridgetops	10%					1.40	0.07-0.20	3-4	B-C	H-VH	3-4L	†	S	S
8D	Basalt Outcrop & Talus, 40-90 percent slopes	Rock outcrop and talus	100%	Cliffs and very steep sideslopes	NA	Basalt	NA	NA	NA	NA	NA	VH	8	L	NA	NA
10A	Heist Variant, sandy loam, 0-6 percent slopes	Veet Variant	95%	Drainage valleys and alluvial fans	>60	Alluvium derived from the Pilot Shale, limestone, and some volcanics	W	1.54	0.08-0.19	2	A	L	3	L-H	D	VD
		Inclusions of Wrango Variant	5%					1.54	0.04-0.11	2	A	L	2	L	D	D
11A	Atlanta Variant, loam, 0-6 percent slopes	Izar Variant	55%	Alluvial fans	>60	Alluvium derived from the Pilot Shale, limestone, and some volcanics	W	1.42	0.07-0.20	2	A	H-VH	3-4L	L	S	VD
		Penelas Variant	20%					1.40	0.14-0.20	3-4	B-C	H-VH	4L	L	S	S
		Inclusion of soils with less coarse fragments	25%					1.40	0.09-0.19	3-4	B-C	H-VH	3-4L	L	S	S

Map Unit ID #	Map Unit	Map Unit Component	% of Map Unit[1]	Landform	Depth to Bedrock (inches)	Parent Material	Drainage[2]	Bulk Density (g/cm^3)	AWHC[3] (in/in)	Perm Class[4]	Hydro Soil Group[4]	Surface Runoff Class[5]	WEG[6]	SEH[7]	Root Restriction Depth[8]	Soil Depth Class[8]
12A	Heist Variant, sandy loam, 0-6 percent slopes	Izar Variant	55%	Upper drainage valleys and alluvial fans	20-40	Alluvium derived from the Pilot Shale, limestone, and some volcanics	W	1.42	0.07-0.20	2	A	H-VH	3-4L	L	S	MD
		Penelas Variant	20%					1.40	0.14-0.20	3-4	B-C	H-VH	4L	L	S	S
		Inclusion of soils with less coarse fragments	25%					1.40	0.09-0.19	3-4	B-C	H-VH	3-4L	L	S	S
20B	Izar Variant, channery clay loam, 2-30 percent slopes	Izar Variant	85%	Gently sloping to steep narrow ridges	<10	Alluvium derived from the Pilot Shale, limestone, and some volcanics	W	1.42	0.07-0.20	4	C-D	H-VH	3-4L	L	S	VS
		Rock outcrop	15%					NA	NA	NA	NA	VH	8	L	NA	NA
50B	Palinor Variant, gravelly clay loam, 2-20 percent slopes	Izar Variant	60%	Gently sloping to steep narrow ridges	20-40	Alluvium derived from the Devil's Gate limestone	W	1.42	0.07-0.20	3	B-C	H-VH	3-4L	L	S	S
		Rock outcrop	20%					NA	NA	NA	NA	VH	8	L	NA	NA
		Inclusion of soils with less coarse fragments	20%					1.40	0.09-0.19	3-4	B-C	H-VH	3-4L	L	S	S

[1]Percentage of components in map unit.
[2]Drainage: E=excessively drained; W=well drained; MW=moderately well drained; P=poorly drained
[3]AWHC = Available Water Holding Capacity
[4]Permeability Class for Major Textural Class: 6=very slow, 5=slow, 4=slow to moderate, 3=moderate, 2=moderate to rapid. Hydrologic Soil Group: 6=D, 5=C-D, 4=C-D, 3=B, 2=A
[5]Surface Runoff Class: L=low; M=moderate; H=high; VH=very high
[6]Wind Erodibility Group: 1 and 2 extremely severe; 3 and 4 high to moderately erodible; 4L=erodible; 5 and 6 slightly erodible; 7 and 8 very slightly erodible or not subject to erosion
[7]Soil Erosion Hazard: $K_W<0.25$ = Low (L); $0.25<K_W<0.40$ = Moderate (M); $K_W>0.40$ = High (H)
[8]Root Restriction Depth: VS= very shallow (0-10 inches); S=shallow (10-20 inches); MD=moderately deep (20-40 inches); D=deep (40-60 inches); VD=very deep (>60 inches)
†Data not available
K_w = Whole Soil Erodibility Factor (Including coarse fragments); calculated based on Section 618.45, pgs. 618-30 to 618-32, National Soil Survey Handbook. 1993. Soil Conservation Science. Handbook Number 430. U.S. Government Printing Office, Washington, D.C.
NA = Not Available

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Prime Farmland

Prime farmland is classified as available land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops (USDA, 1993). Prime soils have the quality, growing season, and moisture supply needed to produce economical crops, including few or no rocks. No designated prime farmland exists within the project area. However, three soil units in the project area are classified as prime farmland soils. Soil unit 351 (Heist - Tulase association) is considered prime farmland if subject to irrigation. Soil units 1245 and 1340 (Biken - Tulase association and Pyrat - Tulase association, respectively) have one or more components that are considered prime farmland if subject to irrigation.

Growth Medium

An evaluation of the soils in the project area for use in growth medium was conducted. Table 3.5-3 identifies the criteria used to determine suitability of soils for use as growth medium during reclamation.

Table 3.5-3 Criteria Used to Determine Growth Medium Suitability

Property	Topsoil/Growth Medium Suitability				Restrictive Feature
	Good	Fair	Poor	Unsuitable	
Texture	Textures finer than sands and coarser than sandy clay and silty clay, with less than 35% clay	Loamy textures	Sand textures and clayey textures with <60% clay	>60% clay content	Excessive sands or clays
Organic Matter Content	>3%	<3% but greater than1%	0.5 to 1.0%	<0.5%	Low fertility
Coarse Fragments (0-40 inches)	<15% by volume	15-25% by volume	25-35% by volume	>35% by volume	Equipment restrictions and low fertility
Depth to High Water Table	--	--	<1 foot to high water	Perennial wetness	Equipment restrictions
Soil Reaction–pH[1] (0-40 inches)	6.0 to 8.0	5.0 to 6.0 8.0 to 8.5	4.5 to 5.0 8.5 to 9.0	<4.5 or >9.0	Excessive acidity or alkalinity
Slope Steepness	<8% slope	8 to 25% slope	25 to 40%slope	>40% slope	Equipment restrictions

Sources: USDA, 1993 and 2012a
[1]pH in standard units

Typical texture of map units within the project area consists of loamy soils, often with coarse fragment modifiers. Map units in the project area have been identified as having from zero to more than 35 percent surface coarse fragments with some profile layers containing as much as 80 percent coarse fragments (NRCS, 1998). No map units in the project area have been identified as being hydric (NRCS, 1998 and 2012). The soils within the project area are generally neutral to alkaline with pH values ranging from 6.6 to 9.0 (NRCS, 1998). The majority of map units have pH values of 7.8 to 8.4.

The depth of growth medium needed for reclamation is dependent on the characteristics of the material to be covered and the effectiveness of the bond between the base material and the applied growth medium. A six-inch depth of loose topsoil would settle an inch or two; therefore, three to six inches after settling is sufficient with adequate moisture to establish grasses and legumes (NDEP, 1994). Table 3.5-4 shows the volume of material required to obtain various depths of growth medium applied during reclamation activities.

Table 3.5-4 Material Volume for Application of Growth Medium to Various Depths

Desired depth of Growth Medium Application (inches)	Cubic Yards per 1,000 Square Feet Required	Cubic Yards per Acre Required
1	3.1	134.4
2	6.2	268.9
3	9.3	403.3
4	12.4	537.8
5	15.5	672.2
6	18.6	806.7

Source: NDEP, 1994

Rock outcrops are not suitable for recovery and use as growth medium. Based on review of available soil data, most recovered soil material would be classified as fair or poor for use as growth medium during reclamation activities. Mixing of soil map units during salvage operations would dilute excessive coarse fragment content and distribute organic matter throughout the recovered material, resulting in maximum recovery volumes.

Erosion Potential

The overall hazard of erosion for soils was determined by soil surveys conducted within the project area. Soils in the project area primarily belong to wind erodibility groups three and four, indicating that they are moderately to highly susceptible to wind erosion. There is a variant of one soil map unit, Inclusions of the Wrango variant within the Veet Variant, that is extremely susceptible to wind erosion, and several units or unit variants that are slightly to very slightly susceptible to wind erosion (Tetra Tech, 2011; Table 3.5-2). In general, upland areas are more susceptible to erosion than lowland sites, and areas with higher coarse fragment content and lower slope angle have lower potential for water erosion hazard. Areas where herbaceous vegetation is sparse or absent are most susceptible to wind and water erosion as well as to drying and crusting (BLM, 2008b; NRCS, 1998).

Living organisms and their byproducts form biological crusts at the surface of the soil by binding soil particles together with organic materials. The ecological function of these crusts is to stabilize the soil, increase water infiltration, and enhance plant establishment. Biological crusts, although they tolerate harsh growing conditions, are not well adapted to physical disturbances. The potential for soil erosion increases when the crusts are diminished (BLM, 2008b).

General review of soil textures within the project area shows a predominance of silt loam and loamy soils, many with coarse fragment modifiers, indicating a range of moderate to high erosion potential ratings utilizing this method of erosion determination. A high percentage of coarse fragments and/or dense vegetation on the soil surface would further reduce the erosion potential by wind and water.

Waste Rock Disposal Site Design Alternative

The existing soil conditions for the Waste Rock Disposal Site Design Alternative are the same as those for the Proposed Action.

Southwest Power Line Alternative

The existing soil conditions for the Southwest Power Line Alternative are similar to those for the Proposed Action. The Proposed Action project area comprises 22 NRCS third-order soil map units (Figure 3.5-1). Of these, 11 are found within the fenced area.

The Southwest Power Line Alternative comprises 32 NRCS third-order soil map units (Figure 3.5-3). The Southwest Power Line Alternative ROW and the associated project area have eight third-order NRCS soil map units in common, and 24 that are not found in the project area.

Table 3.5-5 summarizes the soil map units found along the Southwest Power Line Alternative ROW. Soil map units in bold are those that are found in both the Proposed Action project area and the Southwest Power Line Alternative ROW.

These soil map units were not tested or analyzed in terms of their physical parameters (farmland potential, growth medium, and erosion potential) because the soils that would be disturbed during the construction of the Southwest Power Line Alternative would not be salvaged, as the disturbances would be due to power pole installation and road construction for overland travel. However, according to the soil descriptions, most of these soil map units have moderate to severe limitations that make them unsuited to cultivation, and restrict their use to mainly grazing, forestland, or wildlife uses.

No Action Alternative

The existing soil conditions for the No Action Alternative are the same as those for the Proposed Action.

Table 3.5-5 Third-order Soil Map Units Associated with the Southwest Power Line Alternative ROW

Soil Map Unit Number	Soil Map Unit Name
100	Pookaloo-Cavehill-Rock outcrop association
101	Wholan-Clowfin association
104	**Pookaloo–Zimbob–Hyzen association**
111	Lien-Hayeston association
111	**Zimbob-Hyzen-Rock outcrop association**
131	Pumper sandy loam, cool
160	Ocala association
190	Broyles silt loam, cool
191	Broyles-Pumper complex
192	Broyles-Ricert association
202	Umil-Hayeston association
203	Umil-Clowfin association
232	Linoyer-Heist-Tulase association
242	Katelana association
271	**Atlow association**
282	**Palinor very gravelly loam**
284	Palinor, very gravelly loam
351	**Heist-Tulase association**
352	Fenster-Jesse Camp association
356	Heist-Wintermute association
373	Automal-Wintermute association
380	Palinor-Parisa association
401	Brinnum-Humboldt association
480	**Pioche-Cropper association**
610	Broyles-Heist-Unsel association
631	Roden-Haarvar association
633	**Roden-Izar association**
902	Abgese-Risley-Roden association
990	Blimo-Kunzler-Pern association
977	**Zimbob-Pookaloo association**
1000	Broyles-Heist-Unsel association
1203	Tulase-Bubus-McConnel association
1245	**Biken-Tulase association**
1340	**Pyrat-Tulase association**

Source: NRCS, 2006a and 2007

Note: Bold face denotes soil map units also found in Proposed Action area.

Figure 3.5-3 Southwest Power Line Alternative NRCS Soil Map Units

3.6 Air Resources

3.6.1 Area of Analysis

Proposed Action

The direct effects area of analysis occurs within a 31-mile (50-kilometer) radius surrounding the project area, which includes the associated access road and power line. This also includes the predicted maximum impact and the region where air dispersion modeling shows a significant contribution to the ambient air quality.

Waste Rock Disposal Site Design Alternative

The direct effects area of analysis for the Waste Rock Disposal Area Design Alternative occurs within the project area.

Southwest Power Line Alternative

The direct effects area of analysis for the Southwest Power Line Alternative occurs within the project area and within the 60-foot power line ROW.

No Action Alternative

The direct effects area of analysis for the No Action Alternative occurs within the approved exploration POO boundary.

3.6.2 Data Sources and Methods

Proposed Action

Local meteorological data consisting of April 1, 2011 through March 31, 2012 from the Eureka Airport weather station combined with upper air and cloud cover data from the Elko National Weather Service Station was utilized in the modeling analysis. Due to the remote location of the project area, background concentrations were determined using the monitor station located in the Great Basin National Park. This monitoring station is far removed from urban development and likely to represent the values seen at the project area. Historical data on the meteorological conditions from the Western Regional Climate Center and from the National Oceanic and Atmospheric Administration were analyzed in the area of analysis.

The regulatory framework for air quality includes both federal and state rules, regulations, and standards promulgated by the EPA and implemented by NDEP Bureau of Air Quality Planning. NDEP Bureau of Air Pollution Control (BAPC) is the governing body that enforces the state and federal rules and regulations.

The federal Clean Air Act (CAA) established the National Ambient Air Quality Standards (NAAQS) for seven criteria pollutants. The criteria pollutants include carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter 10 microns (PM_{10}) or less in diameter, particulate matter 2.5 microns ($PM_{2.5}$) or less in diameter, and sulfur dioxide. Table 3.6-1 lists the NAAQS and the Nevada Standards.

Table 3.6-1 Air Quality Standards

Pollutant		Averaging Time	National Standard	Nevada Standard	Form
Carbon Monoxide		8-hour	9 ppm	9 ppm (<5,000 ft)	Not to be exceeded more than once a year
				6 ppm (>5,000 ft)	
		1-hour	35 ppm	35 ppm	
Lead		Rolling 3 month average	0.15 µg/m^3	1.5 µg/m^3	Not to be exceeded
Nitrogen Dioxide		1-hour	100 ppb	-	98th percentile, averaged over 3 years
		Annual	53 ppb	0.053 ppm	Annual Mean
Ozone		8-hour	0.075 ppm	-	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
		1-hour	Revoked	0.12 ppm	Not to be exceeded more than once per year
				0.10 ppm	Lake Tahoe Basin #90
Particle Pollution	$PM_{2.5}$	Annual	15 µg/m^3	-	Annual mean, averaged over 3 years
		24-hour	35 µg/m^3	-	98th percentile, averaged over 3 years
	PM_{10}	Annual	Revoked	50 µg/m^3	Not to be exceeded more than once per year
		24-hour	150 µg/m^3	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide		1-hour	75 ppb	-	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		3-hour	0.5 ppm	0.5 ppm	Not to be exceeded more than once per year
		24-hour	Revoked	0.14 ppm	Not to be exceeded more than once per year
		Annual	Revoked	0.030 ppm	Not to be exceeded more than once per year
Hydrogen Sulfide		1-hour	-	0.08 ppm	Not to be exceeded more than once per year

µg/m^3 = micrograms per cubic meter of air
ppm = parts per million

Pursuant to the CAA, the EPA has developed classifications for distinct geographical regions known as Air Pollution Control Regions. In Nevada, the Air Pollution Control Regions are based on the boundaries of the local hydrographic basins. Each Air Pollution Control Region has been classified as Attainment, Non-Attainment, or Maintenance for each criteria air pollutant. Regions classified as Attainment are areas in which the pollutant has either not exceeded the NAAQS, or there are no sufficient ambient monitoring data available to classify the region. A Non-Attainment classification represents an area in which the pollutant has exceeded the NAAQS. The Maintenance designation is used when monitored pollutants have been reduced from the Non-Attainment to the Attainment levels.

In addition to the regional classification, the CAA also required EPA to limit the deterioration of specific areas not related to Air Pollution Control Regions. The most restrictive category, Class I, prevents the deterioration of National Parks and Wilderness Areas, which exceed 5,000 acres and were in existence prior to 1977 and areas that have been designated as Class I under federal Prevention of Significant Deterioration (PSD) regulations (40 CFR 52.21). All regions not designated as Class I are designated as Class II areas. No Class III areas have been designated. The project area has not been classified as a PSD area; therefore, there is no monitoring required by the BLM or the NDEP.

Federal PSD regulations limit the maximum allowable increase in Class I, Class II and Class III areas as seen in Table 3.6-2. There are no Class I areas located within 124 miles (200 kilometers) of the project area. The Jarbidge Wilderness Area is located approximately 155 miles (250 kilometers) north of the project area. The Class II limits are triggered in regions that have been designated as Non-Attainment or Maintenance. The closest Non-Attainment/Maintenance area is hydrographic basin 179, located approximately 43 miles (70 kilometers) east of the project area. The project area is within hydrographic basin 159, which is in attainment for all pollutants.

Table 3.6-2 Federal Prevention of Significant Deterioration Limits

Pollutant	Averaging Time	Maximum Allowable Increase ($\mu g/m^3$)		
		Class I Area	Class II Area	Class III Area
$PM_{2.5}$	Annual	1	4	8
	24-hour	2	9	18
PM_{10}	Annual	4	17	34
	24-hour	8	30	60
SO_2	Annual	2	20	40
	24-hour	5	91	182
	3-hour	25	512	700
NO_2	Annual	2.5	25	50

$\mu g/m^3$ = Micrograms Per Cubic Meter of Air

The CAA also enacted the New Source Performance Standards (NSPS) for specific types of equipment located at new or modified stationary sources. NSPS regulations limit emissions from source categories to minimize the deterioration of air quality. Stationary sources are required to meet these limits by installing newer equipment or adding pollution controls to older equipment that reduce emissions below the specified limit. The project area would include equipment that is subject to various NSPS regulations.

The CAA Amendments of 1990 introduced a new facility-wide Federal Operating Permit program. Federal Operating Permits, Title V permits, are required for facilities with the potential to emit more than 100 tons per year of a regulated pollutant, 10 tons per year of any single hazardous air pollutant, or 25 tons per year of any combination of hazardous air pollutants.

Waste Rock Disposal Site Design Alternative

The data sources and methods for the Waste Rock Disposal Area Design Alternative are the same as those for the Proposed Action.

Southwest Power Line Alternative

The data sources and methods for the Southwest Power Line Alternative are the same as those for the Proposed Action.

No Action Alternative

The data sources and methods for the No Action Alternative are the same as those for the Proposed Action.

3.6.3 Existing Conditions

Proposed Action

Local Climatological Air Quality

The project area is located at approximately 6,800 feet AMSL, in the Pancake Range. Terrain west of the project area is channeled by the Diamond Mountains running north and south. The eastern terrain also channels the wind in a north and south pattern with the White Pine Range. Wind speeds are generally more moderate in the daylight hours and lighter in the evening and night time hours. Winds are affected by the terrain and predominately flow from south to north. Wind patterns atop the mountain ranges exhibit a stronger west to east flow pattern. As expected from local topography wind patterns are predominately from the southern direction.

An on-site meteorological tower collected data from April 1, 2011 through March 31, 2012. The data was collected and processed by Air Sciences, Inc. The analysis area includes a four-season environment with cold winters in the project area. The valley locations register warmer mean temperatures than found in the higher elevations. Precipitation and snowfall occurs more in the high elevations and less on the valley floor. Table 3.6-3 summarizes the meteorological conditions found in the vicinity of the project area.

Table 3.6-3 Meteorological Conditions near the Project Area

Monitor	Elevation (feet)	Winter	Spring	Summer	Fall	Annual
Mean Seasonal Temperature Average (°F)						
Eureka	6,550	29.0	43.4	66.2	48.3	46.7
Diamond Valley (USDA)	5,970	26.1	43.8	63.7	45.4	44.8
Diamond Valley Pollard	5,910	24.9	40.7	63.1	44.7	43.4
Ruby Lake	6,010	28.1	44.4	66.0	47.3	46.5
McGill	6,300	28.9	44.5	67.3	48.4	47.3
Duckwater	5,610	29.5	47.1	68.4	49.4	48.6
Fish Creek Ranch	6,050	23.4	41.3	60.7	43.6	42.3
Pan Onsite	6,800	31.0	41.8	66.4	47.9	46.8
Mean Seasonal Precipitation Average (inches)						
Eureka	6,550	1.0	1.4	0.8	0.8	11.8
Diamond Valley (USDA)	5,970	0.7	1.0	0.7	0.7	9.1
Diamond Valley Pollard	5,910	0.6	0.8	1.0	0.7	9.1
Ruby Lake	6,010	1.4	1.3	0.7	1.1	13.1
McGill	6,300	0.6	0.9	0.7	0.7	8.9
Duckwater	5,610	0.4	0.7	0.7	0.6	7.0
Fish Creek Ranch	6,050	0.4	0.6	0.5	0.5	5.6
Pan Onsite	6,800	0.3	0.9	0.5	0.7	7.3
Mean Snowfall Average (inches)						
Eureka	6,550	9.5	6.9	0.2	3.0	58.9
Diamond Valley (USDA)	5,970	0.3	0.1	0.0	0.0	1.4
Diamond Valley Pollard	5,910	4.6	1.4	0.0	0.8	20.1
Ruby Lake	6,010	9.9	4.4	0.0	2.0	48.9
McGill	6,300	4.2	2.3	0.1	0.8	22.1
Duckwater	5,610	4.5	1.8	0.0	1.1	22.0
Fish Creek Ranch	6,050	3.2	1.3	0.0	1.2	17.4
Mean Snow Cover Average (inches)						
Eureka	6,550	2.3	0.3	0.0	0.3	1.0
Diamond Valley (USDA)	5,970	0.0	0.0	0.0	0.0	0.0
Diamond Valley Pollard	5,910	1.0	0.0	0.0	0.0	0.0
Ruby Lake	6,010	2.7	0.3	0.0	0.0	1.0
McGill	6,300	1.0	0.0	0.0	0.0	0.0
Duckwater	5,610	0.3	0.0	0.0	0.0	0.0
Fish Creek Ranch	6,050	1.3	0.0	0.0	0.3	0.0

Source: WRCC, 2012

Regional Air Quality

The direct impact analysis and immediate surrounding areas are currently in attainment or unclassified for all criteria pollutants. Monitoring of criteria pollutants has been discontinued in the area since the late 1990s when the EPA allowed monitoring to cease where pollutants were less than 60 percent of the NAAQS. NDEP has discontinued ambient air monitoring in much of Nevada due to this EPA guidance. The closest ongoing PM_{10} monitoring is located approximately 87 miles (140 kilometers) to the east of the project area at Great Basin National Park. NDEP has compiled the historical data from the discontinued monitoring sites and advises applicants in rural areas of Nevada to use background concentrations from the Great Basin National Park monitoring station. Monitoring data from the Lehman Caves in Great Basin National Park is used to simulate background concentrations for air quality permitting at NDEP-

BAPC. These values are 10.2 µg/m^3 for the 24-hour averaging period and 9.0 µg/m^3 for the annual averaging period. The Great Basin National Park estimated $PM_{2.5}$ background concentrations from the monitored aerosol data from the monitoring station. Annual $PM_{2.5}$ background concentration is a three-year weighted average equal to 2.4 µg/m^3. The 24-hour $PM_{2.5}$ background concentration is a three-year average of the 98th percentile and equal to 7 µg/m^3.

Gaseous pollutants are typically monitored near highly populated urban areas or along highway corridors. The project is located in a rural area where gaseous concentrations are expected to be negligible with respect to the NAAQS. NDEP-BAPC recommends using zero for background concentrations of gaseous pollutants in rural Nevada. Due to the lack of monitoring data available for rural areas and the recommendation by NDEP-BAPC, background concentrations of CO, NO_x, SO_2, and VOC would be assumed as zero for the project area.

Existing Air Pollutant Emission Sources

There are no existing emission sources in the immediate project area. The closest sources of air pollution are found approximately 15.5 miles (25 kilometers) to the northwest of the project area in Eureka, Nevada. Land use in the direct impact analysis area is dominated by mining, ranching, and recreation.

Climate Change

Ongoing scientific research has identified anthropogenic greenhouse gas (GHG) emissions as potential impacts to the global climate. Through complex interactions on a global scale, GHGs lead to a net warming of the atmosphere. GHGs are gasses that trap heat in the atmosphere by decreasing the amount of heat radiated by the earth back into space. Although there are many GHGs, the most notable is carbon dioxide (CO_2). Industrialization and the burning of fossil fuels have increased the levels of CO_2 in the atmosphere. Because CO_2 is the most prevalent GHG, the EPA references all GHG emissions to what they term CO_2e (carbon dioxide equivalent). The Intergovernmental Panel on Climate Change concluded that “Both past and future anthropogenic CO_2 emissions would continue to contribute to warming and sea level rise for more than a millennium, due to the time scales required for removal of this gas from the atmosphere” (IPCC, 2007).

According to the EPA, the global average temperature has risen by 1.4°F over the past century and is expected to raise another 2°F to 11.5°F over the next century (EPA, 2012a). Increasing the GHG emissions to the atmosphere is expected to accelerate this temperature change.

In addition to the overall increase in global average temperature, other changes in the climate have been observed and attributed to climate change. In the Great Basin these include the following:

- Changes in the quantity and timing of precipitation;
- Magnitude and frequency of extreme weather events;

- Earlier average snowmelt and decrease in annual snowpack volume;
- Increase in frequency and severity of drought conditions;
- Changes in the geographic ranges of plant communities and individual species;
- Changes in plant community composition;
- Increased tree mortality due to increased size, frequency and duration of wildfires, and synergistic association between drought stress and insect outbreaks; and
- Increased probability of plant and animal extinctions as ecological niches move or disappear (Loehman, 2010).

Scientists have used such tools as woodrat middens, pollen deposition, tree rings and other climate records to study past climate changes and their effects on vegetation and the biosphere. In addition to effects on the biosphere, scientists have been able to ascertain the time periods over which the changes occurred and how quickly vegetation and animals were able to respond or adapt to the changes (HTNF, 2011).

Observed climate changes in the Great Basin over the past 100 years include the following:

- Region-wide warming of 0.6 to 1.1^{o}F. Minimum temperatures have increased more than maximum temperatures. The probability of very warm years has increased and the probability of very cold years has decreased.
- Annual precipitation has increased from six to 16 percent since the 1950s, but interannual variability in precipitation has also increased. The probability of extreme high precipitation events has increased, which has been reflected in increased streamflow, especially in winter and spring.
- April 1 snowpack volumes have declined.
- Spring snowmelt is 10-15 days earlier than in the mid-1900s, and there has been an increase in interannual variability in spring flow.
- Phenological studies indicate that in much of the west, the average bloom date is earlier for both purple lilac (two days per decade for the period of 1957-1994) and honeysuckle (3.8 days per decade for the period 1968 to 1994) (Chambers, 2008).
- Since 1986 the length of the active wildfire season has increased by 78 days and the average duration of large fires has increased from 7.5 days to 37.1 days (HTNF, 2011).
- Scientists have observed plant communities shifting their range north and to higher elevation to compensate for increasing temperatures; these migrations tend to isolate those communities that move to higher elevations (Loehman, 2010: Finch 2012).

While in some cases climate change tends to mitigate ongoing impacts to vegetation and animals in the Great Basin (i.e., increased CO_2 in the atmosphere promotes vegetative growth),

in most cases it exacerbates impacts from irrigation (i.e., less water available for other uses in the summer and increased evapotranspiration from higher temperatures), overgrazing (i.e., native grasses and forbs further stressed by higher temperatures and lower availability of water during the growing season), and invasive species (Chambers, 2008).

Waste Rock Disposal Site Design Alternative

The existing conditions for the Waste Rock Disposal Site Design Alternative are the same as those for the Proposed Action.

Southwest Power Line Alternative

The existing conditions for the Southwest Power Line Alternative are the same as those for the Proposed Action.

No Action Alternative

The existing conditions for the No Action Alternative are the same as those for the Proposed Action.

3.7 Vegetation, Including Noxious and Non-Native, Invasive Weeds and Special Status Plants

3.7.1 Area of Analysis

Proposed Action

The direct effects area of analysis occurs within the project area, which includes the associated access road and power line.

Waste Rock Disposal Site Design Alternative

The direct effects area of analysis for the Waste Rock Disposal Area Design Alternative occurs within the project area.

Southwest Power Line Alternative

The direct effects area of analysis for the Southwest Power Line Alternative occurs within the project area and within the 60-foot power line ROW.

No Action Alternative

The direct effects area of analysis for the No Action Alternative occurs within the approved exploration POO boundary.

3.7.2 Data Sources and Methods

Proposed Action

Pedestrian surveys of the project area were used for vegetation inventories. These surveys focused on vegetation community types, invasive, non-native species, and focused surveys in areas that presented suitable habitat for special status species.

Waste Rock Disposal Site Design Alternative

The data sources and methods for the Waste Rock Disposal Area Design Alternative are the same as those for the Proposed Action.

Southwest Power Line Alternative

The data sources and methods used for the Southwest Power Line Alternative are the same as those used for the Proposed Action.

No Action Alternative

The data sources and methods for the No Action Alternative are the same as those for the Proposed Action.

3.7.3 Existing Conditions

Proposed Action

Vegetation Communities

Four vegetation community types are present in the project area. Some portions of the Proposed Action area have been disturbed by previous and current exploration activities.

The four main vegetation community types present within the project area include the Sagebrush community, the Intermountain Cold Desert Scrub community, the Lower Montane Woodland community, and the Intermountain Cliff and Canyon community. Reclaimed and unreclaimed disturbance also occurs within the project area. The occurrence of these community types throughout the project area is shown on Figure 3.7-1. Each of these community types are described further in the following sections.

<u>Sagebrush Community</u>

The sagebrush community occupies approximately 54 percent of the project area in elevations ranging from 6,000 to 7,300 feet AMSL. It consists of three ecological systems including Intermountain Basin Big Sagebrush Shrubland, Intermountain Basins Big Sagebrush Steppe, and Great Basin Xeric Mixed Sagebrush Shrubland (EPA, 2012b). It occurs on flats and areas with moderate to shallow slopes containing deeper soils usually adjacent to swales with gravelly, clay loam soils. Species observed in this community type during field surveys include an overstory comprised of basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*), black sagebrush (*Artemisia nova*), broom snakeweed (*Gutierrezia sarothrae*), and rabbitbrush (*Chrysothamnus* ssp.). Dominant understory species include whitestem blazingstar (*Mentzelia albicaulis*), squirreltail (*Elymus elymoides*), cheatgrass (*Bromus tectorum*), Sandberg bluegrass (*Poa secunda*), needle and thread grass (*Stipa comata*), and saltlover (*Halogeton glomeratus*).

<u>Intermountain Cold Desert Scrub</u>

The Intermountain Cold Desert Scrub community occupies approximately six percent of the project area and occurs in elevations ranging from 5,900 to 6,400 feet AMSL. It consists of three ecological systems including Intermountain Basins Mixed Salt Desert Scrub, Intermountain Basins Semi-desert Scrub Steppe, and Intermountain Basin Greasewood Flat (EPA, 2012b). It occurs on flats and areas with shallow slopes in gravelly loam soils. Dominant overstory species

includes shadscale (*Atriplex confertifolia*), hopsage (*Grayia spinosa*), greasewood (*Sarcobatus vermiculatus*), black sagebrush, bud sagebrush (*Picrothamnus desertorum*), winterfat (*Krascheninnikovia lanata*), and broom snakeweed. The understory is composed of grasses and forbs including desert globemallow (*Sphaeralcea ambigua*), Indian ricegrass (*Achnatherum hymenoides*), Sandberg bluegrass, squirreltail, cheatgrass, and saltlover. Intermountain Cold Desert Scrub occurs mostly in the lower elevations of the project area.

Lower Montane Woodland

The Lower Montane Woodland community occupies approximately 35 percent of the project area and occurs on all slope aspects in elevations ranging from 6,500 to 7,300 feet AMSL. It consists of the Great Basin pinyon-juniper woodland ecological system and occurs in shallow, stony loam soils. Dominant canopy species includes singleleaf pinyon (*Pinus monophylla*) and Utah juniper (*Juniperus osteosperma*) with occasional occurrences of curl-leaf mountain mahogany (*Cercocarpus ledifolius*) and snowberry (*Symphoricarpos* ssp.). Scattered areas within the lower montane woodland community, where rock outcrops occur on summits and side slopes, are dominated by curl-leaf mountain mahogany (*Cercocarpus ledifolius*). Understory species include big sagebrush, black sagebrush, low sagebrush (*Artemisia arbuscula*), rabbitbrush, Hood's phlox (*Phlox hoodii*), and desert frasera (*Frasera albomarginata*). Older, same-age pinyon-juniper stands in the southwest portion of the Proposed Action area lack significant understory root-mass and considerable soil erosion is apparent (JBR, 2012b). This community type occurs in the southern and eastern portions of the area.

Intermountain Cliff and Canyon

The Intermountain Cliff and Canyon community occupies approximately three percent of the project area and occurs on ridgelines in elevations ranging from 7,000 to 7,300 feet AMSL. It is commonly devoid of vegetation but would occasionally provide soil in cracks and crevices that contain various grasses and forbs. This community type occurs in the northern portion of the project area.

Other

Both reclaimed and unreclaimed disturbance occupies approximately two percent of the project area. Disturbed areas contain seeded species, crested wheatgrass (*Agropyron cristatum*) and blue flax (*Linum lewisii*), and annual invasive species cheatgrass, saltlover (halogeton), and crossflower (*Chorispora tenella*).

Wildfires

Wildfire management within the project area falls under the Ely District Managed Natural and Prescribed Fire Plan. According to the current plan, there are no allowable burn acres within the project area (BLM, 2000b). No wildfires have occurred or have been documented within the project area in the past 30 years.

Figure 3.7-1 Proposed Action Vegetation and Special Status Plant Species Communities

Noxious and Non-Native, Invasive Weeds

Noxious weeds within Nevada are defined in the Nevada Revised Statures 555.005 as "Any species of plant which is, or is likely to be, detrimental or destructive and difficult to control or eradicate." The University of Nevada Cooperative Extension provides a list of all weeds currently listed as noxious for the State of Nevada (Creech et al., 2010). Invasive, non-native plant species are defined as alien species whose introduction is likely to cause economic or environmental harm to human health (NISC, 2010). Invasive species often displace native species and become dominant, in turn affecting native flora, wildlife, watersheds, fire regimes, and recreation.

A noxious and invasive weed risk assessment was completed for the project area in 2010 (BLM, 2011e). Surveys for noxious weed species were also conducted during baseline surveys in 2010 and 2011 and no noxious weed species were found (JBR 2010, 2012b). There are currently no mapped noxious weed infestations within the project area but the following species are found along roads or drainages leading to the project:

- Russian knapweed (*Acroptilon repens*);
- Spotted knapweed (*Centaurea stoebe*);
- Whitetop/Hoary cress (*Cardaria draba*);
- Musk thistle (*Carduus nutans*); and
- Bull thistle (*Cirsium vulgare*).

Invasive, non-native species such as cheatgrass, curveseed butterwort (*Ceratocephala testiculata*), crossflower, redstem stork's bill (*Erodium cicutarium*), clasping pepperweed (*Lepidium perfoliatum*), and saltlover commonly occur in areas adjacent to roads and other disturbed areas within the project area. Halogeton (saltlover) dominates areas within the Intermountain Cold Desert Scrub community and cheatgrass commonly occurs in the understory of the sagebrush and lower montane woodland communities (JBR, 2010 and 2012b).

Special Status Species

Federally-listed species are those species listed as endangered or threatened by the USFWS, and those species that are candidates for listing or are proposed for listing by the USFWS. The status of threatened and endangered species is determined by the USFWS under the provisions of the Endangered Species Act of 1973, as amended (ESA). Under the ESA, endangered species are defined as being in danger of extinction throughout all or a significant portion of their range. Threatened species are likely to become endangered in the foreseeable future. The USFWS also maintains a listing of species or subspecies (i.e., taxa) that may warrant listing as threatened or endangered, and for which the USFWS has sufficient biological information to support a rule to list as threatened or endangered. These species are referred to as candidate species. Proposed species are those species (taxa) for which the USFWS has published a proposal to list as threatened or endangered in the Federal Register. Based on consultation with the USFWS and surveys conducted, no federally-listed plant species are known to occur or were identified in the project area.

In addition to federally-listed, candidate or proposed species, the BLM maintains a list of Nevada sensitive species. The BLM Manual 6840.06 E states that native species may be listed as sensitive if the species:

- Could become endangered or extirpated from a state, or within a significant portion of its range in the foreseeable future;
- Is under review [for listing as threatened or endangered] by the USFWS;
- Is undergoing significant current or predicted downward trend in habitat capability that would reduce the species' existing distribution, and/or population or density such that Federally-listed, proposed, candidate, or State-listed status may become necessary;
- Typically consists of small and widely dispersed populations;
- Inhabits ecological refugia, or specialized or unique habitats; and
- Is state-listed, but may be better conserved through application of BLM sensitive species status.

The BLM affords these species the same level of protection as federal candidate species. The BLM's policy for sensitive species is to avoid authorizing actions that would contribute to the listing of a species as threatened or endangered.

Starveling milkvetch (*Astragalus jejunus* var. *jejunus*), low feverfew (*Parthenium ligulatum*), and sand cholla (*Grusonia pulchella*), BLM special status species, have been previously identified as having potential habitat in the project area. These are also listed by the Nevada Natural Heritage Program (NNHP) as sensitive species (JBR, 2012b). Other special status species identified during literature searches with potential habitat in the project area include Eastwood milkweed (*Asclepias eastwoodiana*). This species is listed on the NNHP White Pine County Rare Species list and has the potential to occur in the area. No other BLM sensitive species or habitat for sensitive species were identified in the project area.

Starveling milkvetch is a dwarf, mounded perennial herb that occurs on dry hilltops, bluffs, and barren ridges or river terraces on tuff, shale, sandstone or clays in Elko and White Pine counties at elevations ranging from 6,600 to 7,000 feet AMSL in the pinyon-juniper zone (Cronquist et al., 1989). This plant flowers and fruits from May to July and has distribution in northern Utah, southeastern Idaho, southwestern Wyoming, northwestern Colorado, and in disjunct areas of eastern Nevada (Fertig et al., 1994). Habitat for this species was located in the higher elevations of the project area within low sagebrush ridgelines and rocky ridges. None of these plants were located during vegetation surveys (JBR, 2012b).

Low feverfew is a mound-forming herbaceous perennial that grows up to three centimeters in height from a branched taproot and has white ray flowers on the ends of branches. Low feverfew is known to occur on barren or semi-barren calciferous outcrops in salt desert scrub, sagebrush, and pinyon-juniper communities in elevations ranging from 5,590 to 7,000 feet

AMSL (NatureServe, 2012). Habitat for low feverfew was identified in the higher elevations of the project area in barren outcrops within the pinyon-juniper vegetation community type. None of these plants were located during vegetation surveys (JBR, 2012b).

Sand cholla is known to occur in sand dunes, on dry lake borders, river bottoms, washes, valleys, and in plains with deep sandy soils in the desert at elevations ranging from 3,950 to 6,300 feet AMSL (NNHP, 2001). It is a low, inconspicuous clump-forming cholla cactus which usually blooms from May to June. Habitat for the sand cholla within the project area was marginal as sandy soils were found to be compacted and occurrences had not been previously documented in White Pine County (NNHP, 2001). Sand cholla was located in the project area along the access road in big sagebrush steppe and also in open areas outside of the project area, to the southwest of the access road (Figure 3.7-2). Sand cholla occurrences were found between 6,100 and 6,160 feet AMSL (JBR, 2012b).

Eastwood milkweed is a Nevada endemic species that occurs in elevations ranging from 4,600 to 7,100 feet AMSL in open areas with basic soils including calcareous clay knolls, sand, carbonate, or basaltic gravels; and shale outcrops in generally barren small washes in mixed shrub, sagebrush, and lower pinyon-juniper zones (NNHP, 2001). Eastwood milkweed is a showy, long-lived perennial herb that flowers from May to June. Suitable habitat for Eastwood milkweed was identified in the lower elevations of the project area within sagebrush and scrub communities; however, none of these plants were located during vegetation surveys (JBR, 2012b).

Waste Rock Disposal Site Design Alternative

The existing conditions for the Waste Rock Disposal Area Design Alternative are the same as those for the Proposed Action.

Southwest Power Line Alternative

The existing conditions for the Southwest Power Line Alternative are generally the same as those for the Proposed Action except there are 33.49 acres in the Newark Allotment and 88.05 acres in the Duckwater Allotment within the Southwest Power Line Alternative ROW.

Vegetation Communities

The three main vegetation community types present within the power line ROW include the Sagebrush community, the Intermountain Cold Desert Scrub community, and the Lower Montane Woodland community. Reclaimed and unreclaimed disturbance also occurs within the ROW. Plant species, which comprise each of the vegetation communities, are the same as for the Proposed Action. Occurrence of these community types throughout the ROW is shown on Figure 3.7-2.

The sagebrush community occupies approximately 60 percent of the ROW and occurs at elevations between 5,942 and 6,857 feet AMSL. The Intermountain Cold Desert Scrub community occupies approximately 34 percent of the ROW and occurs at elevations ranging from 5,933 to 6,488 feet AMSL. The Lower Montane Woodland community occupies approximately five percent of the ROW and occurs at elevations ranging from 6,609 to 6,892 feet AMSL. Reclaimed and unreclaimed disturbance accounts for approximately one percent of the ROW at elevations ranging from 5,924 to 7,509 feet AMSL.

Invasive and Non-Native Species

Invasive, non-native species cheatgrass, curveseed butterwort, crossflower, redstem stork's bill, clasping pepperweed, and saltlover commonly occur in areas adjacent to roads and other disturbed areas within the ROW. No noxious weeds were documented within the ROW.

Special Status Species

Two separate sand cholla populations were located along the 60-foot power line ROW. A total of 16 sand cholla plants were found in loose sandy soils and occurred in areas dominated by bud sagebrush and Indian ricegrass (Figure 3.7-2).

No Action Alternative

The existing conditions for the No Action Alternative include the authorized exploration activities as discussed in Section 2.2. The vegetative community types identified within the authorized area of disturbance are sagebrush (78 percent), intermountain cold desert scrub (less than one percent), and lower montane woodland (22 percent). Other disturbance accounts for less than one percent of the No Action Alternative. Plant species which comprise each of the vegetation communities are the same as for the project area.

Figure 3.7-2 Southwest Power Line Vegetation and Special Status Plant Species Communities

3.8 Wildlife Resources, Including Migratory Birds and Special Status Wildlife

As described in Section 3.7, four vegetation communities exist within the project area. These communities range in elevation from 5,900 feet to 7,300 feet AMSL and consist of a variety of terrain from alluvial flats to rocky cliffs. The different vegetation, elevation, and terrain types provide suitable habitat within the project area for a variety of wildlife species.

This section describes wildlife species that occur or have potential to occur within the project area. These species include big game, non-game, game birds, migratory birds, bats, and reptiles. Wildlife species with a special status as defined by governmental agencies are also addressed in this section and include those listed as threatened, endangered, proposed, candidate, or sensitive.

3.8.1 Area of Analysis

Proposed Action

The direct effects area of analysis for wildlife resources occurs within the project area. The area of analysis includes both the project area and Hunt Units 131-134 for mule deer (*Odocoileus hemionus*) and Hunt Units 131,145, 163, and 164 for pronghorn antelope (*Antilocapra americana*). A three-mile buffer surrounding the project area was analyzed for greater sage-grouse (*Centrocercus urophasianus),* and a ten-mile buffer was analyzed for golden eagle (*Aquila chrysaetos canadensis*) and bald eagle (*Haliaeetus leucocephalus*). No fisheries or potential fish habitat exists within the project area; therefore, no analysis for fisheries resources was performed.

Waste Rock Disposal Site Design Alternative

The direct effects area of analysis for the Waste Rock Disposal Area Design Alternative occurs within the project area.

Southwest Power Line Alternative

The direct effects area of analysis for the Southwest Power Line Alternative occurs within the project area and within the 60-foot power line ROW. A ten-mile buffer of the power line was considered for golden and bald eagle.

No Action Alternative

The direct effects area of analysis for the No Action Alternative occurs within the approved exploration POO boundary.

3.8.2 Data Sources and Methods

Proposed Action

The area of analysis was evaluated using a combination of existing resources, including information provided by BLM, NDOW, USFWS, NNHP, and extensive biological surveys conducted by JBR in 2010, 2011, and 2012. To familiarize field crew members with project-

specific habitat and wildlife data, information from these sources was reviewed prior to JBR conducting wildlife surveys. The survey team familiarized themselves with special status species data and associated habitats as part of their preparation. Appropriate buffer zones around the project were also surveyed and were plotted on topographic maps and aerial photographs.

Pedestrian surveys of the project area were used for wildlife inventories; these surveys focused on each vegetation community type. Additional attention was given to areas that presented suitable habitat for special status species and those areas that had been identified during literature review as potential special status species habitat. Surveys for bat species were performed using external acoustic monitoring methods as outlined in *The Revised Nevada Bat Conservation Plan* (Bradley et al., 2006). Survey block data from the *Atlas of the Breeding Birds of Nevada* (Floyd et al., 2007) was reviewed for migratory bird species occurrences in addition to what was documented during field surveys.

Greater sage-grouse PPH and PGH was evaluated based on existing BLM maps. Further evaluation was performed by implementing a two-part process of refinement of PGH at interfaces of Phase III pinyon-juniper woodlands (middle and late stages of succession), as these areas are not thought to be suitable for greater sage-grouse (Cassazza et al., 2011). Recent research in Nevada indicates that greater sage-grouse actively avoid pinyon and juniper when patch sizes are greater than 200 meters wide (GGSAC, 2012). Cassazza et al (2011) found that areas of Utah juniper and singleleaf pinyon were avoided by greater sage-grouse where canopy cover exceeded five percent. The two-part process consists of reviewing high resolution aerial imagery and delineating pinyon-juniper woodland interfaces. This has been completed. The second part of the refinement involves pedestrian foot surveys, which would verify initial delineations. These field surveys were performed in the spring of 2013 in coordination with NDOW and BLM. A memorandum that summarizes the methodologies, discusses the refined acreages for PGH, and transmitted the spatial data was completed in July 2013 (JBR, 2013a). The results of this memorandum are presented in Chapter 4.

Golden and bald eagle nesting surveys were conducted during 2012 and the 2013 breeding season. During the 2013 breeding season, golden and bald eagle nesting surveys were conducted within a 10-mile buffer. These surveys consisted of helicopter surveys and ground surveys of habitat within a ten-mile buffer of the Proposed Action. Biologists were provided with a database of known nest locations in the area so they could visit documented sites while surveying for additional nest locations. Surveys also documented raptor nests encountered other than those of golden and bald eagles. Photographs, waypoints, nest activity, and nesting species were documented during surveys. Inventory techniques were performed as outlined in the *Interim Golden Eagle Technical Guidance: Inventory and Monitoring Protocols; and Other Recommendations in Support of Golden Eagle Management and Permit Issuance (*Pagel et al., 2010).

Waste Rock Disposal Site Design Alternative

The data sources and methods for the Waste Rock Disposal Area Design Alternative are the same as those for the Proposed Action.

Southwest Power Line Alternative

The data sources and methods used for the Southwest Power Line Alternative are the same as those used for the Proposed Action with the addition of aerial and pedestrian surveys for wildlife, which occurred during the fall of 2012 and the spring of 2013. Surveys for general wildlife were conducted within 400-feet of the centerline power line ROW and surveys for golden and bald eagle were conducted within a 10-mile buffer of the power line.

No Action Alternative

The data sources and methods for the No Action Alternative are the same as those for the Proposed Action.

3.8.3 Existing Conditions

Proposed Action

Wildlife

Big Game

Big game species within the project area consist primarily of pronghorn antelope and mule deer. Big game species utilize a variety of habitat throughout the year. These two species are known to move between seasonal ranges but are typically found at higher elevations during summer months (“summer range") and lower elevation during winter ("winter range"). For most game species in Nevada, NDOW manages by Hunt Unit and/or Management Area (denoted by the first two numbers of the Hunt Unit). The project area lies within the western portion of NDOW Hunt Unit 131. This Hunt Unit encompasses portions of the Pancake Range, the White Pine Range, the Egan Range, Little Smoky Valley, Newark Valley, Railroad Valley, and Jakes Valley. The mule deer population associated with Hunt Unit 131 and the project area is managed as part of Hunt Units 131-134. The pronghorn antelope population associated with Hunt Unit 131 and the project area is managed as part of Hunt Units 131, 145, 163, and 164.

Pronghorn antelope occur within and adjacent to the project area as year round residents. NDOW estimates that approximately 100 antelope utilize the areas near the project area and that many of these antelope favor the agriculture fields to the west during summer months (Podborny, 2012). The population status and trend for pronghorn antelope associated with Hunt Unit 131, as identified in *Nevada Department of Wildlife 2011-2012 Big Game Status*, showed strong indicators of a healthy population and a record high herd population estimate for 2012 (NDOW, 2012a). Pronghorn antelope and their sign were observed throughout the project area during baseline wildlife surveys (JBR, 2012c).

Mule deer are found in low densities within the northern portion of the Pancake Range in the vicinity of the project area (Podborny, 2012). The project area falls within a mule deer migration corridor associated with the Diamond Mountains mule deer herd (Figure 3.8-1). The population status and trend for mule deer associated with Hunt Unit 131, as identified in *Nevada*

Department of Wildlife 2011-2012 Big Game Status, showed favorable range conditions and a small population increase for the third consecutive year (NDOW, 2012a). Mule deer sign (scat, tracks, etc.) was observed throughout the project area during baseline wildlife surveys (JBR, 2012c).

Small Mammals

Jackrabbits, ground squirrels, chipmunks, and packrats likely occur throughout the project area, based on the diversity of the habitat. Pygmy rabbit (*Brachylagus idahoensis*) was identified as having potential to occur within the project area through consultation with the USFWS and is discussed further in the Special Status Species section below. Mountain cottontail (*Sylvilagus nuttallii*) and yellow-bellied marmot (*Marmota flaviventris*) also have potential to occur within the project area. Black-tailed jackrabbit (*Lepus californicus*) and white-tailed antelope squirrel (*Ammospermophilus leucurus*) were observed throughout the project area during baseline wildlife surveys (JBR, 2012c).

Predatory Mammals

Diversity within the project area provides suitable habitat for a number of predator species. Game and non-game predators such as mountain lion (*Felis concolor*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), red fox (*Vulpes vulpes*), gray fox (*Urocyon cinereoargenteus)*, kit fox (*Vulpes macrotis*), and badger (*Taxidea taxus*) are likely to occur within the project area as the larger or more common predators. Bobcat, coyote, and gray fox sign (scat, tracks, etc.) was observed throughout the project area during baseline surveys (JBR, 2012c).

Reptiles

The project area provides suitable habitat for various species of reptiles found in the Great Basin. Sagebrush lizard (*Sceloporus graciosus*) and western fence lizard (*Sceloporus occidentalis*) were observed throughout the project area during baseline surveys (JBR, 2012c).

Upland Game Birds

Chukar (*Alectoris chukar*) and greater sage-grouse are known to occur within and adjacent to the project area throughout the year. Greater sage-grouse were identified during consultation with the USFWS and are discussed in the Special Status Species section below. Mourning doves (*Zenaida macroura*) are known to utilize the project area during migration and nest in low densities. Greater sage-grouse and chukar were observed during baseline surveys (JBR, 2012c).

Figure 3.8-1 Big Game

Migratory Birds

The project area provides suitable habitat for a number of migratory bird species, some of which are known to forage and nest in the vicinity. The following species were observed within the project area during biological baseline surveys: Black-throated sparrow (*Amphispiza bilineata*); sage sparrow (*Amphispiza belli*); chipping sparrow (*Spizella passerina*); olive-sided flycatcher (*Contopus cooperi*); horned lark (*Eremophila alpestris*); western meadowlark (*Sturnella neglecta*); American crow (*Corvus brachyrhynchos*); and pinyon jay (*Gymnorhinus cyanocephalus*). Migratory birds with special status, which have suitable habitat within or adjacent to the project area, are discussed in the Special Status Species section below.

A Breeding Bird Atlas Block (atlas block) was established just south of the project area as a part of the Atlas of Breeding Birds of Nevada program (Floyd et al., 2007). The atlas block is located in the northern portion of the Pancake Range approximately five miles south of the project area. Atlas blocks are surveyed during the breeding season. Surveyors identify bird species present on the atlas block and attempt to determine whether those species breed on the atlas block. The four-square-kilometer atlas block was surveyed in 1999. Table 3.8-1 lists species recorded on the atlas block as well as their breeding status.

Table 3.8-1 Breeding Bird Atlas Survey Results, Northern Pancake Range Block

Common Name	Scientific Name	Breeding Status
American kestrel	*Falco sparverius*	Confirmed breeding
Brewer's sparrow	*Spizella breweri*	Presumed non-breeding
Black-throated sparrow	*Amphispiza bilineata*	Confirmed breeding
Common raven	*Corvus corax*	Confirmed breeding
Horned lark	*Eremophila alpestris*	Confirmed breeding
Loggerhead shrike	*Lanius ludovicianus*	Possible breeding
Northern mockingbird	*Mimus polyglottos*	Confirmed breeding
Sage sparrow	*Amphispiza belli*	Confirmed breeding
Say's phoebe	*Sayornis saya*	Possible breeding
Sage thrasher	*Oreoscoptes montanus*	Confirmed breeding
Western scrub-jay	*Aphelocoma californica*	Possible breeding

Special Status Species

The BLM defines special status species as those species collectively, federally, listed, or proposed and BLM sensitive species, which include both federal candidate and delisted species within five years of delisting (BLM, 2008c).

Federally Listed, Proposed, and Candidate Species

The USFWS identified concern for three species that are known or expected to occur within the project area. These species are listed in Table 3.8-2 and are discussed individually below. The USFWS recommended that analysis be performed for these species, as they could potentially be affected by the project (USFWS, 2010). In addition, the USFWS identified potential impacts

to migratory birds and recommended land clearance surveys prior to any disturbance during the migratory bird nesting season.

Table 3.8-2 USFWS Identified Species with Potential to be Affected by the Project

Common Name	Scientific Name	USFWS Significance
Greater sage-grouse	*Centrocercus urophasianus*	USFWS Candidate
Pygmy rabbit	*Brachylagus idahoensis*	USFWS Status Review
Golden eagle	*Aquila chrysaetos*	BGEPA and MBTA Protected

BGEPA = Bald and Golden Eagle Protection Act
MBTA = Migratory Bird Treaty Act of 1918

Greater Sage-Grouse

Greater sage-grouse is currently a BLM-sensitive species and a State of Nevada-protected game bird managed in accordance with the *Greater Sage-Grouse Conservation Plan for Nevada and Eastern California* (NDOW, 2004). The greater sage-grouse is currently a candidate for listing under status review by the USFWS.

Between July 2002 and December 2003, the USFWS received several petitions requesting that the greater sage-grouse be listed as threatened or endangered range-wide. On April 21, 2004, the USFWS announced a 90-day petition finding in the Federal Register (69 FR 21484) that these petitions, taken collectively, as well as information in their files, presented substantial information indicating that the petitioned actions may be warranted. On January 12, 2005, the USFWS announced that the 12-month finding (70 FR 2244), after reviewing the best available scientific and commercial information, found that listing the greater sage-grouse was not warranted. Western Watersheds Project filed a complaint on July 14, 2006, alleging that this finding was arbitrary and capricious under the Administrative Procedure Act (5 U.S.C. 701 et seq.). On December 4, 2007, the United States District Court, District of Idaho, ruled that the 12-month petition finding was in error and remanded the case to the USFWS for further consideration. Legal action is still pending and the court has not yet set a date for completion of the remand. In February 2008 (73 FR 10218), the USFWS determined that it was appropriate to initiate a new status review to address information that had become available since the 2005 petition finding. The 2005 finding relied on information that was compiled in 2004; since that time significant research and literature has become available regarding threats, conservation measures, and population and habitat status of the greater sage-grouse. Further information was reviewed, and in March 2010, the USFWS published its decision on the petition to list the greater sage-grouse as "Warranted but Precluded" (75 FR 13910). In its "Warranted but Precluded" listing decision, USFWS concluded that existing regulatory mechanisms, defined as “specific direction regarding sage-grouse habitat, conservation, or management” in the BLM's Land Use Plans, were inadequate to protect the species. The USFWS is scheduled to make a new listing decision in fiscal year 2015.

In response to USFWS' inadequate regulatory mechanism findings and in order to avoid a potential listing, the BLM and the United States Forest Service (USFS) began a process to amend their land use management plans affecting greater sage-grouse habitat to incorporate

greater sage-grouse conservation measures. Secretary of the Interior Salazar invited the states impacted by a potential greater sage-grouse listing to develop state-specific regulatory mechanisms to conserve the species and preclude the need for listing.

On March 30, 2012, Governor Sandoval issued Executive Order 2012-09, which established the Governor's Greater Sage-Grouse Advisory Committee with a directive to provide an updated strategy and recommended approach for greater sage-grouse conservation in Nevada. Prior to issuing its final report on July 31, 2012, the committee met for several months taking significant evidence and expert testimony in public hearings with continuous participation and input from state and federal agencies including the NDOW, USFS, and BLM.

In August 2011, the BLM convened the Sage-Grouse National Technical Team (NTT), which brought together resource specialists and scientists from the BLM, State Fish and Wildlife Agencies, the USFWS, NRCS, and USGS. The NTT met in Denver, Colorado in August and September 2011 and in Phoenix, Arizona in December 2011, and developed a series of science-based conservation measures to be considered and analyzed through the land use planning process. As a result of meeting and coordination, the NTT released a report titled *A Report on National Greater Sage-Grouse Conservation Measures (*NTT, 2011*)*. On December 27, 2011, the BLM released an Instructional Memorandum (IM 2012-044) that provides direction to the BLM on how to consider the NTT conservation measures in the land use planning process. Further, in July 2011 the BLM announced its *National Greater Sage-Grouse Planning Strategy* (BLM, 2011d), which would work with the aforementioned Instructional Memorandum to review existing regulatory mechanisms and implement new or revised regulatory mechanisms through the land use planning process to conserve and restore the greater sage-grouse and their habitat. On December 27, 2011, the BLM released IM 2012-043 that provides interim management policies and procedures (BLM, 2011c). On August 10, 2012, the BLM released IM NV-2012-058 to add clarity to current mapping and management protocols for direction of proposed activities within greater sage-grouse habitat (BLM, 2012c).

The BLM requires that a consultation process be conducted between mining companies and the BLM for proposed mining projects occurring in greater sage-grouse PPH and PGH habitat on federal lands.

Populations of greater sage-grouse are allied closely with sagebrush (Connelly et al., 2000a). Greater sage-grouse are known obligates in black sagebrush and other sagebrush habitats (Beck, 1975; Braun et al., 2005), meaning that they require sagebrush for some part of their life cycle. They use sagebrush for roosting, cover, and food. During the winter, more than 99 percent of their diet consists of sagebrush leaves and buds (NRCS, 2006b). In Nevada, they select wind-swept ridges with short, scattered black sagebrush plants as winter feeding areas (Gullion, 1964) as browse of black sagebrush is highly preferred by greater sage-grouse (Young and Palmquist, 1992). Raven abundance and shrub cover are also important variables in considering the quality of habitat for the greater sage-grouse (Coates and Delehanty, 2010).

The project area overlaps the Diamond Population Management Unit (PMU) and the Butte/Buck/White Pine PMU. The boundary between these two greater sage-grouse specific management areas splits the project area approximately in half. Greater sage-grouse from these two PMUs use the northern portion of the Pancake Range throughout the year, although only a small amount of data specific to this population's year-round distribution exists (Podborny, 2012).

Greater sage-grouse habitat maps for PPH and PGH have been developed through a collaborative effort between the BLM and NDOW. The best available data was used to create a statewide prioritization of greater sage-grouse habitat. The habitat determination of PPH is defined as having the highest conservation value to maintaining sustainable greater sage-grouse populations. These habitats include breeding, nesting, brood rearing, and winter concentration areas. The habitat determination of PGH is defined as occupied seasonal or year-round habitat that includes areas of higher quality habitat that may lack a key component such as vegetative structure or herbaceous understory, which prevents it from meeting PPH.

During the winter of 2012, JBR collaborated with NDOW and the BLM to begin the two-part process of refining the PGH associated with the project (see Section 3.8.2) as discussed above. The information presented here accurately represents greater sage-grouse habitat associated with the project area. The PGH, existing (based on existing BLM maps) and refined (reviewing high resolution aerial imagery and delineating pinyon-juniper woodland interfaces), is shown on Figure 3.8-2. During the spring of 2013, ground verification surveys of PGH were performed to verify the initial delineations. This involved a collaborative foot survey conducted by JBR in and out to verify the habitat refinement lines created during the review of aerial imagery. Existing and refined habitat acreages associated with the Proposed Action are displayed in Table 3.8-3. Facilities displayed in Table 3.8-3 represent the facilities layout within the project area as well as the Proposed Action power line and access road.

Table 3.8-3 Proposed Action Greater Sage-Grouse Habitat

	PPH (acres)	PGH (acres)		PGH Net Difference (acres)
		Existing Mapping	Refined Mapping	
Project Area*	3,170	4,623	3,680	943
Proposed Disturbance Area	467	1,471	1,303	168

*Includes the entire POO boundary.

Figure 3.8-2 Greater Sage-Grouse Habitat Categorization

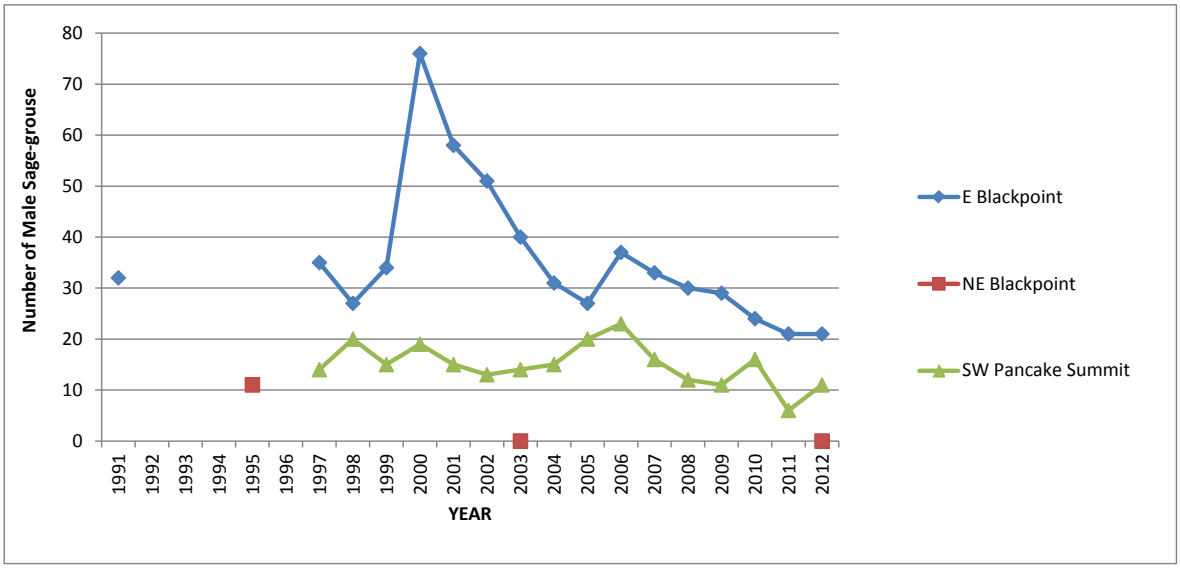
In addition to the suitable greater sage-grouse habitat associated with the project area, four greater sage-grouse leks have been identified within three miles of the project area. These leks are identified as the Southwest Pancake Summit, the East Black Point, Silverado Mountain South, and the Northeast Black Point leks. The Southwest Pancake lek and the East Black Point lek are considered "Active" by NDOW. NDOW defines "Active" as a lek that had two or more birds present during at least one of three or more visitations in a given breeding season. For a strutting ground to attain this status, it must also have had two or more birds present during at least two years in a five-year period (Connelly et al., 2003). The status of the Northeast Blackpoint lek is considered "unknown" and the Silverado Mountain South lek is considered inactive by NDOW. The Southwest Pancake lek and the East Blackpoint lek have been active annually from 1997 through 2012 and have had average lek attendance counts of 15 and 36 birds respectively (Podborny, 2012). Greater sage-grouse and their sign were observed at leks during the baseline surveys (JBR, 2012c).

Baseline ambient noise data was collected at the Southwest Pancake lek and the East Blackpoint lek during the 2013 breeding season over a seven-day period. At the BLM's request, ambient baseline levels were measured between the hours of 3 a.m. and 9 a.m. The noise level data which were collected include standard A-weighted and C-weighted ambient noise levels and 1/3 octave frequency data. The overall mean ambient sound values were then compared against the modeled impact values to determine potential impacts on the greater sage-grouse (Section 4.8.2). The data indicates that the overall mean ambient sound levels that occur at the Southwest Pancake Lek were 19 dBA (L90), 30 dBA (Leq) and the overall mean ambient sound levels that occur at the East Blackpoint Lek were 18 dBA (L90), 27 dBA (Leq).

The three greater sage-grouse leks identified have been monitored by NDOW for a number of years (Figure 3.8-3). The Southwest Pancake Summit Lek was identified in 1991 and historic counts show a peak of 23 male birds, a low of six, and an average count of 15. The East Blackpoint Lek was identified in 1997 and historic counts show a peak of 76 male birds, a low of 21, and an average count of 36. The Southwest Pancake Lek and the East Black Point Lek are considered "Active" by NDOW. The Northeast Black Point Lek was identified in 1995 with 11 males that year but has shown to have no activity during subsequent visits. Each of the three leks show a downward long-term trend. The Southwest Pancake Summit Lek and the East Black Point Lek represent significant breeding grounds for the population associated with the project area (Podborny, 2012). Historic male counts, the year identified, and the trend at each of the three leks is shown in Figure 3.8-3.

USGS is currently conducting a five year study on greater sage-grouse movement near the project area. This study uses GPS and Very High Frequency collars to track greater sage-grouse movement (Coates and Blomberg, 2013). Preliminary data from the first few months of the USGS study indicate that NDOW's assumption that greater sage-grouse move between the Southwest Pancake lek and the East Blackpoint lek to the Fish Creek area to the west and the Scoppettone North Ranch to the north is substantiated (JBR, 2013c, USGS 2013).

Figure 3.8-3 Greater Sage-Grouse Lek Trends



Pygmy Rabbit

Currently, pygmy rabbits are listed as Sensitive by the BLM and are a protected game species by the State of Nevada. On January 8, 2008, the USFWS published a substantial 90-day finding (73 CFR 1312) on a petition to list the pygmy rabbit as threatened or endangered under the ESA, thus initiating a status review of the species to determine if listing is warranted. This species was identified during consultation with the USFWS and was recommended for analysis and consideration during project planning and implementation and specifically prior to ground-disturbing activities. During agency consultation, NDOW identified the species as being present east and north of the project area and indicated that they may be present within the project area.

Pygmy rabbits occur throughout most of the Great Basin in dense sagebrush or mixed sagebrush habitats in areas with deep soils suitable for burrowing. Potential habitat within the project area for this species is available in areas containing big sagebrush. Suitable pygmy rabbit habitat was encountered during baseline surveys, although no individuals or their sign were documented (JBR, 2012c).

Golden Eagle

The golden eagle is listed as Sensitive by the BLM and is protected by the State of Nevada. The species has no special status with the USFWS, although it is protected under the MBTA and the BGEPA. During agency consultation, NDOW identified those golden eagle nests documented within the project vicinity. The USFWS indicated a concern for the species and recommended analysis of project impacts to the affected individuals, their habitats and regional populations.

Figure 3.8-4 Raptor Nests

The golden eagle is a common permanent resident in the Great Basin. Most golden eagle nests in the Great Basin are located on ledges along canyon walls or on cliff sides (Ryser, 1985). Suitable nesting habitat for the golden eagle is present within and adjacent to the project area (Figure 3.8-4). Surveys were conducted during the fall of 2012 and in spring 2013. Two golden eagle nests were identified within the northern portion of the project area and 39 were identified within a 10-mile buffer (JBR, 2013b). Further, golden eagles were observed nesting during baseline surveys (JBR, 2011b).

Bald Eagle

The bald eagle is listed as Sensitive by the BLM and is protected by the State of Nevada. The bald eagle was removed from the USFWS federal list of threatened and endangered species on August 9, 2007, and currently, the species has no special status with the USFWS. It is protected under the MBTA and the BGEPA.

Bald eagles primarily inhabit Nevada during the winter (GBBO, 2010). Historic winter range extends from northern Eureka east to Ely. Valley areas in Nevada with large populations of black-tailed jackrabbits typically support congregations of wintering eagles (Herron et al., 1985). Potential roost sites for bald eagle are thought to occur at cottonwood stands adjacent to ranches or in areas with pinyon-juniper woodlands. These areas are typically located near lakes and reservoirs that are large enough to remain unfrozen. In extreme cases, bald eagles will exchange proximity to water for roost sites that offer protection from harsh winter weather (GBBO, 2010). Fish Creek, located approximately five miles to the west of the Project Area has been identified by the USFWS as wintering habitat. The stretch of Fish Creek within the 10-mile radius of the Project Area has limited perch sites that would be utilized by bald eagles. Two ranches and associated agricultural fields are located along this portion of Fish Creek. The closest is approximately 1.14 miles to the northwest of Fish Creek and the second is located approximately 1.5 miles to the southeast. A small portion of pinyon-juniper woodland is located approximately 0.4 miles to the southeast of Fish Creek, and a larger area of pinyon-juniper is located approximately 1.5 miles to the north. The Project Area and adjacent areas serve as potential foraging habitat.

BLM Sensitive and State of Nevada Protected Species

Sensitive BLM species are defined as those species that require special management consideration to avoid potential future listing under the ESA and that have been identified in accordance with procedures set forth in BLM Manual 6840. The BLM also defines Special Status Species as those species collectively, federally, listed or proposed and BLM sensitive species, which include both federal candidate species and delisted species within five years of delisting (BLM, 2008c). Nevada Administrative Code 503.030 through 503.050 identifies those species listed as Protected by the State of Nevada and further classifies those protected species listed as Threatened and Sensitive. Table 3.8-4 identifies BLM-sensitive and State of Nevada-protected species, excluding greater sage-grouse, pygmy rabbit and golden eagle, as they have been discussed above.

Table 3.8-4 BLM Sensitive and State of Nevada-Protected Wildlife Species with Habitat in the Project Area

Species Name		Status	Description and Habitat	Potential to Occur on Project Area	Documented During Surveys
Common	Scientific				
Pallid Bat	*Antrozous pallidus*	BLM Sensitive Nevada Protected	The pallid bat inhabits low desert shrubland, juniper woodlands, and grasslands. It most commonly occurs in low, dry regions with rock outcrops, usually near water, and roosts in rock crevices, buildings, rock piles, tree cavities, shallow caves, and abandoned mines (NatureServe, 2012). Their primary food sources are arthropods such as crickets, grasshoppers, beetles, scorpions, and spiders.	Potential roosting habitat is available in rocky outcrops within and adjacent to the project area.	No
Townsend's Big-Eared Bat	*Corynorhinus townsendii*	BLM Sensitive Nevada Protected	Townsend's big-eared bat is a permanent resident in North America. Maternity and hibernation colonies generally occur in caves and abandoned mine workings. This species may roost in buildings and has often been found utilizing mine shafts and adits as maternity roosts and hibernacula. Habitats in the vicinity of roosts include pine forests, pinyon-juniper woodland, and cottonwood bottomland. It is a moth specialist with over 90% of its diet composed of lepidopterans (Montana, 2012).	Potential roosting habitat is available in rocky outcrops within and adjacent to the project area.	No
Big Brown Bat	*Eptesicus fuscus*	BLM Sensitive	The big brown bat is a medium- to large-sized bat that is known to roost in buildings, bridges, mines, caves, rock crevices, and even in giant saguaro cacti (WBWG, 2005). Their primary diet includes beetles and they usually forage within a few kilometers of their roost. This bat can be locally common in some urbanized environments.	Potential roosting habitat is available in rocky outcrops within and adjacent to the project area.	No
Spotted Bat	*Euderma maculatum*	BLM Sensitive Nevada Protected	The spotted bat occurs in varied habitats, including desert-scrub, pinyon-juniper woodland, mixed conifer forest, canyon bottoms, riparian areas, fields, and open pastures (WBWG, 2005). They roost in cracks, crevices and caves high in rock cliffs. Their primary diet consists of moths.	Potential roosting habitat is available in rocky outcrops within and adjacent to the project area.	No
Greater Western Mastiff Bat	*Eumops perotis*	BLM Sensitive Nevada Protected	The greater mastiff bat is primarily a cliff-dwelling species found generally under exfoliating rock slabs. It has also been found in similar crevices in large boulders and buildings. Roosts are generally high above the ground, usually allowing a clear vertical drop of at least three meters. It is found in a variety of habitats from desert scrub to chaparral to oak woodland and into the ponderosa pine belt and high elevation meadows of mixed conifer forests. Its diet consists primarily of moths, but also includes beetles, crickets and katydids (WBWG, 2005).	Potential roosting habitat is available in rocky outcrops within and adjacent to the project area.	No

Species Name		Status	Description and Habitat	Potential to Occur on Project Area	Documented During Surveys
Common	**Scientific**				
Allen's Lappet-Eared Bat	*Idionycteris phyllotis*	Nevada Protected	Allen's lappet-eared bat has been documented roosting in large boulder piles, sandstone crevices, cliffs, ponderosa pine snags, and abandoned mines. The species ranges from central Mexico north through the southwestern United States, including Arizona, New Mexico, southern Nevada and southern Utah. This species eats primarily small moths (WBWG, 2005).	Potential roosting habitat is available in rocky outcrops within and adjacent to the project area.	No
Silver-Haired Bat	*Lasionycteris noctivagans*	BLM Sensitive	The silver-haired bat is known to roost primarily in large trees but would also roost in mines and caves. It forages in the open canopy over meadows and water courses and is associated primarily with North Temperate Zone conifer and mixed conifer/hardwood forests, eating medium-sized flying insects (WBWG, 2005).	Potential roosting habitat is available in large trees and rocky outcrops within and adjacent to the project area.	No
Western Red Bat	*Lasiurus blossevillii*	BLM Sensitive Nevada Protected	The western red bat commonly roosts in hidden locations that lack obstruction beneath, lack lower perches, have dark ground cover, and have nearby vegetation. Roost sites are generally on the south or southwest side of a tree. Distribution ranges from southern British Columbia through much of the western United States, Mexico, and Central America to Argentina and Chile in South America. They have been recorded to feed on homopterans, coleopterans, hymenopterans, dipterans, and lepidopterans.	Potential roosting habitat is available in rocky outcrops within and adjacent to the project area.	No
Hoary Bat	*Lasiurus cinereus*	BLM Sensitive	The hoary bat is known for its relatively large size and golden-colored fur. Common roosting sites include coniferous and deciduous trees and caves. Hoary bats are common in the Pacific Northwest where they are highly associated with forested habitats (WBWG, 2005). Primary food sources include beetles, moths, grasshoppers, dragonflies, and wasps.	Potential roosting habitat is available in rocky outcrops and forested areas within and adjacent to the project area.	Yes
California Leaf-Nosed Bat	*Macrotus californicus*	Nevada Protected	The California leaf-nosed bat is known to roost in caves, mines, and buildings. It occurs in the lower Sonoran life zone in the deserts of California, southern Nevada, Arizona and south into Baja California and Sonora, Mexico (WBWG, 2005). This species neither hibernates nor migrates. It feeds primarily on moths and immobile diurnal insects such as butterflies and katydids.	Potential roosting habitat is available in rocky outcrops within and adjacent to the project area.	No

Species Name		Status	Description and Habitat	Potential to Occur on Project Area	Documented During Surveys
Common	**Scientific**				
California Myotis	*Myotis californicus*	BLM Sensitive	The California myotis inhabits riparian woodlands, canyons, grasslands, and desert habitats and utilizes rock crevices, caves, buildings, and abandoned mine workings for roosting, maternity and hibernation. It forages on insects along margins of tree canopy and over water (NatureServe, 2012).	Potential roosting habitat is available in rocky outcrops within and adjacent to the project area.	No
Western Small-Footed Myotis	*Myotis ciliolabrum*	BLM Sensitive	The western small-footed myotis inhabits desert habitats and utilizes rock crevices, caves, buildings, and abandoned mine workings for roosting, maternity and hibernation. Its primary food source is small insects found along cliffs and rocky slopes (NatureServe, 2012).	Potential roosting habitat is available in rocky outcrops within and adjacent to the project area.	Yes
Long-Eared Myotis	*Myotis evotis*	BLM Sensitive	The long-eared myotis is a hovering feeder that eats insects such as moths, beetles, flies, lacewings, and true bugs off foliage and from the ground (WBWG, 2005). Known roosting sites include hollow trees, caves, mines, cliff crevices, sinkholes, and rocky outcrops.	Potential roosting habitat is available in rocky outcrops within and adjacent to the project area.	No
Little Brown Myotis	*Myotis lucifugus*	BLM Sensitive	The little brown myotis is also commonly called the little brown bat and is among the most widespread and common bats of temperate North America. Common roosting sites for this bat include tree cavities, caves, mines, and buildings. They are also known to utilize caves and abandoned mines for hibernation (WBWG, 2005). The little brown myotis eat flying insects such as mosquitoes, moths, caddis flies, spiders, and small beetles (NatureServe, 2012).	Potential roosting habitat is available in rocky outcrops within and adjacent to the project area.	No
Fringed Myotis	*Myotis thysanodes*	BLM Sensitive Nevada Protected	The fringed myotis ranges through much of western North America. It occurs most commonly in middle elevations. Distribution is patchy. It appears to be most common in drier woodlands (oak, pinyon-juniper, ponderosa pine) but is found in a wide variety of habitats including desert scrub, mesic coniferous forest, grassland, and sage-grass steppe. It feeds on a variety of invertebrate taxa and the relative importance of prey items may vary according to prey availability, geography, or time period (WBWG, 2005).	Potential roosting habitat is available in rocky outcrops within and adjacent to the project area.	No

Species Name		Status	Description and Habitat	Potential to Occur on Project Area	Documented During Surveys
Common	**Scientific**				
Long-Legged Myotis	*Myotis volans*	BLM Sensitive	The long-legged myotis occurs throughout the western United States primarily in coniferous forests and seasonally in riparian and desert habitats where it is known to roost in abandoned buildings, caves, mines, cliff crevices, and hollow trees (WBWG, 2005). Its primary food sources include moths and other soft-bodied insects.	Potential roosting habitat is available in rocky outcrops within and adjacent to the project area.	Yes
Yuma Myotis	*Myotis yumanensis*	BLM Sensitive	The Yuma myotis inhabits riparian areas, scrublands, deserts, and forests and is commonly found roosting in bridges, buildings, cliff crevices, caves, mines, and trees. Its primary diet is emergent aquatic insects such as caddis flies, midges, and small moths and beetles (WBWG, 2005).	Potential roosting habitat is available in rocky outcrops and forested areas within and adjacent to the project area.	No
Western Pipistrelle	*Pipistrellus hesperus*	BLM Sensitive	The western pipistrelle is the smallest of all North American bats and is usually associated with rocky canyons and outcrops where they are known to roost in small crevices. It is also known to occupy mines and caves (WBWG, 2005). Its food sources include ants, mosquitoes, fruit flies, and leafhoppers.	Potential roosting habitat is available in rocky outcrops within and adjacent to the project area.	No
Brazilian Free-Tailed Bat	*Tadaria brazilienses*	BLM Sensitive Nevada Protected	The Brazilian free-tailed bat is one of the most widely distributed mammalian species in the Western Hemisphere. It is highly colonial and commonly roosts in large caves, rock crevices, and abandoned mines where maternity colonies can range in size from a few hundred to 20 million (WBWG, 2005). Its primary diet consists of moths, but includes flying ants, weevils, and ground beetles.	Potential roosting habitat is available in rocky outcrops within and adjacent to the project area.	No
OTHER MAMMAL SPECIES					
Dark Kangaroo Mouse	*Microdipodops megacephalus*	BLM Sensitive Nevada Protected	The dark kangaroo mouse burrows in gravelly sandy soils at the base of sagebrush. Its primary food source is seeds and insects. Dark kangaroo mice do not need to be near a water source, and instead obtain water from the food they consume (WAPT, 2006).	Potential habitat is available in the low sagebrush community located throughout the project area.	No
Bighorn Sheep	*Ovis canadensis*	BLM Sensitive	Bighorn sheep inhabit a variety of vegetation communities depending on the season. They can be found anywhere from alpine mountains to desert grasslands. They primarily graze on grass, forbs, and shrubs. Bighorn sheep are not dependent on a freestanding water source and obtain it all from the food they consume (WAPT, 2006).	Potential habitat is available in rocky cliff areas within and near the project area.	No

Species Name		Status	Description and Habitat	Potential to Occur on Project Area	Documented During Surveys
Common	**Scientific**				
BIRD SPECIES					
Northern Goshawk	*Accipiter gentilis*	BLM Sensitive Nevada Protected	The northern goshawk is a fairly large hawk (55 – 61 cm in length) with rounded wing tips and conspicuous pale eye brow. It nests in a variety of habitat types including deciduous, coniferous, and mixed forests. Western birds are known to nest in deciduous forests dominated by aspen (NatureServe, 2012).	Potential nesting habitat is available in trees within and near the project area. However, no aspen is present.	No
Western Burrowing Owl	*Athene cunicularia*	BLM Sensitive	The burrowing owl is a small (9 to 10 inches) ground-dwelling owl with long legs, white chin stripe, round head, and stubby tail (NatureServe, 2012). It often nests in burrows that have been abandoned by other burrowing mammals and usually in open areas with good surrounding visibility. It is present in northern Nevada in the spring and summer months and winters in the southwestern states (Udvardy, 1994).	Potential nesting and foraging habitat is available throughout the project area.	No
Ferruginous Hawk	*Buteo regalis*	BLM Sensitive	In pinyon-juniper habitats of the Great Basin, ferruginous hawks typically nest in juniper trees along the forest shrubland edge. Their nests are often located on the closest trees adjacent to shrubland habitats. Ferruginous hawks prey heavily on ground squirrels. Because their principal prey (ground squirrels) enters aestivation by late July or early August, ferruginous hawks typically fledge young and leave the area by early August (Montana, 2012).	Potential nesting and foraging habitat is available in pinyon-juniper woodland throughout the project area.	Yes
Swainson's Hawk	*Buteo swainsoni*	BLM Sensitive	Swainson's hawk inhabits grassland, shrubland, and agricultural areas where this species has open areas to forage and roost. Swainson's hawk prefers to nest in trees bordering agricultural fields, wetlands, and abandoned farms. Flimsy stick nests are built in trees and shrubs, sometimes as little as four feet from the ground. They hunt small mammals, songbirds, and insects in grass and agricultural lands, especially along river bottoms (Montana, 2012).	Potential nesting and foraging habitat is available throughout the project area.	No
Peregrine Falcon	*Falco peregrinus*	BLM Sensitive Nevada Protected	Peregrine falcons typically nest on vertical cliffs and ledges. They are known to nest on man-made structures including buildings, bridges, and raised platforms. They feed primarily on medium sized birds, but are known to sometimes forage on small mammals, lizards, fish, and insects (Montana, 2012).	Potential foraging habitat is available throughout the project area.	No

Species Name		Status	Description and Habitat	Potential to Occur on Project Area	Documented During Surveys
Common	**Scientific**				
Pinyon Jay	*Gymnorhinus cyanocephalus*	BLM Sensitive	The pinyon jay inhabits higher elevations of the Great Basin, near pinyon-juniper woodlands. It is a resident bird that feeds mostly on pinyon pine seeds and other nuts, berries, and insects. Habitat for pinyon jays consists of pinyon-juniper woodlands with diverse age class distribution. These habitat requirements of the pinyon jay put this species at risk from habitat loss, degradation, and forest fragmentation. Fire suppression in some areas may have contributed to dense single age class pinyon pine woodlands that are not preferred habitat for this species (Audubon, 2010).	Potential nesting and foraging habitat in pinyon-juniper woodlands is available throughout the project area.	Yes
Bald Eagle	*Haliaeetus leucocephalus*	BLM Sensitive Nevada Protected	The bald eagle inhabits areas near water to feed on fish and waterfowl, but would also inhabit areas where other food is available, such as rabbits and road kill (NatureServe, 2012). Their nests are built in pines, spruce, firs, cottonwoods, rocky cliffs, and pinnacles (Audubon, 2010). During winter months, eastern Nevada bald eagles roost on sagebrush in the valley bottoms (WAPT, 2006).	Potential nesting habitat is available throughout and adjacent to the project area. Potential foraging habitat is available throughout the project area.	No
Loggerhead Shrike	*Lanius ludovicianus*	BLM Sensitive Nevada Protected	The loggerhead shrike typically occupies dense, low, shrubby sagebrush and grassland vegetation types. They breed in open country with scattered trees and shrubs. Perching habitat is important for this species, which often uses wire, poles, and fence posts (WAPT, 2006). Scattered thorny shrubs or barbed wire fences are usually necessary, as they serve as impaling stations for the birds' prey (USFS, 2003).	Potential nesting and foraging habitat is available throughout the project area.	No
Black Rosy Finch	*Leucosticte atrata*	BLM Sensitive	Black rosy finches are found among glaciers or beyond timberline. In the winter, they are found in open fields and cultivated lands. They are known to roost in mine shaft adits, and feed primarily on seeds and insects (WAPT, 2006).	Potential winter habitat is available throughout the project area.	No

Species Name		Status	Description and Habitat	Potential to Occur on Project Area	Documented During Surveys
Common	**Scientific**				
Sage thrasher	*Oreoscoptes montanus*	BLM Sensitive Nevada Protected	The sage thrasher is found in areas with large amounts of cover from sagebrush. They primarily feed on insects and sometimes plants. They nest either on the ground or in sagebrush (Montana, 2012).	Potential nesting and foraging habitat is located throughout the project area.	No
Brewer's sparrow	*Oreoscoptes montanus*	BLM Sensitive Nevada Protected	This species is found throughout Nevada in sagebrush communities. They nest in sagebrush communities with low shrubs and grasses, and primarily feed on insects and seeds (WAPT, 2006).	Potential nesting and foraging habitat is available throughout the project area.	No

Waste Rock Disposal Site Design Alternative

The existing conditions for the Waste Rock Disposal Area Design Alternative are the same as those for the Proposed Action with the exception of the north west and north east WRDA footprint and the acreage of disturbed PGH would be 119 acres less than the WRDA footprint for the Proposed Action. However, there would be an increase of 29 acres of impacted PGH during operations because the fence line within the project area shifts slightly to the east to accommodate the WRDA footprints for the Waste Rock Disposal Area Design Alternative (Figure 2.4-1).

Southwest Power Line Alternative

The existing conditions for the Southwest Power Line Alternative are the same as those for the Proposed Action with the exception of the following:

Federally Listed, Proposed, and Candidate Species

Greater Sage-Grouse

Under existing preliminary maps prepared by the BLM and NDOW, portions of the project area and associated footprint within the project area are designated as PPH and PGH. Existing and refined habitat acreages associated with the Southwest Power Line Alternative are displayed in Table 3.8-5 and shown on Figure 3.8-2. Habitat acreages for greater sage-grouse are similar to the Proposed Action in that the facilities displayed in Table 3.8-5 represent the facilities layout within the project area as well as the Southwest Power Line and ROW. The PPH and PGH acreages for the Southwest Power Line Alternative are similar to those associated with the Proposed Action, with the exception of the access road and power line; the facilities would be the same. Facilities displayed in Table 3.8-5 represent the facilities layout within the project area as well as the access road and the Southwest Power Line and ROW.

Table 3.8-5 Southwest Power Line Alternative Greater Sage-Grouse Habitat

	PPH (acres)	PGH (acres)		PGH Net Difference (acres)
		Existing Mapping	Refined Mapping	
Project Area*	3,115	4,639	3,698	941
Proposed Disturbance Area	435	1,486	1,319	167

*Includes the entire POO boundary.

The power line and associated ROW are not adjacent to any active greater sage-grouse leks. One lek of "unknown" status, Silverado Mountain South, is located approximately 0.2 miles south of the power line near U.S. Highway 50. Greater sage-grouse and their sign were not observed during fall 2012 baseline surveys of the power line and 400-foot analysis area.

Golden Eagle

During raptors surveys in the spring of 2013, a total of 41 golden eagle nests were identified within 10 miles of the Southwest Power Line Alternative, including two nests within the project area. These territories were documented in addition to those inventoried during previous baseline studies.

BLM Sensitive and State of Nevada Protected Species

Bats

Bat surveys were performed in the fall of 2012 for the alternative power line and 400-foot analysis area. The following species were recorded during surveys: hoary bat, western small-footed myotis (recently split to small-footed dark-nosed myotis), long-legged myotis, and Brazilian free-tailed bat.

Raptors

Raptor surveys were performed during fall 2012 and spring of 2013 (Figure 3.8-4). During the 2012 surveys, one Swainson's hawk nest, two ferruginous hawk nests, and two burrowing owl nesting territories were identified (JBR, 2012c). One of the burrowing owl territories appeared to have been recently occupied and its status was documented as active during the 2012 breeding season. During the 2013 survey 34 raptor nests, which included ferruginous hawk, prairie falcon, turkey vultures, and potential raptor nests, were identified within 10 miles of the Southwest Power Line Alternative.

Migratory Birds

Migratory bird surveys were performed during fall 2012 baseline surveys of the alternative power line and 400-foot analysis area. The following species were observed during surveys: pinyon jay, loggerhead shrike, and Brewer's sparrow.

No Action Alternative

The existing conditions for the No Action Alternative include the authorized exploration activities as discussed in Section 2.2.

3.9 Range Resources

3.9.1 Area of Analysis

Proposed Action

The direct effects area of analysis occurs within the project area, which includes the associated access road and power line.

Waste Rock Disposal Site Design Alternative

The direct effects area of analysis for the Waste Rock Disposal Area Design Alternative occurs within the project area.

Southwest Power Line Alternative

The direct effects area of analysis for the Southwest Power Line Alternative occurs within the project area and within the 60-foot power line ROW.

No Action Alternative

The direct effects area of analysis for the No Action Alternative occurs within the approved exploration POO boundary.

3.9.2 Data Sources and Methods

The following indicators were considered when describing the affected environment for range resources:

- Number of livestock allotments or Herd Management Areas (HMAs) that the project is situated within, and the numbers of livestock or horses currently using, or approved to use, these areas;
- Number of Animal Unit Months (AUMs) within affected allotments;
- Vegetation types found within the area of analysis and their overall value as livestock forage (high or low forage productivity); and
- Locations of water sources, springs, and other range improvements in relation to the project area.

Vegetation types and estimated forage productivity information in this chapter are based on original vegetation data presented in Section 3.7 and rangeland health standards studies completed by the BLM for each allotment. Information about allotment locations, planned range improvements, and surface water sources was gathered from existing BLM data and from original baseline studies performed in 2009 and 2012 (JBR, 2012b).

3.9.3 Existing Conditions

The project area lies mostly within the Newark Allotment on the north end of the project area and the South Pancake and Duckwater livestock grazing allotments on the south end of the project area (Figure 3.9-1), in western White Pine County. The Newark Allotment is 264,543 acres in size that is all public land; the South Pancake Allotment is 35,638 acres in size that is all public land; and the Duckwater Allotment is 849,127 acres which includes both public and private land.

Vegetation within the project area is generally dominated by shrubland species (Figure 3.7-1). The most common shrub species are big sagebrush, rubber rabbitbrush (*Ericameria nauseosa*), winterfat, and yellow rabbitbrush (*Chrysothamnus viscidiflorus*) in the west and west-central portions of the project area. Pinyon-juniper woodlands occur at higher elevations in the eastern and southern portions of the project area. Grasses and forbs occupy a small component of the understory and are generally comprised of Indian ricegrass, needle grasses, basin wildrye, desert globemallow, and various annual grasses and forbs. No springs or other natural surface waters occur within the project area. Developed water sources for livestock occur to the west and the east of the project.

Newark Allotment

The Newark Allotment is currently managed for an active grazing preference of 9,709 active AUMs, from April 1 through November 1, on BLM-administered lands. No range improvements are currently proposed for this allotment.

An assessment of the Northeastern Great Basin Area Standards for Rangeland Health (Pellant et al., 2000) was conducted for the Newark Allotment in 2008-2009 during the permit renewal process (BLM, 2009a). During the assessment, a review and analysis of the monitoring data was conducted. A summary of the findings for the allotment is as follows:

Standard #1: Upland Sites: *Achieving the Standard*. Rangeland monitoring data and professional observation indicated that overall soil condition is currently being maintained on the Newark Allotment. Soils are stable, and the topsoil is holding in place. No evidence of rills, gullies, compaction, or pedestaling was noted. Line intercept cover data collected on the allotment indicated that the vegetative cover is below the appropriate or expected ground cover percentage at three of the eight key areas where data were collected. Utilization across the allotment was measured at the slight to moderate level. This level of utilization allows for plant maintenance and provides adequate litter which would further protect the soil surface and promote infiltration and permeability across the Newark Allotment, as well as provide stability to the watershed. Furthermore, cryptobiotic crusts are present on the soil surface. Therefore, the allotment is achieving this standard by providing appropriate stability to the soil surface through canopy and ground cover, including live vegetation, litter, and biotic soil surface features.

Standard #2: Riparian and Wetland Sites: *Not achieving the Standard, not making significant progress towards the Standard; Livestock are a significant factor in not meeting the Standard.* Six springs on the Newark Allotment have been assessed for proper functioning condition. These springs are considered to be representative of livestock use of riparian areas across the allotment.

Sadler Canyon, Mau Creek, and Water Canyon were found to be in proper functioning condition. Robinson Springs were found to be in proper functioning condition in 2007 and functioning at risk with an upward trend in 2008. Stinton Spring was found to be functioning at risk with a downward trend. Rock Spring was found to be nonfunctional. Sulfur Spring was determined to be inappropriate for proper functioning condition assessment due to development.

Standard #3: Habitat: *Not achieving the Standard, but making significant progress towards the Standard; Livestock are not a significant factor in not meeting the Standard.* Rangeland monitoring data and professional observations indicated that vegetation structure and distribution on the Newark Allotment are consistent with the Rangeland Ecological Site Descriptions (ESD) and/or expected plant community for the area. However, on the Newark Allotment vegetation composition and productivity differ somewhat from the ESD.

Figure 3.9-1 Grazing Allotments

South Pancake Allotment

The South Pancake Allotment is currently managed for an active grazing preference of 1,155 AUMs, from November 1 through April 15 on BLM-administered lands. No range improvements are currently proposed for this allotment.

An assessment of the Northeastern Great Basin Area Standards for Rangeland Health (Pellant et al., 2000) was conducted for the South Pancake Allotment in 2009 during the permit renewal process (BLM, 2009c). During the assessment, a review and analysis of the monitoring data was conducted. A summary of the findings for the allotment is as follows:

Standard #1: Upland Sites: *Achieving the Standard*. Rangeland monitoring data and professional observation indicate that overall soils condition is currently being maintained on the South Pancake Allotment. No evidence of rills, gullies, compaction, or pedestaling was noted. Cover data collected on the allotment indicates that the vegetative cover is below the appropriate or expected ground cover at the key areas. However, utilization across the allotment was measured at the slight to moderate level, which allows for plant maintenance and provides adequate litter, which would further protect the soil surface and promote infiltration and permeability. Furthermore, cryptobiotic crusts and lichens are present on the soil surface. Therefore, the allotment is achieving this standard by providing appropriate stability to the soil surface through canopy and ground cover, including live vegetation, litter, and biotic soil surface features.

Standard #2: Riparian and Wetland Sites: *Not Applicable.* No known riparian areas occur on the South Pancake Allotment.

Standard #3: Habitat: *Achieving the Standard.* Rangeland monitoring data and professional observations indicated that vegetation structure and distribution on the South Pancake Allotment are consistent with the Rangeland ESD and/or expected plant community for the area. Vegetation is distributed across the landscape as expected. Vegetative production is as expected for the allotment.

Duckwater Allotment

The Duckwater Allotment is currently managed for an active grazing preference of 20,065 AUMs, year-round, on BLM-administered lands in both White Pine and Nye counties. No range improvements are currently proposed for this allotment.

An assessment of the Northeastern Great Basin Area Standards for Rangeland Health (Pellant et al., 2000) was conducted for the Duckwater Allotment in 2009 during the permit renewal process (BLM, 2010a). During the assessment, a review and analysis of the monitoring data was conducted. A summary of the findings for the allotment (Pancake East Bench/Duckwater Valley Use Area) is as follows:

Standard #1: Upland Sites: *Not achieving the Standard, not making significant progress towards the Standard.* Cattle grazing is a contributing factor to not achieving the Standard. Due to shrub

dominance, lack of native vegetation cover, the risk of invasive species spread, risk of erosion and loss of soil structure, and historic heavy or severe utilization, the soil resources lack capability to maintain or improve site conditions.

Standard #2: Riparian and Wetland Sites: *Not achieving the Standard, not making significant progress towards the Standard; Livestock are a significant factor in not meeting the Standard.* Three springs were evaluated during the summer of 2008. They are all developed water sources with hydric soils that support native riparian plants. All three springs (Florio, McClure, and Florio Well) were rated functional at risk with a downward trend. Vegetation attributes for all three areas were rated negatively. Current management is not maintaining the biological integrity of the three springs.

Standard #3: Habitat: *Not achieving the Standard, not making significant progress towards the Standard; Livestock are not a significant factor in not meeting the Standard.* Vegetation cover studies, ecological condition studies, frequency trend studies, photographs, and professional observations indicate major portions of the Pancake East Bench Use Area are not achieving the Habitat Standard due to inappropriate plant composition and structure and invasive annuals present. The area, as a whole, exhibits a moderate potential to be converted to a non-indigenous cheatgrass dominated range. Invasive annuals, halogeton, Russian thistle, and some mustards are also present.

Although the Duckwater allotment does not fall within the project area fenced boundary the plan of operations boundary will include a small portion of the Bull Corner/Poison Patch Use Area which includes four permits. The Newark and South Pancake Allotment both have active grazing permits that lie within the project area fenced boundary. Table 3.9-1 shows the schedule, type and number of livestock permitted, duration, and AUMs of each permit that lies within the project area fenced boundary. Each grazing permit is aimed at meeting the Standards set forth by BLM. The permittee is tasked with meeting the terms and conditions of each permit.

Table 3.9-1 Newark and South Pancake Active Grazing Permits

Permit/ Allotment	Pasture	Livestock Number/Kind	Grazing Period Begin/End	Percent Public Land	Type Use	AUMs
#2704520 Newark	Eighteen Mile House	106 (C) 335 (S)	11/1 – 4/15 11/1 – 4/15	100 100	Active Active	578 366
#2703638 South Pancake	West Pasture	655 (S)	11/1 – 4/15	100	Active	715
#2703802 Newark	Eighteen Mile House	93 (S)	11/1 – 4/15	100	Active	102
#2700101 Newark	Eighteen Mile House	29 (C)	11/1 – 4/15	100	Active	158

(S) = Sheep
(C) = Cattle

3.10 Wild Horses

3.10.1 Area of Analysis

Proposed Action

The direct effects area of analysis occurs within the project area, which includes the associated access road and power line.

Waste Rock Disposal Site Design Alternative

The direct effects area of analysis for the Waste Rock Disposal Area Design Alternative occurs within the project area.

Southwest Power Line Alternative

The direct effects area of analysis for the Southwest Power Line Alternative occurs within the project area and within the 60-foot power line ROW.

No Action Alternative

The direct effects area of analysis for the No Action Alternative occurs within the approved exploration POO boundary.

3.10.2 Data Sources and Methods

Proposed Action

The following indicators were considered when describing the affected environment for wild horses and burros:

- Number of HMAs that the project is situated within, and the numbers of horses currently using, or approved to use, these areas;
- Appropriate Management Levels (AMLs) designated for the affected HMA;
- Vegetation types found within the area of analysis and their overall value as forage (high or low forage productivity);
- Locations of water sources, springs, and other range improvements in relation to the project area;
- Number of wild horses currently within the potentially affected HMA(s); and
- Whether HMAs are meeting AML standards.

Vegetation types and estimated forage productivity information in this chapter are based on original vegetation data presented in Section 3. HMA information for the project was gathered from the 2008 Ely RMP and from monitoring data collected for the Ely Proposed RMP/FEIS. AML data was obtained from the BLM that was established through the ROD and approved by the Ely District RMP. Information about surface water sources was gathered from original baseline studies performed in 2009 and 2012 (JBR, 2012b).

Waste Rock Disposal Site Design Alternative

The data sources and methods for the Waste Rock Disposal Area Design Alternative are the same as those for the Proposed Action.

Southwest Power Line Alternative

The data sources and methods used for the Southwest Power Line Alternative are the same as those used for the Proposed Action.

No Action Alternative

The data sources and methods for the No Action Alternative are the same as those for the Proposed Action.

3.10.3 Existing Conditions

Proposed Action

Wild horses, protected under the Wild Free-Roaming Horse and Burro Act of 1971, occur within the project area within the Pancake HMA, as shown on Figure 3.10-1. The 2008 Ely RMP combined two existing HMAs (Monte Cristo and Sand Springs East) into the Pancake HMA, which is located approximately 30 miles southwest of Ely, Nevada, and 10 miles southeast of Eureka, Nevada within White Pine and Nye counties. The HMAs were combined due to the historical interchange of wild horses between the two HMAs and was also based on an in-depth analysis of habitat suitability and monitoring data as set forth in the Ely Proposed RMP/FEIS (BLM, 2007a). The boundary of the Pancake HMA was established to ensure sufficient habitat for wild horses and an AML was set that aimed to achieve a thriving natural ecological balance and rangeland health. An AML is the number of wild horses that can be sustained within a designated HMA that achieves and maintains a thriving natural ecological balance in keeping with the multiple-use management concept for the area. The Pancake AML range is between 240 and 493 wild horses, which was established at a level that would maintain healthy wild horses and rangelands over the long-term and was based on monitoring data collected over time as well as an in-depth analysis of habitat suitability. The AML range for the Pancake HMA was established through the ROD and Approved Ely District RMP (BLM, 2008b).

Vegetation within the project area is described in Sections 3.7 and is summarized in Section 3.9. Water resources within the project area are described in Section 3.2.

The Pancake HMA is approximately 855,000 acres in size and occupies most of the project area. Wild horse populations in the Pancake HMA generally summer at higher elevations and move down to the valleys during the winter periods. Sufficient year-long range is available within the region, and wild horses are generally in good condition. However, competition exists among wild horses, livestock, and wildlife for forage and water resources. According to the Ely ROD and approved RMP (BLM, 2008b), the initial AMLs for the Pancake HMA are between 240 and 493 horses. The HMA estimated population is 1,086 wild horses, which is approximately two times over the high end of AML.

Figure 3.10-1 Herd Management Areas

Waste Rock Disposal Site Design Alternative
The existing conditions for the Waste Rock Disposal Area Design Alternative are the same as those for the Proposed Action.

Southwest Power Line Alternative
The existing conditions for the Southwest Power Line Alternative are the same as those for the Proposed Action.

No Action Alternative
The existing conditions for the No Action Alternative include the authorized exploration activities as discussed in Section 2.2.

3.11 Cultural Resources

The National Historic Preservation Act of 1966, as amended (NHPA), the Archaeological Resources Protection Act of 1979 (ARPA), the American Indian Religious Freedom Act of 1978 (AIRFA), and the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) are the primary laws regulating preservation of cultural resources. Federal regulations obligate federal agencies to protect and manage cultural resource properties.

The NHPA sets forth procedures for considering effects to historic properties and supports and encourages the preservation of prehistoric and historic resources. It directs federal agencies to consider the impacts of their actions on historic properties. The NHPA established the Advisory Council on Historic Preservation (ACHP) and tasked the ACHP with administering and participating in the preservation review process established by Section 106. Section 106 of the NHPA, as amended, requires federal agencies to take into account any action that may adversely affect any structure or object that is, or can be, included in the National Register of Historic Places (NRHP). These regulations, codified at 36 CFR 60.4, provide criteria to determine if a site is eligible. Beyond that, the regulations define how those properties or sites are to be dealt with by federal agencies or other involved parties. These regulations apply to all federal undertakings and all cultural (archaeological, cultural, and historic) resources.

The purpose of ARPA is to secure the protection of archaeological resources and sites that are on public lands and Indian lands and to foster increased cooperation and exchange of information between governmental authorities, the professional archaeological community, and private individuals having collections of archaeological resources.

The AIRFA was passed in 1978 to “protect and preserve for American Indians their inherent right to freedom to believe, express, and exercise the traditional religions of the American Indian, Eskimo, Aleut, and Native Hawaiians, including but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonial and traditional rites.”

NAGPRA became law in 1990; the regulations implementing the statute were completed and went into effect in January 1996. This law formally affirms the rights of Indian tribes, Native Alaskan entities, and Native Hawaiian organizations to custody of Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony with which they have a relationship of cultural affiliation. In addition, the law and regulations describe procedures designed to ensure that all Americans can derive educational, historical, and scientific value from the remains and objects covered by the statute through public interpretation, documentation, and study.

Cultural resources are defined as any definite location of past human activity identifiable through field survey, historical documentation, and/or oral evidence. Cultural resources have many values and provide data regarding past technologies, settlement patterns, subsistence strategies, and many other aspects of history. The term “Cultural Resources” can apply to “those parts of the physical environment – natural and built – that have cultural value of some kind to some sociocultural group.” This can include spiritual places, historic resources, archaeological resources, Native American cultural items, historical objects, religious practices, cultural uses of the natural environment, community values, or historical documents (Parker and King, 1998).

A Traditional Cultural Property (TCP) is a property associated with cultural practices or beliefs of a living community that (a) are rooted in that community’s history, and (b) are important in maintaining the continuing cultural identity of the community (Parker and King, 1998); this property type may be determined eligible for the NRHP if it meets criteria found in 36 CFR 60.4.

3.11.1 Area of Analysis

Proposed Action

A Programmatic Agreement establishing an Area of Potential Effect (APE) for cultural resources and outlining the methods of identification and treatment of cultural resources was completed for the project and signed by the agencies (Appendix 3B) as well as other parties including the Duckwater Shoshone Tribe and the Lincoln Highway Association. Under the Programmatic Agreement, the BLM has assumed responsibility for completing Section 106 compliance for cultural resources within the APE. The APE for assessment of direct effects includes all of the Pan Mine Project components associated with the Proposed Action and alternatives as described in Section 2.3. The APE for assessing indirect effects includes the direct disturbance area plus one mile outward in all directions from the perimeter of the APE. The indirect APE may extend beyond the one-mile convention to encompass properties that have traditional religious and cultural importance to Indian tribes or other geographically extensive historic properties such as trails or roads, when effects have been determined to extend beyond this distance.

Class III cultural resource inventories (systematic and detailed field inspections) were conducted for the entire fenced area and access road (Banks et al., 2012a, 2012b, 2012c, and 2012d; Orcutt and Brewer, 2012).

Waste Rock Disposal Site Design Alternative
The Waste Rock Disposal Area Design Alternative occurs within the project APE.

Southwest Power Line Alternative
The 60-foot power line ROW that constitutes the Southwest Power Line Alternative occurs within the project APE.

No Action Alternative
The No Action Alternative occurs within the project APE.

3.11.2 Data Sources and Methods

Proposed Action
Information regarding cultural resources in the project area was collected through literature searches and field inventory (Banks et al., 2012a, 2012b, 2012c, 2012d; Orcutt and Brewer, 2012). Data for cultural resources includes record search information for an area one-mile out from project components and field inventories.

Waste Rock Disposal Site Design Alternative
The data sources and methods for the Waste Rock Disposal Area Design Alternative are the same as those for the Proposed Action.

Southwest Power Line Alternative
The data sources and methods used for the Southwest Power Line Alternative are the same as those used for the Proposed Action.

No Action Alternative
The data sources and methods for the No Action Alternative are the same as those for the Proposed Action.

3.11.3 Existing Conditions

Proposed Action
Detailed discussions of the prehistory and history of the area can be found in the cultural resource reports (Banks et al., 2012a, 2012b, 2012c, and 2012d; Orcutt and Brewer, 2012).

Prehistory
The Pan Mine Project is located in east-central Nevada; a portion of the western Great Basin characterized by high altitude valleys (or basins) and pronounced mountain ranges. Generally, the region's prehistory can be divided into a series of developmental stages based on changes in technology, settlement, economy, ideology, and social organization. The earliest is termed the Pre-Archaic Period (ca. 7,500 to 11,500 before present [BP]). This stage coincides with the occurrence of Pleistocene fauna and climatic conditions. The lithic technology of this period indicates a focus on big game hunting, the utilization of small animals, and possibly the gathering of lake-marsh plant foods. The Early Archaic stage (4,600 to 7,500 BP) followed and was distinguished by a shift to a more diverse distribution of habitat exploitation with less

reliance on hunting and more reliance on plant resources from a wider variety of ecozones. The transition from the Early to Middle Archaic (about 1,300 to 4,600 BP) is not marked by a dramatic change in technology, but rather shifts in settlement and subsistence patterns. Population densities increased and winter and seasonal base camps appear to have been consistently reoccupied (Elston, 1986). Emphasis was focused on big game hunting and seed processing. Groundstone tools such as manos, metates, mortars, and pestles became a larger part of the tool assemblage. The Late Archaic (700 to 1,300 BP) is marked by changes in some aspects of material culture (i.e., replacement of the atlatl and dart by the bow and arrow, appearance of pottery, emphasis on plant processing tools) and possibly in the people inhabiting the area. Subsistence strategies entailed a greater reliance on a diversity of resources, prompting an increased emphasis on plant foods and small game. The Late Prehistoric period (700 BP to Contact) is characterized by Desert Series projectile points and Intermountain Brownware pottery. Quarrying activities at Tosawihi sharply intensified (Elston and Raven, 1992) and use of uplands was less common. High altitude villages found in the White Mountains (Bettinger, 1991; Delacorte, 1991) and the Toquima Range (Thomas, 1982) may indicate an expansion into less hospitable environments caused by close-packed populations from the previous periods.

Prior to the arrival of Euro-Americans, the Western Shoshone and Goshute (or *Gosiute*) inhabited northeastern Nevada. Western Shoshone territory has been described as covering a large area extending roughly from southern Idaho to Death Valley; west to the Reese River watershed of central Nevada; east to include the majority of White Pine County, Nevada, and beyond to the Great Salt Lake basin and into southeastern Idaho (Bengston, 2003; Thomas, 1986). The Goshute are often subsumed under the rubric of Western Shoshone in ethnographic summaries (Bengston, 2003; Thomas, 1986), but have a distinct identity locally. Their traditional territory is thought to extend from “the Great Salt Lake to the Steptoe Range [sic] in Nevada, from the Salt Lake Valley to Granite Rock in the desert to the west, and from Simpson Springs on the south to the Great Salt Lake Desert (Bengston, 2003).

History

For the Pan Mine area there are several historical “themes” (Banks et al., 2012c). These include Mining and Mineral Exploration, Settlement, Ranching and Farming, and Transportation. However, sites in the area are overwhelmingly related to mining. There are several mining districts in the vicinity including the White Pine Mining District, the Eureka Mining District, the Newark Mining District, and the Pancake Mining District. Most of the historic roads in and around the area are the result of mining activities, the one exception being the Lincoln Highway (Figure 3.11-1).

Figure 3.11-1 Lincoln Highway

Mining activity in the greater project vicinity began when prospectors discovered silver, lead, and copper on the western slopes of the White Pine Range. The discovery led to the organization of the White Pine Mining District in 1865. The resulting mining rush lead to the founding of numerous mining camps in the area, including Seligman, Hamilton, Treasure City, and Shermantown (Tingley, 1998). By 1870, the district and its communities were already in decline (Hall, 1994), many lured to the next silver boom in Eureka. Production of the district was originally slow because of problems separating the amalgamated lead and silver ores, but began to boom in 1869 when a new smelting process was used. Most of the ore bodies were exhausted by 1885 and the price of silver fell in the late 1880s, causing the district to decline significantly. Brief revivals occurred from 1906 to 1910, in 1923, from 1926 to 1929, and from 1938 to 1940 (Paher, 1970).

The project area itself lies within the Pancake Mining District. The district was organized in 1870 after silver discoveries. Old workings in the district consist of scattered mines, quarries, and prospects (Tingley and Bentz, 1983).

Specialized workers known as *carbonari* of largely Italian, Swiss-Italian, and Chinese origin, worked charcoal kilns at forested elevations eventually spanning a wide swath of central Nevada, including in the Diamond, Fish Creek, Pancake, and White Pine ranges (Reno, 1994). The demand for charcoal declined and eventually ceased when the ore bodies panned out and the last smelter in Eureka closed in 1891 (Reno, 1994).

Previous investigations in the Pancake Range have documented extensive remains of charcoal production complexes in the project vicinity, including charcoal kilns, wood lots, and habitation areas (Billat and Billat, 1990; Zerga, 2009), thought to have been used by Italian and Swiss-Italian *carbonari* between ca. 1869-1890 (Zerga, 2010).

Settlement

White Pine County was formed from Lander County in 1869. A number of early communities in the area include Seligman, Hamilton, Shermantown, and Treasure City. The mining camp of Pinto lies closest to the project area. Pinto, in White Pine County, was founded in the 1860s as the center of the Silverado Mining District and a smelting center for the Eureka mines. North of the project area lies the town site of Newark, founded in 1866 after silver discoveries in Newark Valley. Mining activity declined by the turn of the century, and the town is now abandoned (Hall, 1994; Paher, 1970).

Ranching and Farming

Ranching in Nevada began as a seasonal endeavor, where cattle from California were brought east across the Sierra to winter (Zeier and Furnis, 1989). Cattlemen began establishing permanent bases in the state during the 1860s. The successful mining operations in the remote sections of the eastern part of the state required support systems to feed its burgeoning population. Many unsuccessful miners who desired to settle in the area turned to ranching and agriculture.

White Pine County and sections of northeastern Nye County comprised the Proposed District Four of the 1934 Nevada Grazing Districts, which resulted from the Taylor Grazing Act. The Newark Valley-Pancake Range area was used historically by sheepherders. A map of historic sheep trails in Nevada shows Newark Valley and northern portions of the Pancake Range braided with sheep trails as they diverged south from Ruby Lake, moving toward Duck Creek (Sawyer, 1971).

Transportation

The county seat of Hamilton became a center for the local stage and express system, although a railroad was never built to the town (Elliott and Rowley, 1987). Several stage routes were created including the Denver-Shepard Toll Road and the Hill Beachey Toll Road (Hall, 2008).

These routes presumably decreased in importance after stage and rail routes serving Eureka were established. Serving these routes were numerous stage stations including the Maryland Wells station. Closer to the project area is 18-Mile House Pasture, located approximately 1.5 miles to the west. It likely served at least some of the same stagecoach routes as Maryland Wells Station, and was possibly contemporaneous with it, but appears to have also been in use later than Maryland Wells (Hall, 2008; Johnston et al., 1985).

With the advent of automobiles, highways replaced the stage lines in the twentieth century. The Lincoln Highway was planned in 1912 by promoters as the country's first transcontinental highway, intended to incorporate existing routes wherever possible (Zerga, 2010). Across Nevada, it closely follows portions of the Midland Trail and Overland Trail, now U.S. Highways 50 and 93. In eastern Nevada, the original route entered from Utah following the Pony Express Trail west to Schellbourne before turning south to Ely, then west towards Hamilton, from which an early route or alternate apparently crossed the eastern arm of Newark Valley and the Pancake Range several miles south of modern U.S. Highway 50 (Franzwa and Petersen, 2004; Zerga, 2010). By 1916, Maryland Wells was known by the name of Fourteen Mile House as a waypoint on the Lincoln Highway, offering travelers non-potable radiator water but no other amenities, as the station was deserted, according to The Complete Official Road Guide of the Lincoln Highway (Lincoln Highway Association, 1916). This same promotional guide noted that no accommodations were available at “Pancake Summit”, presumably the unnamed summit located approximately 1.7 miles east of the southern end of the project area, and not to be confused with the Pancake Summit on the later (and current) route of the Lincoln Highway/U.S. Highway 50.

From 1922 to 1924, the Lincoln Highway in the project vicinity was rerouted to the present-day U.S. Highway 50 alignment, located immediately north of the project area, and graveled (Zerga, 2010).

The Lincoln Highway in eastern Nevada was designated as U.S. Highway 50/SR 2 on 1927-1929 Nevada Department of Highways maps (NDOT, 1927 and 1929). By 1951 to 1953, the roads composing the earlier (ca. 1913-1922) route of the Lincoln Highway in the project vicinity are depicted as unnamed, unimproved dirt roads on USGS topographic quadrangles for the

area. The period of significance for the Lincoln Highway began in 1913, the year the Lincoln Highway Association was formed, and ends in 1956 when the Federal Aid Highway Act was passed, which marks the development of the modern interstate system. Additional data regarding the Lincoln Highway can be found in Zerga (2010) and the National Park Service (2004).

Great Basin National Heritage Area

In 2006, the United States Congress acknowledged the region's national significance by designating the Great Basin National Heritage Area (GBNHA), the purpose of which includes the opportunity to conserve, interpret, and develop the archaeological, historical, cultural, natural, scenic, and recreational resources (Great Basin Heritage Area Partnership, 2011). The GBNHA includes Millard County, Utah and White Pine County, Nevada, as well as the Duckwater Shoshone Reservation in Nye County, Nevada. The project area is within the GBNHA.

Previous Research

Records searches of the project area, and areas surrounding it, were conducted through the Nevada State Historic Preservation Office Cultural Resource Information System online database, as well as at the Nevada BLM Ely District Office. Results plotted on USGS topographic quadrangle base-maps covering the project area were reviewed to identify previously documented sites and cultural resource studies completed within one-mile of project components. A search of GLO survey plats, land patent records, historical indices, and historical topographic maps was conducted using the BLM Public Land Records website, and the University of Nevada, Reno Ansari Map Library collections available through the University Digital Conservancy. This information is documented in the associated cultural resource reports (Banks et al., 2012a, 2012b, 2012c, 2012d; Orcutt and Brewer, 2012).

Cultural Resource Inventory Results

A Class III level inventory was conducted on the entire project area of the Pan Mine Project (Banks et al., 2012a, 2012b, 2012c, 2012d; Orcutt and Brewer, 2012). Data from the project-specific studies were incorporated into an analysis. As outlined in the Programmatic Agreement, all elements of the final design would be fully inventoried and Section 106 satisfied prior to any project related disturbance. Exploration disturbance proposed outside of the fenced area but within the Plan boundary, not included in field investigations, would be subject to a Class III inventory as project planning proceeds and prior to any ground-disturbing activities in those locations.

No TCPs have been identified in the project area by previous studies.

A total of 158 cultural resource sites were encountered during the project-specific inventories, including 22 previously recorded sites (Table 3.11-1). The majority of the sites encountered are historic sites (137) with seven prehistoric sites and 14 multi-component sites (both historic and prehistoric) also recorded. Of the 158 sites, 75 are considered eligible for the NRHP, one is unevaluated, and 82 are considered not eligible.

Table 3.11-1 Known Cultural Resources in the Project Area

Site Type	NRHP Eligible	Not Eligible	Unevaluated	Total
Historic	67	69	1	137
Prehistoric	1	6	-	7
Multi-component	7	7	-	14
Total	75	82	1	158

Historic site types include refuse/can scatters, charcoal platforms, charcoal production areas, mining sites, cairns, prospects, a stone quarry, logging camps, camps, habitations, roads, a rock cooking oven, a corral, and a ranch. The most common historic site type is refuse/can scatter. The most common activity specific historic site is the charcoal platform and charcoal production area associated with the Carbonari. One segment of road is associated with the Lincoln Highway; it is an alternative route used from about 1913-1922 after which the highway was realigned.

Prehistoric site types include lithic scatters, a toolstone quarry, and stone circles. The multi-component sites are combinations of the above site types, such as a lithic scatter and charcoal production site or a lithic scatter and refuse/can scatter.

Waste Rock Disposal Site Design Alternative

The existing conditions for the Waste Rock Disposal Area Design Alternative are the same as those for the Proposed Action.

Southwest Power Line Alternative

Cultural surveys along the Southwest Power Line Alternative have not been completed; however, if this alternative is selected surveys would be conducted as per the Programmatic Agreement.

No Action Alternative

The existing conditions for the No Action Alternative include the authorized exploration activities as discussed in Section 2.2.

3.12 Native American Religious and Traditional Values

Federal agencies are required by law (including NHPA and ARPA) to consult with Native Americans on actions that may affect their traditions or uses of public lands. The agency must provide tribes a reasonable opportunity to identify its concerns about historic properties, advise on the identification and evaluation of historic properties, including those of traditional religious and cultural importance, articulate its views on the undertaking's effects on such properties, and participate in the resolution of adverse effects.

The goal is to "assure that tribal governments, Native American communities, and individuals whose interests might be affected have a sufficient opportunity for productive participation in

BLM planning and resource management decision making." To this end, the BLM has engaged in consultation with the Native Americans associated with the area.

Ethnographic resources include sites or areas of concern to Native American groups either for heritage or religious reasons. The BLM followed general procedures and guidance for Native American Consultation as outlined in BLM Manual H-8120-1 (BLM, 2004a).

A TCP is a property associated with cultural practices or beliefs of a living community that (a) are rooted in that community's history; and (b) are important in maintaining the continuing cultural identity of the community (Parker and King, 1998).

Several applicable laws, regulations, and other requirements pertaining specifically to Native American concerns were considered, including:

American Indian Religious Freedom Act of 1978 (42 USC 1996)
AIRFA reaffirms American Indian religious freedom under the First Amendment and sets policy to protect and preserve the inherent right of American Indians to believe, express, and exercise their traditional religions. Further, AIRFA requires federal actions to avoid interfering with access to sacred locations and traditional resources that are integral to the practice of religions.

Native American Graves Protection and Repatriation Act of 1990 (25 USC 2001 et seq.)
NAGPRA became law in 1990; the regulations implementing the statute were completed and went into effect in January 1996. This law formally affirms the rights of Indian tribes, Native Alaskan entities, and Native Hawaiian organizations to custody of Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony with which they have a relationship of cultural affiliation. NAGPRA gives even stronger custody rights to lineal descendents when such a close relationship can be documented. In addition, the law and regulations describe procedures designed to ensure that all Americans can derive educational, historical, and scientific value from the remains and objects covered by the statute through public interpretation, documentation, and study.

Executive Order 13007, Indian Sacred Sites (May 24, 1996)
This Executive Order (EO) directs federal land-managing agencies to accommodate Native Americans' use of sacred sites for religious purposes and to avoid adversely affecting the physical integrity of sacred sites. Federal agencies managing lands must implement procedures to ensure reasonable notice where an agency's action may restrict ceremonial use of a sacred site or adversely affect its physical integrity.

Executive Order13175, Consultation and Coordination with Indian Tribal Governments (November 6, 2000)
This EO establishes regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications, to strengthen the United States government-to-government relationships with Indian tribes, and to reduce the imposition of

unfunded mandates upon Indian tribes. This order revokes the preceding EO 13084 – Consultation and Coordination with Indian Tribal Governments.

Secretarial Order 3206 – American Indian Tribal Rights, Federal Tribal Trust Responsibilities, and the Endangered Species Act

This Order clarifies the responsibilities of federal agencies when actions taken under authority of the ESA and associated implementing regulations affect, or may affect, Indian lands, tribal trust resources, or the exercise of American Indian tribal rights. It acknowledges the trust responsibility and treaty obligations of the United States toward Indian tribes and tribal members. Accordingly, federal agencies would carry out their responsibilities under the ESA in a manner that harmonizes the federal trust responsibility to tribes, tribal sovereignty, and statutory missions and strive to ensure that Indian tribes do not bear a disproportionate burden for the conservation of listed species.

3.12.1 Area of Analysis

The analysis area for the Proposed Action and Action Alternatives is the project area.

3.12.2 Data Sources and Methods

Data regarding Native American Concerns relied on the BLM tribal liaison's knowledge of and familiarity with places and resources of Native American interest and concern within their district. Further, ethnohistoric reports produced for previous federal undertakings in the vicinity of the project area were reviewed.

3.12.3 Existing Conditions

The BLM is consulting with federally-recognized Indian tribes that have a cultural affiliation based on traditional use, ancestral ties, and/or oral histories associated with the area. These tribes include:

- Battle Mountain Band Council;
- Confederated Tribes of the Goshute Indian Reservation;
- Duckwater Shoshone Tribe;
- Elko Band Council;
- Ely Shoshone Tribe;
- Las Vegas Paiute Tribe;
- Moapa Band of Paiutes;
- Wells Band Council;
- South Fork Band Council;
- Te-Moak Tribe of the Western Shoshone Indians of Nevada; and
- Yomba Shoshone Tribe.

On June 7, 2012, letters soliciting information from Native American Tribes and inviting the Tribes to enter into consultation for the proposed project were sent by the BLM to the 11 Tribal governments listed above. To date, no comments have been received.

The Duckwater Shoshone Tribe (Tribe), whose reservation is located about 27 miles south of the project area, expressed interest; this is the closest reservation to the project area. The Duckwater Shoshone are currently proposing an expansion of their reservation which would then extend to the southern border of the project area. On July 2, 2012, the BLM met with the Tribe to discuss proposed mining activities north of the Duckwater Reservation. On August 10, 2012, the BLM met with the Yomba Shoshone Tribe to discuss the project. The Yomba Shoshone Tribe expressed concerns with impacts to groundwater and applicable mitigation measures. Their lands are located to the west of the project area on the northwest side of Nye County.

The Ely Shoshone Tribe's lands are located to the east in central White Pine County. To date they have not expressed any concerns.

Indian trust resources are natural resources protected by a fiduciary obligation on the part of the United States. Indian trust resources located on Indian reservation lands are managed and protected by the Tribes. Indian trust resources located on lands administered by the BLM are managed and protected by the BLM; no Indian trust resources have been identified on BLM-administered lands within the project area.

Cultural resource sites are manifestations of past human activities. Prehistoric and ethnographic overviews are provided in Section 3.11 (Cultural Resources), as are the known cultural resource sites in the project area. The prehistoric and historic sites indicate continuous use of the area for thousands of years by various groups. The Duckwater Shoshone Tribe and Te-Moak Tribe of Western Shoshone have been identified as Indian Tribes that may attach religious and cultural significance to cultural resources within the APE.

The project area is within the aboriginal territory of the Western Shoshone and in general, the area provided home and village sites, pine nut gathering areas, and hunting areas for the Tribes. Several nearby areas have been identified as traditional use areas by the Western Shoshone (Bengston, 2003). The Antelope Mountains have been utilized for pine nut collection and deer hunting. The Pancake Mountains and White Pine Mountains have also been used for pine nut collection. The Smoky Valley, to the west of the project area, has been identified as important to the Yomba Shoshone Tribe potentially containing burial sites.

To date, no TCPs or EO 13007 (Indian Sacred Sites) sites have been identified within the project area.

Two tribes commented on the DEIS (Chapter 7). The Confederated Tribes of the Goshute submitted a comment letter on May 9, 2013. The Duckwater Shoshone Tribe submitted a comment letter on May 10, 2013, which was then retracted by the Tribe on July 2, 2013.

The Duckwater Tribe submitted another letter under the signature of Maurice Frank-Churchill on May 14, 2013.

There will be tribal meetings with the Confederated Tribes of the Goshute and the Duckwater Shoshone Tribe prior to signing the ROD.

3.13 Land Use and Access

This section identifies and describes current land ownership patterns, land use plans, public access, and major land uses that could be affected by the Proposed Action and Alternatives.

3.13.1 Area of Analysis

Proposed Action

The direct effects area of analysis occurs within the project area, which includes the associated access road and power line.

Waste Rock Disposal Site Design Alternative

The direct effects area of analysis for the Waste Rock Disposal Area Design Alternative occurs within the project area.

Southwest Power Line Alternative

The direct effects area of analysis for the Southwest Power Line Alternative occurs within the project area and within the 60-foot power line ROW.

No Action Alternative

The direct effects area of analysis for the No Action Alternative occurs within the approved exploration POO boundary.

3.13.2 Data Sources and Methods

Proposed Action

Land use and access information, policies, and current management practices were compiled from USGS 7.5 minute topographic quadrangles, NDOT, aerial photography, BLM master Title Plats, BLM Oil and Gas Plats, BLM Transportation Plan, BLM Ely RMPs, and White Pine County land use plans. Land use authorizations and land tenure information were gathered from BLM RMPs as well as current data contained within BLM's LR2000 that provides reports on BLM land and mineral use authorizations for oil, gas, and geothermal leasing, ROWs, mineral development, land and mineral title, mining claims, withdrawals, classifications, and federal mineral estate information. These data were used to characterize land use within and surrounding the project area for the purpose of determining potential changes in public and private land use and ownership, BLM land use authorizations, and land disposals.

Waste Rock Disposal Site Design Alternative

The data sources and methods for the Waste Rock Disposal Area Design Alternative are the same as those for the Proposed Action.

Southwest Power Line Alternative

The data sources and methods used for the Southwest Power Line Alternative are the same as those used for the Proposed Action.

No Action Alternative

The data sources and methods for the No Action Alternative are the same as those for the Proposed Action.

3.13.3 Existing Conditions

Proposed Action

The project area is located entirely on public land administered by the BLM, Ely District, EFO jurisdiction and is managed according to the Ely District RMP.

Land Use Plans and Policies

Ely RMP

The BLM Ely District RMP ROD was approved on August 20, 2008. The RMP provides programmatic and implementable direction for management of BLM administered public lands within the Ely RMP planning area.

The RMP supports the following federal policies:

- *Mining and Minerals Policy Act of 1970, Section 102 of the Federal Land Policy and Management Act of 1976, and BLM's Mineral and National Energy Policy.*

The RMP provides specific applicable management decisions for each resource that is addressed. The following provides a brief summary of the management actions specific to geology and mineral resources, wildlife, livestock grazing, recreation, and wild horse habitat.

- The goal and policies of the RMP for livestock grazing are to promote the management and monitoring of livestock grazing to a level that is consistent with multiple use, sustained yield, rangeland health, and watershed function and health;

- Provide habitat for wildlife (i.e., forage, water, cover, and space) and fisheries that is of sufficient quality and quantity to support productive and diverse wildlife and fish populations, in a manner consistent with the principles of multi-use management, and to sustain the ecological, economic, and social values necessary for all species;

- The goals and policies of the RMP for Geology and Mineral Extraction promote the environmentally responsible production and exploration of leasable minerals (both solid and fluid), locatable minerals and mineral materials to meet local, regional and national needs, while also protecting other resources and uses;

- The goals and policies of the RMP for recreation promote recreation opportunities on public land and undeveloped spaces while encouraging a minimum impact; and

- Maintain and manage healthy, self-sustaining wild horse herds inside HMAs within AMLs to ensure a thriving natural ecological balance while preserving a multiple-use relationship with other uses and resources.

County Land Use Plans

White Pine County

The White Pine County Land Use Plan (White Pine County, 2009) describes the land use patterns and designations of White Pine County. Approximately 92 percent of White Pine County's land is administered by public agencies (BLM, National Park Service, USFS, and USFWS). White Pine County has 11 general land use designations in the plan: (1) Open Range; (2-4) Low-, Medium-, and High-Density Residential; (5) Mobile Home; (6) Commercial; (7) Industrial; (8) Public Facility/Recreation; (9) Public Land Transfer; (10) Brownfield; and (11) Federal Reserve. Most land outside of established communities, including the project area, is designated in the county land use plan as Open Range. Land designated as Open Range is used mainly for ranching and agricultural use but also for mining, recreation, and as wildlife habitat. Mining and natural resources is the second largest employment sector in White Pine County, and agricultural lands comprise the majority of private land in the County. The White Pine County Land Use Plan encourages the expansion of the mining sector and compatibility with environmental quality within White Pine County.

In coordination with the Nevada State Land Use Planning Agency, the White Pine County Public Land Users Advisory Committee (PLUAC) developed the *White Pine County Public Lands Policy Plan* (WPCPLUAC, 2007). This plan was developed through a collaborative effort in order to establish and update the county's vision and policy voice concerning federal land management. The White Pine County Public Land Use Plan provides a coordinated land use planning effort among the county, BLM, and USFS. In general, the public land policies encourage environmentally responsible mineral exploration, opportunities for livestock grazing and other agricultural uses; encourage dispersed recreational opportunities; supports the concept of Multiple Use Management as an overriding philosophy for management of public lands, and support a diversity of wildlife species and habitats.

Specific policies relating to development of mineral resources are included in the plan. Policies address items such as the need for careful development of mineral resources while recognizing the need to conserve other environmental resources; supporting of state and federal policy that encourages both large and small-scale operations; the need for mineral operations to be consistent with best management practices for the protection of environmental quality; that mine site reclamation standards be consistent with the best possible post-mine use for the specific area; and reclamation of mine sites should be coordinated with the county and the PLUAC.

Eureka County

The Eureka County Master Plan (Eureka County, 2010) describes land use and planning for Eureka County. The Eureka County Master Plan identifies six principle land use categories. These six categories are: (1) urban areas; (2) permanent open space; (3) open space with appropriate associated uses; (4) agriculture or mining with limited housing; (5) agriculture or

mining with very limited housing; and (6) agriculture only with associated housing. The Eureka County Master Plan supports the responsible exploration, development and reclamation of oil, gas, geothermal, locatable minerals, aggregate and other resources on federal land.

Land use within Eureka County is comprised mainly of mining and agriculture. The greatest land use in the county is agricultural open space, comprised of designated grazing allotments. Approximately 2.4 million acres (90 percent of lands) are used for cattle and sheep grazing and pasture, as well as for crops such as hay or barley. Mining represents the next largest land use designation in the county. Approximately 79 percent of the land within Eureka County is managed by federal agencies (BLM and USFS), which is primarily used for livestock grazing, mining, geothermal energy production, and outdoor recreation. Eureka County has not adopted a zoning ordinance, and the land use pattern has developed from economic activity such as mining and agriculture. The project area is not within Eureka County.

Land Use and Ownership

The primary land uses within and adjacent to the project area include ranching (livestock grazing), wildlife habitat, hunting, mineral exploration, and dispersed recreation. The federal government (BLM) is a significant land owner with scattered private land ownership adjacent to the project area. The BLM has divided range lands in the region into grazing allotments to facilitate the management of the land for public livestock grazing (Section 3.9). Much of the private lands are also Open Range. The majority of public lands in Nevada are managed by the BLM for range uses. Figure 3.13-1 shows land ownership within and adjacent to the project area. Mining is an important land use in Nevada, and there are numerous mining claims in the vicinity of the project area. Not including the four active claims held by Midway, there are 20 active claims within the same Township and Range of the project area.

Access

The project area is generally accessed via a system of regional highways, including U.S Highway 50, Interstate 80, SR 278, 227, 379, and 892 (Figure 3.13-1). The Federal Highway Administration (FHWA) administers these routes and NDOT maintains them. Interstate 80 and U.S. Highway 50 generally run east-west; Interstate 80 traverses across the northern portion of Nevada and U.S. Highway 50 across the middle portion.

The major east-west highway directly north of the project area is U.S. Highway 50. The project area would be accessed from Eureka to the west, and from Ely to the east via U.S. Highway 50. From Elko to the north, the project area would be accessed via Interstate 80 West to Carlin and then south on SR 278 to Eureka then east on U.S. Highway 50 or southeast via SR 228 and south on SR 892 (Strawberry Road) then east on U.S. Highway 50. From the Duckwater Reservation to the south the project area would be accessed via SR 379 and SR 892. Table 3.13-1 from the 2011 NDOT Annual Traffic Report provides the following information from traffic monitoring stations closest to the project area (NDOT, 2011).

Table 3.13-1 Annual Average Daily Traffic

Station I.D.	Location	Number of Vehicles 2009	Number of Vehicles 2010	Number of Vehicles 2011
0330005	U.S. Highway 50, 1.2 miles east of Fish Creek to Duckwater	560	570	520
0330006	SR 892, Strawberry Road, 1 mile north of U.S. Highway 50	90*	90*	90*
0110035	County Road to Palisade, 550 feet west of SR 278	80	80*	80*
0110036	SR 278, Eureka-Carlin Road, 50 feet north of County Road to Palisade South Junction	440	570	510
0110051	U.S. Highway 50, 0.9 miles west of County Road to Duckwater (Fish Creek Road)	80	80*	80*

Source: NDOT, 2011
* = Estimated

The existing access road to the project area is a four-wheel drive road ("Midway Segment"), which has not been fully road-based or otherwise improved for all-weather travel. There is a 1.5 mile section of the historic Lincoln Highway, which commences on the west at the intersection of the Midway Segment and intersects with County Road 1088 (south to Black Shade Well) (the "western segment"). This segment of the Lincoln Highway has been determined not eligible to the NRHP. The remaining segment of 1913 to 1922 Lincoln Highway that traverses from County Road 1088, eastward, (the "center segment") has been evaluated for eligibility to the NRHP and determined eligible to the NRHP. This segment of the 1913 to 1922 alternative route of the Lincoln Highway will be re-routed as a mitigation measure.

The project area occurs in the 18-Mile House Pasture of the Newark Grazing Allotment (BLM, 2011b). Two grazing permits for this area allow for both cattle and sheep grazing from November 1 to April 15. The proposed access road crosses the Newark Valley U.S. Highway 50 ROW fence (554588) and would require a cattle guard to prevent cattle drift onto the highway. Midway would be responsible for maintaining the access road and cattle guard, including cleaning it out as needed. The road would be reclaimed and the fence returned to serviceable condition when no longer needed (BLM, 2011b).

BLM Land Use Authorizations

Land Tenure

There is a 10-acre parcel identified for disposal in the Ely RMP at the following location: Section 6, T17N R55E, Lots 12 and 13. The parcel is near El Dorado Junction.

Special Designations

This section describes specially designated resources located within 30 miles of the project area. All Action Alternatives are located within this 30-mile radius. Special designations include Wilderness Areas managed by the USFS and Wilderness Study Areas (WSAs) managed by the BLM (Figure 3.13-1).

Figure 3.13-1 Land Ownership and Special Designations

Wilderness Areas are designated by Congress under the authority of The Wilderness Act of 1964 (P.L. 88-577; 16 USC 1131-1136) and comprise the National Wilderness Preservation System. There are five Wilderness Areas located in the Humboldt-Toiyabe National Forest managed by the USFS that are located within 30 miles of the project area. The closest USFS Wilderness Area is the White Pine Range Wilderness Area located approximately 15 miles to the southeast of the project area. The remaining four Wilderness Areas located within 30 miles of the project area include Shellback, Bald Mountain, Currant Mountain, and Red Mountain (Figure 3.13-1).

WSAs are areas that have been inventoried for Wilderness designation as described in FLPMA and are currently managed under the BLM Manual 6330 - Management of Wilderness Study Areas until such time as Congress makes a determination regarding wilderness designations (BLM, 2012d). Lands that have been identified as having wilderness characteristics are managed by the BLM to protect those characteristics.

There are two WSAs within 30 miles of the project area. The Antelope Range WSA and the Park Range WSA are located approximately 25 miles to the southwest (Figure 3.13-1) of the project area and 22 miles south of the Southwest Power Line Alternative. The Antelope Range WSAs managed by the BLM Battle Mountain District Office and the Park Range WSA is managed by the BLM Ely District Office.

Areas of Critical Environmental Concern (ACECs) are the principal BLM designation for public lands where special management is required to protect important natural, cultural, and scenic resources, or to identify natural hazards. The Honeymoon Hill/City of Rocks ACEC is the closest ACEC located just outside of 30 miles from the project area to the south east.

The BLM uses a variety of land use plan decisions, in addition to special designations described above, to manage these lands such as establishing VRM class objectives to preserve the existing landscape; attaching conditions to permits, leases, and other authorizations; and establishing limited or closed off-highway vehicle designations. A Lands with Wilderness Characteristics Inventory Update was performed (2012); the resource is not present within the project area.

Waste Rock Disposal Site Design Alternative

The existing conditions for the Waste Rock Disposal Area Design Alternative are the same as those for the Proposed Action.

Southwest Power Line Alternative

The existing conditions for the Southwest Power Line Alternative are the same as those for the Proposed Action except for 12 miles of the Southwest Power Line alternative along SR 379 at Fish Creek Road are within Eureka County and approximately 0.5 miles cross private lands (Figure 3.13-1).

No Action Alternative

The existing conditions for the No Action Alternative include the authorized exploration activities as discussed in Section 2.2.

3.14 Visual Resources

3.14.1 Area of Analysis

Proposed Action

The direct effects area of analysis occurs within the project area, which includes the associated access road and power line.

Waste Rock Disposal Site Design Alternative

The direct effects area of analysis for the Waste Rock Disposal Area Design Alternative occurs within the project area.

Southwest Power Line Alternative

The direct effects area of analysis for the Southwest Power Line Alternative occurs within the project area and within the 60-foot power line ROW.

No Action Alternative

The direct effects area of analysis for the No Action Alternative occurs within the approved exploration POO boundary.

3.14.2 Data Sources and Methods

Proposed Action

The BLM VRM system provided the basis of the methods used to assess and characterize the existing aesthetic conditions and visual sensitivity within the area of analysis. The three principle components of the methodology that were used included:

- Identification of applicable laws, ordinances, regulations, standards, and management policies and plans;
- Inventory of the scenic values and inherent landscape character within the area of analysis; and
- Identification of viewer sensitivity to change and visually sensitive areas, including representative key observation points (KOPs).

For the purpose of applying BLM VRM guidelines, *BLM Manual H-8410-1 Visual Resource Inventory* (BLM, 1986a) was used for the assessment of the existing aesthetic conditions and evaluation of visual sensitivity. In addition, *BLM Manual H-8431: Visual Resource Contrast Rating* (BLM, 1986b) was used to determine the degree to which the alternative would conform to BLM-identified guidelines, and the objectives of the applicable VRM classes. VRM objectives and policies in the Ely Proposed RMP/FEIS (BLM, 2007a) were consulted.

The sources of data and information that were used or consulted in order to describe the existing aesthetics conditions and evaluate visual sensitivity included the:

- *Final Visual Baseline Study Report, Visual Resources and Landscape Aesthetics, Pan Project, White Pine County, NV* (ViewPoint, 2012);
- BLM Visual Resource Management Areas Geographic Information Systems data (BLM, 2008d); and
- Observations made during field visits to the area of analysis.

Waste Rock Disposal Site Design Alternative

The sources of data and methodology for the Waste Rock Disposal Site Design Alternative are the same as those described for the Proposed Action.

Southwest Power Line Alternative

The sources of data and methodology for the Southwest Power Line Alternative are the same as those described for the Proposed Action.

No Action Alternative

The sources of data and methodology for the No Action Alternative are the same as those described for the Proposed Action.

3.14.3 Existing Conditions

Proposed Action

Visual Resource Management Classes

The BLM uses the VRM system to manage the human concern for scenery and public acceptance visible change to the natural landscape setting on BLM-administered public lands. The VRM system provides the BLM with an objective means of measuring the scenic value of the visual resources in an area. BLM uses the VRM system to analyze potential impacts an action would have on visual resources of an area and apply visual design techniques to minimize the impacts. The VRM objectives set the standards for planning, designing, and evaluating future projects.

The VRM system consists of two stages: the inventory stage and the analysis stage. During the inventory stage, the visual resources of an area are identified and assessed, and then assigned to inventory classes using the process described in *BLM Manual H-8410-1 Visual Resource Inventory* (BLM, 1986a). The process involves rating the visual appeal of an area, measuring public sensitivity and concern for scenic quality, and determining whether the area is visible from representative or selected key travel routes and/or KOPs. Based on the results of the inventory stage, the area is assigned a visual resource inventory class. Inventory classes are informational in nature and provide the basis for considering visual values during the development process for a RMP (BLM, 1986a).

According to *BLM Manual H-8410-1 Visual Resource Inventory* (BLM, 1986a), VRM classes are a management tool that portrays the visual management objectives of an area, and are assigned through RMPs. The assignment of VRM classes is based on the management decisions that are made in RMPs, and visual values must be considered throughout the RMP process. Management decisions in the RMP must reflect the value of visual resources. An area may be assigned to one of four VRM classes: Class I, II, III, and IV. Management objectives are established for each class (BLM, 1986a).

The analysis stage of the VRM system involves determining whether the potential visual impacts from proposed surface-disturbing activities or actions would meet the management objectives established for the area, or whether design adjustments would be required (BLM, 2012e). A visual contrast rating process is used for this analysis, which involves comparing the project features with the major features in the existing landscape using the basic design elements of form, line, color, and texture (BLM, 1986b).

According to the Ely Proposed RMP/FEIS (BLM, 2007a), the area of analysis occurs within areas that have been assigned to VRM Class III and IV. According to the Ely Proposed RMP/FEIS (BLM, 2007a), most BLM-administered public lands that extend approximately five miles to either side of U.S. Highway 50 in eastern White Pine County have been assigned to VRM Class III. Additionally, all BLM-administered public lands extending approximately four miles to either side of U.S. Highway 50 are part of the Loneliest Highway Special Recreation Management Area (SRMA) (BLM, 2007a). Thus, the portion of the area of analysis located within approximately five miles of U.S. Highway 50 has been assigned to VRM Class III, and the portion within four miles of the highway is located within the Loneliest Highway SRMA. The remaining portion of the area of analysis occurs largely within area assigned to VRM Class IV, but isolated areas assigned to VRM Class III also occur. Figure 3.14-1 shows the VRM classes and the Loneliest Highway SRMA in relation to the area of analysis (ViewPoint, 2012).

Per *BLM Manual H-8410-1 Visual Resource Inventory* (BLM, 1986a), the objectives of VRM Class III are:

> "...to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape."

Figure 3.14-1 Visual Resource Management Classes

The objectives stated in *BLM Manual H-8410-1 Visual Resource Inventory* (BLM, 1986a) for VRM Class IV are:

> "...to provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements of the landscape."

Great Basin National Heritage Area

As presented in Section 3.11, the GBNHA aims to conserve, interpret, and develop the archaeological, historical, cultural, natural, scenic, and recreational resources (Great Basin Heritage Area Partnership, 2011). This can include specific scenic features and viewsheds that are unique and rarely exist elsewhere or perhaps nowhere else on earth. However, because of the GBNHA's role in the support of economic development, protection of viewsheds and scenic areas does not imply opposition to human developments (Great Basin Heritage Area Partnership, 2011). The Proposed Action would be visible from US Highway 50, which the Great Basin Heritage Area Partnership considers a scenic drive.

Visual Character and Inherent Aesthetics

The area of analysis is located in the Pancake Range of White Pine County, approximately five miles to the south of U.S. Highway 50. The Pancake Range is a north-south running range consisting primarily of rolling hills and peaks ranging from 6,400 feet to 7,500 feet AMSL (ViewPoint, 2012). The Pancake Range within the area of analysis and surrounding vicinity is overlain by volcanic rock that is a deep red-brown to black in color. The majority of the area of analysis is located on the west slope of the Pancake Range, but the most southeastern portion of the area is located on the east slope. Little Smoky Valley and Newark Valley are located immediately west of the Pancake Range. The westernmost sections of the area of analysis boundary are located at the base of the Pancake Range, adjacent to Little Smoky and Newark valleys. Newark Valley is located to the east of the Pancake Range. The town of Eureka is located approximately 22 miles northwest of the area of analysis and the city of Ely is located approximately 50 miles to the east (ViewPoint, 2012).

The climate within the area of analysis and surrounding region is arid to semiarid high desert, which is typical in much of the Basin and Range province of Nevada. Most days are characterized by clear skies or few clouds with bright sunshine. Vegetation communities within and surrounding the area of analysis consists mostly of sagebrush scrub and grasses at lower elevations and pinyon-juniper forest at higher elevations. Sagebrush scrub and grasses are gray-green in color, and pinyon-juniper forest is dark green in color (ViewPoint, 2012).

Past and recent exploration activities in the area of analysis have created disturbed areas with numerous dirt roads and areas with piled vegetation and debris. However, the existing disturbance is not visible from the valleys on either side of the Pancake Range (ViewPoint, 2012).

Key Observation Points

A KOP is a specific place on a travel route or within an existing or potential use area where the view of a management activity or project would be most revealing for purposes of the contrast rating. KOPs are selected based on existing land use, frequency of visibility, duration of visibility, and anticipated activities of the observer. Typically, KOPs are selected along highways, well-used roadways and trails and near communities, and scenic overlooks, as these are areas where the greatest number of people is likely to occur, and often occur for the longest periods of time. Per *BLM Manual H-8431: Visual Resource Contrast Rating* (BLM, 1986b), the criteria that should be considered when selecting KOPs are: angle of observation, number of viewers, length of time the project is in view, relative project size, season of use, and light conditions.

Once KOPs are selected, a description of the landscape visible from each KOP is prepared by describing the dominant land and water features, vegetation cover, and structures that comprise the landscape. These landscape components are described in terms of the basic design elements of form, line, color, and texture (BLM, 1986b). The BLM Form 8400-4 (Visual Contrast Rating Worksheet) is used to record the various design elements that characterize the land and water features, vegetation cover, and structures that comprise each KOP landscape. The purpose of describing and characterizing the landscape is to establish the existing baseline conditions of the scenic values and aesthetic quality of an area. Typically, the existing conditions of the landscape are documented on BLM Form 8400-4 using photographs. The photographs and information recorded on BLM Form 8400-4 are then used to prepare the landscape description, often in conjunction with field observations made at the time the photographs were taken. The precise geographic locations of the KOPs are recorded using a Global Positioning System, and any relevant field notes are also recorded at that time.

A total of four KOPs were selected for the project: KOP 1, 2, 3, and 4. The KOPs were selected by a BLM resource specialist based on the areas determined to possess high visual quality and visual sensitivity within the viewshed of the area of analysis. The area of analysis is located in a sparsely populated area, and most readily viewed by motorists travelling at highway speeds from nearby travel routes. Accordingly, the KOPs that were selected are located along the most frequently travelled routes in the viewshed: U.S. Highway 50 and SR 379 (i.e., Fish Creek Road). U.S. Highway 50 is the closest paved road to the project, which is approximately six miles via an unmaintained dirt road from the project area. The area of analysis would be visible to east-bound motorists travelling eastward at highway speeds for approximately 7.5 miles. There are no rest stops, scenic overlooks, or other attractions in the vicinity that would create important viewing locations for large numbers of travelers. All of the KOPs are located within the Loneliest Highway SRMA.

Figure 3.14-2 Key Observation Points

The locations of the KOPs in relation to the area of analysis are shown on Figure 3.14-2. A description of the existing baseline conditions of the scenic values and aesthetic quality of the area of analysis and viewshed is provided below for each of the KOPs. The photographs that were used to describe and document the existing conditions at each of the KOPs are provided in Appendix 3C of this EIS. A copy of the BLM Form 8400-4 that was completed for each KOP to document the landscape conditions in terms of its form, line, color, and texture elements is provided in Appendix 3D.

KOP 1

KOP 1 is located on the south shoulder of a curve-section of U.S. Highway 50 where the area of analysis would first become visible to motorists travelling eastward on the highway (Figure 3.14-2). The angle of view at KOP 1 is southeast across Newark Valley, toward the area of analysis and Pancake Range. The topography in the foreground is flat and gently sloping down to the valley. In the middle ground to background there are gently rolling hills, with a backdrop of higher rugged mountains. The rolling hills and distant mountains create a strong irregular horizontal line at the skyline. Vegetation in the foreground is short shrubs and grasses that appear lumpy to spiky. Vegetation along the road shoulders is bright green and transitions to shades of brown, gold, and red moving away from the roadway. Moving from the foreground to the middle ground, the form and texture of the vegetation becomes indistinct, and color patterns from the vegetation create subtle horizontal lines. Agricultural fields in the middle ground are bright green, contrasting with the surrounding duller shades of green, brown and gold.

The rolling hills are a darker shade of brown, and the distant mountains appear shades of blue against the bright blue sky. U.S. Highway 50 is a prominent man-made development in the foreground with a distinct stippled surface and smooth painted white and yellow lines that create strong curvilinear lines in the foreground. The nearest delineator in the foreground creates short, strong vertical lines; however, other delineators further away are barely visible. Less distinct in the middle ground are fence posts that create a series of short, dark vertical lines.

KOP 2

KOP 2 is located at the intersection of U.S. Highway 50 and SR 892, approximately 2.9 miles east of the location of KOP 1 (Figure 3.14-2). This KOP captures the view that motorists travelling south on SR 892 would have of the area of analysis when stopped at the intersection. KOP 2 also captures the view of the area of analysis that motorists travelling east on U.S. Highway 50 would have. The angle of view at KOP 2 is wide, extending almost from a due east direction to nearly a due south direction. The area of analysis is the focal point of the view, and is located southeast of the KOP.

The topography in the foreground is flat because this KOP is located near the center of Newark Valley. In the middle ground to background there are gently rolling hills, with a backdrop of tall rugged mountains. The distant mountains create a strong irregular horizontal line at the skyline. Vegetation in the foreground generally consists of short shrubs and grasses that appear lumpy to spiked. However, there are a group of black cotton wood trees that surround the south perimeter of a gravel clearing in the immediate foreground area, approximately 150 to 250 feet

southeast of the KOP location. These trees are much taller than the surrounding shrubs and grasses elsewhere in the foreground, and the tree trunks create very subtle vertical lines. The black cottonwood foliage is generally globular in shape, and is a lush, dark-green color. The shrub and grass vegetation along the shoulders of U.S. Highway 50 is bright green and quickly transitions to shades of brown, tan, and gold moving away from the highway. The form and texture of the vegetation becomes indistinct in the middle ground, and color patterns from the vegetation create subtle horizontal lines. Agricultural fields in the southern area of middle ground are bright green and sharply contrast with the surrounding duller shades of brown and gold of most vegetation in the middle ground. The rolling hills at the margin of the middle ground and background appear as a darker shade of brown in contrast to the color of the vegetation in the middle ground. The distant mountains in the background appear as shades of gray and blue with a bright blue sky for a backdrop.

U.S. Highway 50 is the most prominent structure in the foreground with a bold, linear form that contrasts with the generally non-linear form of the foreground vegetation. The road surface has a distinct finely-stippled surface and is framed by smooth painted white and yellow road striping. The painted road striping creates strong curvilinear lines in the foreground. A roadside clearing near the KOP is also a prominent man-made feature of the foreground landscape. The clearing appears flat, and the gravel surface gives the area a coarse stippled texture. The clearing appears uniformly gray in color. There are several signs and sign posts near the perimeter of the clearing that create strong vertical lines. Signs and sign posts vary in color, but include white, yellow, flat silver. Several other structures related to the clearing are also visible, including a low, flat concrete platform painted red and white. A short railing is fastened to the top of the platform that is round, tubular, and painted yellow in color. Other delineators in the foreground include power poles and roadside signage, which create short, strong vertical lines. Other delineators further away are barely visible. Less distinct in the middle ground are fence posts that create a series of short, dark vertical lines.

KOP 3

KOP 3 is located along the east shoulder of SR 379, approximately 1.6 miles south of its intersection with U.S. Highway 50 (Figure 3.14-2). The view from this KOP captures the area of analysis when stopped at the intersection. KOP 2 also captures the view that motorists on SR 379 would have of the area of analysis and surrounding areas to the north and south. The angle of view at KOP 3 is wide, extending almost from the northeast to southeast. The area of analysis is located east to southeast of the KOP.

The form, line, color, and texture that characterize the appearance of the landforms and vegetation in the foreground, middle ground, and background are very similar to those at KOP 1. Topography in the foreground is flat and gently sloping down to the valley. The gently rolling hills seen in the middle ground at KOP 1 are also seen in the middle ground from KOP 3. The background consists of tall rugged mountains that create a strong irregular horizontal line at the skyline. Vegetation in the foreground consists of low, homogeneous shrubs and grasses that appear mostly lumpy. Vegetation in the foreground is generally a dark-green color that is muted by gray overtones. There are a few isolated, low trees that rise several feet above the

surrounding shrubs. This foliage is generally a lush green color, and globular in shape. Vegetation immediately next to SR 379 includes rabbitbrush, which is taller than most of the other shrubs in the foreground and includes bright-yellow flowers. Moving from the foreground to the middle ground, the form and texture of the vegetation becomes indistinct, and color patterns from the vegetation create subtle horizontal lines. Agricultural fields in the southern area of middle ground are bright green and sharply contrast with the surrounding duller shades of green and tan that characterizes the color of most vegetation in the middle ground. The rolling hills are a darker shade of brown, and the mountains in the background appear as shades of blue against the brighter blue sky.

Because KOP 3 is located on the east shoulder of SR 379, and the view is towards the east, the road surface of SR 379 does not appear in the photograph of existing conditions taken at the KOP location. However, with the road only several feet from the KOP location, it is easily the most prominent man-made development in the foreground. The road is bold, flat, and contrasts with the lumpy form of the surrounding vegetation in the foreground. The road surface has a distinct finely-stippled surface that is pale gray in color. The edge of the pavement on either side of the road surface creates strong curvilinear lines in the foreground. Other structures do not appear in the foreground or middle ground. Structures at the margin of the middle ground and background, or farther, are barely visible and indiscernible.

KOP 4

KOP 4 is located along the south shoulder of U.S. Highway 50, slightly east of the approximate location where the highway and the mine's access road intersects (Figure 3.14-2). The location of the KOP coincides with the approximate location where the area of analysis would first become visible to motorists travelling west on U.S. Highway 50. The angle of view at KOP 4 is south and southeast toward the area of analysis and the surrounding areas of the Pancake Range.

The land in the foreground area is characterized by a flat and wide form that is generally simple and homogeneous. Gently rolling hills with sloping topography characterize the form of the land in the middle ground area. A weak and soft horizontal line is apparent where the flat topography of the foreground gives way to rolling topography in the middle ground area. The background form is typified by tall, irregularly shaped, rugged mountains. The mountains create an irregular bold line against the backdrop of the sky. Vegetation in the nearest foreground areas consists of low shrubs that are globular to irregular in shape, and low grasses which are spike shaped. Foreground vegetation transitions to more of a lumpy, but homogeneous form nearer the middle ground area. The foreground vegetation is approximately equal parts light grayish-green and light brown in color. The vegetation lines transition from complex and irregular to subtle and horizontal due to color patterns of the vegetation. Vegetation has an uneven, random coarse texture near U.S. Highway 50, but transitions to dense medium texture with distance from the highway. The form and texture of the vegetation becomes indistinct at the margin of the foreground and middle ground areas. Color patterns in the vegetation create subtle horizontal lines. Vegetation in the middle ground has no distinct form or lines. It appears largely as a smooth texture that is light brown to brown in color. There are occasional interspersed patches

of light brown vegetation and isolated, individual evergreen trees visible in the middle ground. Evergreen trees are dark green to dark gray in color. Vegetation form, color, texture, or line is generally not visible on background mountains.

A wire fence in the foreground area is the only structures visible from KOP 4. The fence posts are several feet tall, and create narrow, bold vertical lines that contrast with the surrounding non-linear lines and form of the foreground vegetation. Fence wire strands are barely visible and create weak horizontal lines at most. Fence posts are very dark brown in color, and contrast sharply with the color of the vegetation surrounding them. Wire strands are light gray in color. The texture of the wire strands is indiscernible, but the texture of the fence posts is uniform and smooth.

Dark Sky Resources

Low light pollution conditions, or dark skies, is one of the most important properties for viewing stars, constellations, and other astronomical features, such as comets. There are no existing stationary light sources within the project area and very few existing stationary light sources in the area of analysis. As a resulting consequence, very little light pollution is produced within the area of analysis. The area of analysis is remote, rural and isolated from major cities and towns of a size substantial enough to be affected by light pollution typically produced in urbanized areas. Thus, the ambient light level within the area of analysis is very low during the night and the sky is considered to be very dark. Although the very low ambient light level improves visibility of astronomical features, it prevents most of the form, line, color, and texture elements of the existing landscape features described above from being visible at the KOPs or elsewhere during night. The night landscape generally appears as an otherwise dark and unlit, black or nearly black space with little to no distinguishable landscape features.

Waste Rock Disposal Site Design Alternative

The existing conditions within the area of analysis for the Waste Rock Disposal Site Design Alternative are the same as the existing conditions described for the Proposed Action.

Southwest Power Line Alternative

The existing conditions within the area of analysis for the Southwest Power Line Alternative are the same as the existing conditions described for the Proposed Action.

No Action Alternative

The existing conditions within the area of analysis for the No Action Alternative are the same as the existing conditions described for the Proposed Action.

3.15 Recreation

3.15.1 Area of Analysis

Proposed Action

The direct effects area of analysis occurs within the project area which includes the associated access road and power line.

Waste Rock Disposal Site Design Alternative

The direct effects area of analysis for the Waste Rock Disposal Area Design Alternative occurs within the project area.

Southwest Power Line Alternative

The direct effects area of analysis for the Southwest Power Line Alternative occurs within the project area and within the 60-foot power line ROW.

No Action Alternative

The direct effects area of analysis for the No Action Alternative occurs within the approved exploration POO boundary.

3.15.2 Data Sources and Methods

Proposed Action

The sources of data and information used to characterize and describe the existing conditions of recreation resources within the area of analysis include the:

- *Ely Proposed Resource Management Plan/Final Environmental Impact Statement* (BLM, 2007a); and
- *Preliminary Environmental Assessment: DOI-BLM-NV-L010-2011-0011-EA: June 2011: Midway Gold Pan Project: Exploration Amendment* (BLM, 2011b).

Other sources that were used include BLM Geographic Information Systems data, and NDOW data pertaining to Hunt Areas and Units (NDOW, 2012b). Information and data obtained from these sources is available to the public.

Waste Rock Disposal Site Design Alternative

The sources of data and methodology for the Waste Rock Disposal Site Design Alternative are the same as those described for the Proposed Action.

Southwest Power Line Alternative

The sources of data and methodology for the Southwest Power Line Alternative are the same as those described for the Proposed Action.

No Action Alternative

The sources of data and methodology for the No Action Alternative are the same as those described for the Proposed Action.

3.15.3 Existing Conditions

Proposed Action

Recreation in the BLM Ely District is managed by designation of BLM-administered public lands as either SRMA or Extensive Recreation Management Areas (BLM, 2007a). An area is designated as a SRMA when: 1) more intensive recreation management of that area is needed; 2) when the BLM Ely District Office has a commitment to provide specific recreation and experience opportunities within that area; and 3) when recreation is a principal management objective of that area. Any areas of BLM-administered public lands that are not designated as a SRMA are designated as an Extensive Recreation Management Area. These areas include both developed recreation sites and primitive recreation sites with minimal facilities (BLM, 2007a).

The Loneliest Highway SRMA, as described in the Ely Proposed RMP/FEIS (BLM, 2007a), includes all BLM lands extending approximately four miles to either side of U.S. Highway 50. Accordingly, the portion of the area of analysis located within approximately four miles of U.S. Highway 50 is located within the Loneliest Highway SRMA (Figure 3.14-1). The Loneliest Highway SRMA contains some of the most popular destinations in the region, including the Illipah and Cold Creek reservoirs, the Garnet Hill rock hounding area, and sections of the Pony Express Trail (BLM, 2007a). The management objectives of the Loneliest Highway SRMA are to: 1) provide recreational opportunities to the public that would otherwise not be available; 2) reduce conflict among users; 3) minimize damage to resources; and 4) reduce visitor health and safety issues (BLM, 2007a).

The remainder of the area of analysis is located within the Egan Extensive Recreation Management Area. According to the Ely Proposed RMP/FEIS (BLM, 2007a), most recreational activities in the BLM Ely District are dispersed uses, such as off-highway vehicle use, hunting, fishing, camping, cross-country skiing, horseback riding, caving, rock climbing, cultural tourism, and mountain biking. The recreation pursuits described in *Preliminary Environmental Assessment: DOI-BLM-NV-L010-2011-0011-EA: June 2011: Midway Gold Pan Project: Exploration Amendment* (BLM, 2011b) include off-highway vehicle use, four-wheel driving, hunting, hiking, sightseeing, outdoor photography, wildlife viewing, and camping. The area in which these activities are described as occurring in the EA (BLM, 2011b) comprises part of the project area. Accordingly, these activities are also likely to be the most common recreational activities within the entire project area. The exact number of recreation visits that occur within the project area over a given period of time is unknown because of the dispersed nature of the uses that are provided within the area. However, recreational use of the public lands in the BLM Ely District has been consistently increasing according to the Ely Proposed RMP/FEIS (BLM, 2007a).

Hunting is the most common recreational activity within the project area and the surrounding vicinity. The state of Nevada has been divided into 29 management areas (i.e., hunting areas) for antelope, deer, mountain lion, elk, bighorn sheep, mountain goat, and fur-bearing animals by

NDOW. Each hunting area has been further divided into several hunt units by NDOW. The project area is located within the boundaries of Hunting Area 13, as defined in NAC 504.201. NDOW Hunting Area 13 is comprised of NDOW Hunt Units 131, 132, 133, and 134 (NDOW, 2012b). The project area occurs entirely within the boundaries of Hunt Unit 131, Hunt Unit 132, Hunt Unit 133, and Hunt Unit 134 that are located generally south of the project area.

Waste Rock Disposal Site Design Alternative

The existing conditions within the area of analysis for the Waste Rock Disposal Site Design Alternative are the same as the existing conditions described for the Proposed Action.

Southwest Power Line Alternative

The existing conditions within the area of analysis for the Southwest Power Line Alternative are generally the same as the existing conditions described for the Proposed Action. However, approximately 33 acres of the area of analysis is located within NDOW Hunting Unit 145, 198 acres within Hunt Unit 131, and approximately five acres are located within NDOW Hunting Area 164 (NDOW, 2012b). The portion of the area of analysis located within these hunting areas is associated with the 60-foot ROW area that would contain the alternative power line and associated maintenance road along SR 379.

No Action Alternative

The existing conditions within the area of analysis for the No Action Alternative are the same as the existing conditions described for the Proposed Action.

3.16 Socioeconomics

3.16.1 Area of Analysis

Proposed Action

The project would be located in the Pancake Mountain Range in White Pine County, eastern Nevada. The project area would be located approximately 50 miles west of Ely (in White Pine County), 22 miles southeast of Eureka (in Eureka County) and 50 miles north of the Duckwater Reservation. The direct effects area of analysis for the social and economic effects of the Proposed Action includes White Pine County, Eureka County, with a focus on the community of Eureka (due to its proximity to the project area) and the community of Duckwater (located in Nye County). These areas (hereafter referred to as the “affected area”) were selected because the most substantial social and economic effects would occur where employees live and work, where the major project-related tax revenues would accrue, and where the majority of project-related commercial transactions would take place.

Waste Rock Disposal Site Design Alternative

The direct effects area of analysis for the Waste Rock Disposal Area Design Alternative occurs within the project area.

Southwest Power Line Alternative
The direct effects area of analysis occurs within the project area and within the 400-foot power line analysis area.

No Action Alternative
The direct effects area of analysis for the No Action Alternative occurs within the approved exploration POO boundary.

3.16.2 Data Sources and Methods

Proposed Action
The social and economic value assessment focused on issues relevant to the Proposed Action. Data in this report are tied to previous analyses conducted for the ON Line Transmission Project (BLM, 2010b) and Mount Hope Project (Blankenship, 2008 and 2009).

Factors examined in this section include economic setting, population and demographics, employment and income, land ownership, agriculture, housing, and community services. Primary published data sources used to characterize the region included the United States Census Bureau (Census), Bureau of Economic Analysis (BEA), Bureau of Labor Statistics (BLS), United States Department of Agriculture, numerous state and local government agencies, and personal correspondence with public officials and economic development directors in White Pine County, Eureka County and the Tribal planner for the Duckwater Reservation.

Waste Rock Disposal Site Design Alternative
The data sources and methods for the Waste Rock Disposal Area Design Alternative are the same as those used for the Proposed Action.

Southwest Power Line Alternative
The data sources and methods used for the Southwest Power Line Alternative are the same as those used for the Proposed Action.

No Action Alternative
The data sources and methods used for the No Action Alternative are the same as those used for the Proposed Action.

3.16.3 Existing Conditions

Proposed Action
Economic Setting
<u>White Pine County</u>
White Pine County is located in the rugged high desert region of eastern Nevada; Ely is the county seat. The county's economic prosperity has traditionally been tied to the mining of the region's deposits of silver, gold and copper. Mining in Ely initially centered on silver and gold mining in the mid-1800s, while later investments developed around mining copper.

Expansion of copper mining was facilitated with the development of the Nevada Northern Railroad in 1906, which provided an effective means to transport copper ore for smelting. From 1906 to the late 1970s, White Pine County's economy was dominated by the copper industry, and for many years, the value of White Pine County's mineral production was higher than that of all of the other counties in the state combined (WPCWAC, 2006).

In 1933, after initial development by a series of owners, the copper resources in White Pine County were acquired by Kennecott Copper, which became the county's largest employer. The company developed and operated local housing, including the "company towns" of Ruth and McGill. Falling copper prices in the late 1970s, coupled with overseas copper production and stricter environmental regulations, led to closure of the copper mine in Ruth in 1978 and significant layoffs at the smelter in McGill. The smelter and the railroad closed in 1983.

Throughout the 1980s and 1990s, the county's economic prosperity continued to fluctuate with the boom and bust cycle of the mining industry, driven by fluctuations in metal prices. During this period, both Alta Gold and Magma Mining Company (subsequently purchased by BHP Minerals of Australia) operated mines in White Pine County. With the decline of world copper prices in 1998, BHP announced its operations in the county would be placed in "Care and Maintenance" status, and laid-off 433 workers. Simultaneously, Alta Gold declared bankruptcy and closed two mines in the county. These events resulted in a significant rise in unemployment, a decline in school enrollment, and a decrease in taxable sales (WPCWAC, 2006).

While mining has been the backbone of the county's economy, a small agricultural industry was developed to supply mining camps and has sustained the area during mining downturns. The primary agricultural activity has been grazing, as the county has large amounts of open land.

The cessation of the Kennecott operations encouraged economic diversification efforts by county leadership. During the early 1980s, the county established an industrial park and eventually pursued the construction of a maximum-security prison within the county. The Ely State Prison was built in White Pine County in 1989 and now provides a stable source of jobs for county residents.

Currently, community leaders are exploring options to diversify the county's economic base; however, mining will continue to play an important role in the local economy as significant mineral resources have been documented in the county and could be developed as demand for commodities and precious metals increases (WPCWAC, 2006). Two of the county's largest employers are mining companies; Robinson Nevada Mining Company and Bald Mountain Mine together employ between 900 and 1,000 workers, about one-quarter of the county's employment.

Eureka County

Eureka County is a sparsely populated, rural county in central Nevada. The unincorporated town of Eureka, located in the southern portion of the county, is the county seat and its largest community.

Mining has been the economic base of Eureka County since its establishment in 1873, with the discovery of silver-lead mineralization near the site of the present town of Eureka. Improvements in the smelting process led to the county's first mining boom, and by 1878, Eureka was the state's second largest city with a population of over 7,000 and a railroad that connected the town with Palisade, to the north. As ore bodies played out, Eureka experienced its first mining bust, and lost most of its population (Blankenship, 2008). Since the mid-1800s, other mining operations have opened and closed, contributing to the traditional boom and bust cycle inherent in the mining industry.

Development of mines in the county's early history brought sheep herders, cattlemen, and other settlers to Eureka, and the establishment of an agricultural industry. Over time, agriculture (principally hay and livestock production) has provided relatively stable employment and income opportunities in the county, and it continues to play an important role in the local economy (Eureka County, 2010).

The legacy provided by the mining industry now forms the basis for an emerging tourism and recreation industry in Eureka. Surges in mining development have provided government tax revenue which has been used in part to develop historic attractions, upgrade public infrastructure, and restore historic buildings and streetscapes. These improvements, coupled with the area's scenic setting and recreation resources, are contributing to a growing tourism and recreation sector (Blankenship, 2008).

Despite some economic diversification, mining continues to play a significant role in Eureka County. Presently, the two largest employers in the county are Newmont Mining Corporation and Barrick Gold Corporation. Together, these companies employ more than 3,500 workers, most who commute from neighboring Elko County. Mining operations have provided substantial tax revenue to Eureka County, which has been used to develop and maintain a variety of public facilities (Blankenship, 2009).

Community of Duckwater and Duckwater Shoshone Reservation

Duckwater is a rural community located in Nye County, Nevada, near the southwestern corner of adjoining White Pine County. The community includes the Duckwater Reservation, three privately-owned ranches, and other privately-owned lands (Sanchez, 2012).

Duckwater is isolated from population centers in White Pine and Eureka counties by distance and poor roads. Employment opportunities within the Duckwater community are limited. When driving on SR 379, Duckwater is located approximately 50 miles from the project area.

The economic center of the area is concentrated on the Duckwater Reservation, home to the Tribe, where 68 percent of the community's residents live. The socioeconomic analysis discussion of Duckwater utilizes Tribal Information.

The Duckwater Shoshone Indian Tribe of the Duckwater Reservation is located in northeastern Nye County, Nevada and is comprised of lands acquired by the United States Government that were formerly known as the "Florio Ranch." The Duckwater Reservation was established in 1940 when the Tribe purchased the 3,272-acre Florio Ranch and 21 families moved onto the land (Dyer, 2012). The Duckwater Reservation is now comprised of 3,815 acres of land. In 2010, there were 156 people living on the Duckwater Reservation.

Employment on the Duckwater Reservation is largely comprised of Tribal programs, including the Duckwater Economic Development Corporation, a trucking business that is wholly-owned by the Tribe. However, many residents of the Tribe are employed by businesses located off the Duckwater Reservation, primarily at the Barrick Mine and the Foreland oil refinery in Ely (Sanchez, 2012). The principal land use within the Duckwater Reservation is agricultural. The Tribe has exclusive jurisdiction over its lands and is a federally recognized self-governance tribe.

Population Trends

White Pine and Eureka counties are rural and sparsely populated, as is the Duckwater Reservation. White Pine County is the most populated, with a 2010 population of 10,030. The 2010 combined population of the two counties and the Duckwater Reservation was 12,173 (Table 3.16-1).

Table 3.16-1 Population in the Affected Area: Selected Years

Year	White Pine County	Percent Change	Eureka County	Percent Change	Duckwater Reservation	Total Area Population[1]	State of Nevada
2000	9,181	--	1,651	--	149	10,981	2,023,378
2001	8,783	-4.3	1,506	-8.8	NA	10,289	2,132,498
2002	8,863	0.9	1,384	-8.2	NA	10,247	2,206,022
2003	8,842	-0.2	1,420	2.7	NA	10,262	2,296,566
2004	8,966	1.4	1,484	4.5	NA	10,450	2,410,768
2005	9,275	3.4	1,485	0.1	NA	10,760	2,518,869
2006	9,542	2.9	1,460	-1.7	NA	11,002	2,623,050
2007	9,590	0.5	1,458	-0.1	NA	11,048	2,718,337
2008	9,694	1.1	1,553	6.5	NA	11,247	2,738,733
2009	9,570	-1.3	1,562	0.6	NA	11,132	2,711,205
2010	10,030	4.8	1,987	27.2	156	12,173	2,724,636

Sources: Population estimates 2000 and 2010: Census, 2002 and 2010a.
Population estimates 2001-2009: NDCNR, 2012.
[1]Total Population for years 2001 through 2009 includes only White Pine and Eureka counties. Intercensal estimates are not available for the Duckwater Shoshone Reservation.
NA = Not available
Notes: Population for years 2001 to 2009 is the estimated population as of July 1 for the specified year. Population for 2000 and 2010 is the enumerated population as of April 1 for the specified years.

The estimated population of White Pine County has fluctuated over the past 11 years, generally trending upward, reaching a high of 10,030 in 2010. In mid-2006, White Pine County was the 46th fastest growing county in the nation. Beginning in 2008, the recessionary factors that caused population declines at the state level also impacted population growth in White Pine County. The Nevada State Demographer forecasts that White Pine County would continue to gain population, reaching 10,957 by 2017; an increase of 9.2 percent over the 2010 in enumeration.

More than half of White Pine County's population (53.3 percent) lives in areas designated as rural by the Census. The remaining 46.7 percent are considered urbanized, and most of these individuals live in Ely. The towns of Lund, McGill, and Ruth are not large population centers. According to the Census enumeration, Ely's population was 4,255 in 2010, and accounted for 42 percent of the total estimated population in the county. Table 3.16-2 summarizes the populations of cities and towns in White Pine County.

Table 3.16-2 White Pine County City and Town Population: 2000 and 2010

Area	2000		2010	
	Population	Percent of Total	Population	Percent of Total
Ely	4,041	44	4,255	42
Lund	161	2	282	3
McGill	1,184	13	1,148	11
Ruth	404	4	440	5
Remainder of County	3,391	37	3,905	39
Total for White Pine County	**9,181**	**100**	**10,030**	**100**

Source: Census, 2002 and 2010a

Population growth in Eureka County has been, and will likely continue to be, influenced by the mining industry. Since 2000, the county's population has ranged from a high of 1,651 (in 2000) to a low of 1,384 (in 2002), which coincided with the suspension of operations at the Ruby Hill Mine. In contrast to population growth trends in White Pine County and the state as a whole, Eureka's population grew significantly in 2008 and more modestly in 2009 and 2010, sustained largely by the mining sector. Currently, 1,609 people reside in the county, with almost one-third of those living in the town of Eureka.

The Nevada State Demographer forecasts that the population of Eureka County would increase to 2,409 by 2017 or about 21 percent over the 2010 enumeration. These projections take into account current economic conditions in the county. Given the importance of mining in the Eureka County economy, changes in the mining industry could have significant positive or negative impacts on the county's future population.

According to 2010 Census data, all of Eureka County is considered rural. The population of Eureka County is concentrated in four areas: the town of Eureka, Crescent Valley, Diamond Valley, and Beowawe. The majority of the county's residents live in the unincorporated town of Eureka, the county seat. The geographic distribution of the county's population has remained roughly the same over the past 10 years, as shown in Table 3.16-3.

Table 3.16-3 Eureka County City and Town Population: 2000 and 2010

Area	2000		2010	
	Population	Percent of Total	Population	Percent of Total
Eureka	499	30	616	31
Crescent Valley	330	20	366	18
Remainder of County	822	50	1,005	51
Total for Eureka County	**1,651**	**100**	**1,987**	**100**

Source: Census, 2002 and 2010a

The community of Duckwater is considered rural. In 2010, population in the community totaled 228, 156 of which lived on the Duckwater Reservation. Since 2000, population in the area as a whole declined slightly, despite a slight increase in the population living on the Duckwater Reservation (Table 3.16-4) (Census, 2010a).

The Duckwater Reservation has two primary population centers. One is the residential area, which consists of a residential subdivision and some recreational facilities. The second area consists of the elementary school, health building, Senior Citizen's Center, and Tribal administrative offices. The Nevada Demographer's Office does not produce population estimates or projections for either the Duckwater community or the Duckwater Reservation (Table 3.16-4).

Table 3.16-4 Duckwater Community and Duckwater Shoshone Tribe Population: 2000 and 2010

	2000 Population	2010 Population
Duckwater Community	250	228
Duckwater Reservation	149	156
Total for Area	**399**	**384**

Source: Census, 2002 and 2010a

Housing Characteristics

According to the Census, in 2010 White Pine County had a total of 4,498 housing units, Eureka County had 1,076, and the Duckwater Reservation had 75 (Table 3.16-5).

At the time of the 2010 Census, 3,707 (82 percent) of the units in White Pine County were occupied and 791 were vacant (including 231 units held for recreational and seasonal use). Owner-occupied units numbered 2,615 and renter-occupied homes totaled 1,092. The majority of housing units in White Pine County are single-family units (80 percent). Multifamily units and mobile homes accounted for 20 percent of the housing units in the county (Census, 2010a).

Existing housing in White Pine County reflects the economic history and development of the communities within the county. In Ely, McGill, and Ruth, housing is a mix of older company housing constructed before 1940 and newer units and manufactured housing built on existing lots within the communities.

Table 3.16-5 Housing Compositions of the Affected Area: 2010

Description	White Pine County		Eureka County		Eureka Town[4,5]		Duckwater Reservation	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total Housing Units	**4,498**	**--**	**994**	**--**	**310**	**--**	**75**	**--**
Occupied[1]	3,707	82.4	772	77.7	195	62.8	68	90.7
Vacant[1]	791	17.6	222	22.3	115	37.2	7	9.3
Single-Family[2,3]	3,583	80.0	225	23.0	112	36.0	53	71.0
Multi-Family Units[2,3]	265	6.0	53	5.0	53	17.0	0	-
Mobile Homes/Other[2,3]	650	14.0	716	72.0	145	47.0	22	29.0

Sources: Census 2010a and Eureka County Assessor's Office, 2010

[1] Estimates of occupied and vacant housing units in Eureka County were made by the preparer using data from the Census, 2010a.

[2]Characteristics of housing units in White Pine County and Duckwater Reservation were estimated using data from the Census (American Community Survey 2007 through 2011) and reflect an average over the five-year period.

[3]Counts for Eureka County were provided by the Eureka County Assessor's Office.

[4]Percent estimates of total housing units for Eureka Town are housing units in the township divided by total housing units in the county.

[5]Percent estimates of housing units by type of unit for Eureka Town are based on total housing units located in the township.

There are currently 50 homes listed for sale on the Desert Mountain Realty website, which serves the communities of eastern Nevada (Desert Mountain Realty, 2013). Although the number of vacant housing units in each county in 2010 (as shown in Table 3.16-5), is relatively high, some local stakeholders in White Pine County and southern Eureka County believe this information does not reflect the current housing market because of increased mining in the area over the past two years, which imports workers that needs housing but may not have the credit worthiness to qualify for a home mortgage (Mears, 2012; Garza, 2012). In White Pine County, area employers have raised concerns regarding the lack of adequate housing for new employees and on their ability to recruit and retain employees because of this. According to a housing needs assessment completed by White Pine County Community and Economic Development (WPCCED) in 2012, almost half of the current housing stock in the county is over 50 years old, substantially older than the housing stock statewide; rental vacancy rates were below nine percent; and the county currently has a housing gap of 137 units. Projected housing needs over the next five years show a demand for an additional 482 units (WPCCED, 2012).

There is high demand for rental property, but few rental units are on the market in White Pine County. According to the Housing Value Needs Assessment undertaken by the WPCCED, rental rates generally range from $700 to $1,000 per month. There were 994 housing units in Eureka County in 2010, according to the Eureka County Assessor's Office. Based on information estimated by the Census, about 78 percent of these units were occupied and 22 percent were vacant. Twenty-six percent of the vacant units were held for seasonal, recreational, or occasional use.

Almost 67 percent of all occupied housing units in Eureka County are owner-occupied, and the remaining units are occupied by renters. Mobile homes are the predominant form of housing in Eureka County, accounting for 72 percent in 2010. Reliance on mobile homes in the county is the result of several factors, including the lack of a stable housing market, a general lack of available housing in the county, and a lack of mortgage financing. Demand for housing is extremely high. Total housing counts for Eureka County in 2011 increased by 30 units for a total count of 1,024. The increase was largely the result of single-family units constructed in Diamond Valley (Mears, 2012).

Almost one-third of all housing in Eureka County is located in the town of Eureka. Single-family units located in the town account for 36 percent of all housing units in the town and half of all single-family units in the county. Mobile homes located in the town of Eureka account for 47 percent of all housing in the town, but only 15 percent of all mobile homes located in the county.

In Eureka County, there is virtually no temporary housing available and very few homes available for sale. Temporary accommodations include motels and RV parks. Motels are generally full every night and the RV parks are frequently at or near full capacity (Mears, 2012).

To help meet current and future housing demands, Eureka County is currently working with various entities to develop the Eureka Canyon Subdivision, which will include both multi-family and single-family housing units. The multi-family portion of the agreement would initially provide 50 rental units with another 50 units to be added if needed. The estimated cost of the multi-family part of the agreement is $4.65 million. The single-family part of the agreement may provide up to 122 single-family lots. The total estimated cost of the development of single-family lots is $11.0 million. The first phase of the project includes 32 single-family units and 50 apartment units (Mears, 2012; Eureka County Recorder/Auditors Office, 2011).

More than 90 percent of housing units on the Duckwater Reservation are occupied, and more than half of those are owner-occupied (57 percent). Of the seven units identified in the 2010 Census as vacant, fewer than half (three units) were considered recreational units and three were as listed as rentals.

Housing unit counts by type of structure for the Duckwater Reservation were estimated using 2010 Census data and estimates made through the American Community Survey program of the Census. Based on these estimates, 71 percent of all housing units on the Duckwater Reservation are single-family units, and essentially all are occupied. The remaining 22 units are classified as mobile homes (29 percent). There is no multi-family housing on the Duckwater Reservation. The Tribe is currently involved with renovating and expanding several homes on the Duckwater Reservation to accommodate larger families. At present, the Duckwater Reservation's housing stock is adequate to meet the needs of the Tribe's population (Sanchez, 2012).

Employment and Income

Labor Force

Labor force is an economic measure that indicates how many people are seeking employment, and is the basis for deriving an unemployment rate. Labor force and unemployment rates are typically not generated for areas smaller than county designations; therefore, the discussion of labor force and unemployment rates for White Pine and Eureka counties is based on information estimate by the Nevada Division of Employment, Training & Rehabilitation (NDETR) while the unemployment analysis for the Duckwater Reservation relies on personal communications with the Tribe.

White Pine and Eureka Counties

In rural and mining communities, when a mine closes or a major employer ceases operations, the unemployment rate may not increase because people leave the area to find employment, and the labor force declines: a scenario exemplified in both White Pine and Eureka counties.

As shown in Table 3.16-6, the size of the resident labor force in both counties has fluctuated over the past 12 years, generally following trends in the mining industry.

Table 3.16-6 Labor Force and Unemployment: 2000–2012

Year	White Pine County			Eureka County			State of Nevada
	Labor Force	Not Employed	Rate	Labor Force	Not Employed	Rate	Rate
2000	3,769	158	4.2	793	26	3.3	4.5
2001	3,646	171	4.7	769	32	4.2	5.3
2002	3,842	158	4.1	772	36	4.7	5.7
2003	3,711	151	4.1	709	39	5.5	5.2
2004	3,953	147	3.7	672	28	4.2	4.4
2005	4,321	184	4.9	674	24	4.3	4.5
2006	4,441	171	4.8	706	28	5.2	4.2
2007	4,660	176	3.8	793	34	4.3	4.7
2008	4,739	234	4.9	844	46	5.5	7.0
2009	5,012	359	7.2	906	62	6.8	11.6
2010	5,237	462	8.8	1,082	82	7.6	13.7
2011	5,859	492	8.4	1,115	67	6.0	13.5
2012	6,003	443	7.4	1,089	67	6.1	12.0

Source: NDETR, 2010

The resident labor force in White Pine County fluctuated modestly between 2000 and 2004, but the annual unemployment rate remained low due in part to a decline in the county's population that began in 2001 and continued through the second half of 2004, when copper mining activities commenced at the Robinson Mine. Since 2005, the civilian labor force has steadily increased, outpacing population growth in the county.

The White Pine County 2012 average unemployment rate of 7.4 percent is higher than Eureka County's, but lower than that of the state of Nevada. Over the past four years, the White Pine County unemployment rate increased significantly over that reported from 2000 through 2008. This comparatively high unemployment rate is a culmination of several factors including the national recession and an aging population in the county. From 2000 to 2010, the median age in White Pine County increased from 37.7 years to 40.8 years. Older people typically have stronger ties to the community and are less likely to relocate.

In Eureka County, fluctuations in the civilian labor force have been more pronounced, especially for the period 2000 through 2005, partially in response to the suspension of operations at the Ruby Hill Mine (Blankenship, 2008). During this period, the unemployment rate remained relatively low as people left the county in search of employment elsewhere. From 2006 through 2010, the civilian labor force increased 53 percent, likely in response to an increase in mining operations, which appears to have drawn people into the county.

Duckwater Reservation

An estimated 69 percent of the Tribe's population over the age of 16 is in the labor force. Because the Duckwater Reservation is a subcomponent of the county, no specific unemployment rate is available; however, according to Tribal Chairman Sanchez, at least one-quarter of the unemployed over the age of 16 are looking for jobs either on, or in close proximity to the Duckwater Reservation (Sanchez, 2012).

Employment

Two types of county-level employment and wage data are produced by federal agencies. The United States Department of Commerce, BEA provides wage and salary employment estimates that include "covered wage and salary employment" (employment covered by unemployment insurance) and proprietor's employment (self-employed workers). BLS provides information on covered employment through its Quarterly Census of Employment and Wages. Because of data suppression, information from both programs was used to show employment and wages for White Pine and Eureka counties. Data used to describe employment for the Duckwater Reservation was estimated by the Bureau of the Census in its American Community Survey 5-Year Estimates Program.

White Pine and Eureka Counties

The economic strength of both White Pine and Eureka counties can be demonstrated by comparing the unemployment rate in each county with that of the state. Since 2008, the unemployment rate in both counties has been significantly below that reported for the state of Nevada, while the population in White Pine and Eureka counties has continued to grow.

Detailed 2010 employment by industry sector for both White Pine and Eureka counties is shown in Table 3.16-7. Trends in nonfarm employment for both counties are shown in Table 3.16-8.

Mining, the primary source of economic expansion in the early history of White Pine and Eureka counties, continues to play an important economic role in both areas. In White Pine County, mining accounted for almost 17 percent of all total employment in 2010. In Eureka County, mining accounted for more than 80 percent of all jobs in 2010 as reported by BEA (Table 3.16-7).

Table 3.16-7 White Pine County and Eureka County Employment: 2010

Description	White Pine County	Eureka County
	2010	2010
Total Employment	**5,155**	**4,912**
Farm Employment	163	163
Nonfarm Employment	4,992	4,749
Nonfarm Employment by Type	**4,992**	**4,749**
Private Employment	**3,478**	**4,527**
Forestry, Fishing and Related Activities	(D)	(D)
Mining[1]	864	3,912
Utilities	(D)	84
Construction	179	(D)
Manufacturing	52	19
Wholesale Trade	75	(D)
Retail Trade	468	56
Transportation and Warehousing	(D)	(D)
Information	45	(D)
Finance and Insurance	161	(D)
Real Estate, Rental And Leasing	109	(D)
Professional, Scientific, Technical Services	109	18
Management Of Companies/Enterprises	22	(D)
Admin. And Waste Management Services	119	(D)
Educational Services	(D)	(D)
Health Care And Social Assistance	(D)	(D)
Arts, Entertainment	59	15
Accommodation/ Food Services	536	63
Other Services	187	45
Government	**1,514**	**222**
Federal, Civilian	232	(L)
Military	25	(L)
State and Local[2]	1,257	209

Source: BEA, 2010a and NDETR, 2010

[1]Mining employment in White Pine County is estimated using BEA's reported 2006 employment and year-to-year changes in mining jobs between 2009 and 2010 reported by the Nevada Department of Employment, Training and Rehabilitation (www.nevadaworkforce.com).

[2]State and Local Government employment for Eureka County was estimated using the ratio of state and local government employment reported in 2010 by the Nevada Department of Employment, Training and Rehabilitation.

(D) = Not shown to avoid disclosure of confidential information. Estimates for this item are included in totals.

(L) = Less than ten jobs. Estimates for this item are included in totals.

Table 3.16-8 Nonfarm Employment Trends: 1990, 2000, 2010

Description	White Pine County			Eureka County		
	1990	2000	2010	1990	2000	2010
Total Nonfarm Employment	4,754	3,851	4992	4,155	4,426	4,915
Nonfarm Sector Employment						
Mining	953	227	864	3,695	3,826	3,928
Government	1,169	1,389	1,514	170	229	219
All other industry sectors	2,632	2,235	2,614	290	371	768

Source: BEA, 1990, 2000, 2010b and NDETR, 2010

[1]Mining employment in White Pine County is estimated using BEA's reported 2006 employment and year-to-year changes in mining jobs between 2009 and 2010 reported by the Nevada Department of Employment, Training and Rehabilitation (www.nevadaworkforce.com).

In 2010, government was the largest employment sector in White Pine County and includes the regional offices of the BLM and USFS, Great Basin National Park, local school districts, and the Ely State Prison. In 2010, BEA estimated there were 1,514 government jobs in the county, or 30 percent of all nonfarm employment jobs. Of these, approximately 500 are in state government, and most of these state jobs are affiliated with the Ely State Prison. According to 2000 Census, 94 percent of the people who work in White Pine County also reside there.

Information on total wages received by covered workers in White Pine County is provided by the NDETR. In 2010, the average weekly wage paid to workers in the mining sector was $1,381. This is significantly higher than the average for all covered workers of $839. While mining employment accounted for 21 percent of all covered employment in the county (818 jobs), it provided 34 percent of all wages paid ($58.7 million). Employment in the county's second largest industry sector, government, accounted for 37 percent of all covered workers in 2010 (1,455 jobs) and 41 percent of all covered wages paid that year ($70.5 million). The combined employment in mining and government accounted for 58 percent of all covered employment in 2010 (2,273 jobs), but 75 percent of the wages paid ($129.3 million). Total covered employment in 2010 in White Pine County was reported to be 3,969. Wages received by these workers totaled $173.1 million.

Most mining employment in the county is associated with mines in the northern portion of the county. Currently, of the three largest employers, two are located in northern Eureka County (Newmont Mining Corporation's Eastern Nevada Operations and Barrick Gold Corporation). The Ruby Hill Mine is adjacent to the town of Eureka.

Other employment sectors of note include local government, utilities, accommodations, and food services. These sectors are minor in comparison to the mining sector, but are comparatively stable.

In contrast to White Pine County, 72 percent of the people working in Eureka County live outside the county and commute to Eureka County for work. Of these commuters, most (94 percent) reside in the town of Elko as it is the most accessible community with a reasonable

selection of services and housing. The remaining commuters (six percent) travel from the counties of Lander, White Pine, and Washoe and areas outside of Nevada (Census, 2000).

The concentration and importance of mining in the Eureka County economy is underscored by the industry's share of wages paid to covered workers. Covered employment in Eureka County was reported to be 4,294 in 2010. Wages paid to these workers totaled almost $356.7 million. Mining employment totaled 3,841, or 89 percent of all covered workers. Wages paid to these workers totaled $335.8 million, or 94 percent of all covered wages reported in the county in 2010. When mining wages are removed from the analysis, the average weekly wage received by all other workers in Eureka County who were covered by unemployment insurance in 2010 was $887.

Duckwater Reservation

According to the most recent American Community Survey data provided by the Census, an average of 91 residents living on the Duckwater Reservation were employed between 2007 and 2011. This represents approximately 69 percent of the population 16 years and over (Census, 2012c).

The largest employer on the Duckwater Reservation is the Tribe itself, as represented in the number of workers in public administration (Table 3.16-9). Other employment concentrations are in agriculture, forestry, fishing and hunting and mining (18 people) and educational services and health care and social assistance.

Table 3.16-9 Duckwater Shoshone Reservation, Employment by Industry Sector: Average 2007-2011

Industry Sector	Employment
Agriculture, forestry, fishing and hunting, and mining	18
Construction	3
Manufacturing	4
Wholesale Trade	0
Retail Trade	8
Transportation and warehousing	6
Information	0
Finance and insurance, real estate rental and leasing	0
Professional, scientific, management, administrative and waste management services	4
Educational services, health care and social assistance	11
Arts, entertainment and recreation, accommodation and food services	9
Other services except public administration	0
Public administration	28
Total civilian employed population	**91**

Source: Census, 2012c

Information provided by the Census does not estimate the number of workers who leave the Duckwater Reservation to work. However, based on personnel communications with Tribal Chairman Sanchez, approximately 65 people are employed in Tribal programs on the reservation and a fair number of residents travel off the Duckwater Reservation to work.

Industry-specific earnings and wage information is not estimated by the American Community Survey. However, the median earnings for all workers averaged $27,375 between 2007 and 2011. This average includes both full-time and part-time workers.

Tourism

Large tracts of open space and numerous designated wilderness areas provide for multiple recreation uses in White Pine and Eureka Counties. The Great Basin National Park is located in White Pine County as are parts of the Humboldt-Toiyabe National Forest and Ruby Lake National Wildlife Refuge. Portions of the Lincoln Highway traverse through White Pine County.

Most recreational activities in the affected area are dispersed uses, such as off-highway vehicle use, hunting, fishing, camping, cross-country skiing, horseback riding, caving, rock climbing, cultural tourism and mountain biking, Because of the dispersed nature of these activities, the exact number of recreation visits in the area is unknown.

Some measures of destination tourism in the area include room tax revenues, and attendance at state and national parks. Based on estimates from White Pine County Room Tax Revenues, visitation at Great Basin National Park, Cave Lake/Ward Charcoal Ovens State Park and reports of angler and hunter days, tourism and travel generates between $25 and $30 million in revenue for White Pine County each year. Both the National and State Parks report 80,000 visitors per year and tourism-related visits total about 96,000 annually (WPCCWAC, 2006).

Eureka County is experiencing higher levels than in past years of outdoor recreation use as hunting, fishing, camping, hiking and mountain bike riding are popular activities in Eureka County. The Eureka Sentinel Museum, located in the Eureka Historic District, is an important part of Eureka's historical and architectural heritage, serving as an indicator of the potential for development of historical tourism in the region. In 2011, visitation to the museum reached 4,755 (Eureka County, 2013).

Both White Pine and Eureka have stated goals of expanding tourism and recreation to diversify their respective economies. In Eureka County's 2011 Comprehensive Annual Report, this effort is summarized as follows: "The County continues to look to other industries such as tourism and agriculture for possible economic development. With the preservation of many historic buildings, the county hopes tourism will be enhanced." (Eureka County, 2013).

As stated in the 2007 White Pine County Public Land Policy Plan, "White Pine County enjoys many natural amenities that attract local residents and visitors. These resources should be protected and developed for the public's multiple use benefit." A specific policy goal outlined in that document is to encourage sustainable recreational use in White Pine County by increasing

marketing efforts that describe the opportunities available, including the Great Basin Heritage Route, the Loneliest Highway in America, the Pony Express Trail and the Great Basin National Park (WPCPLUAC, 2007).

Personal Income

White Pine and Eureka Counties

An analysis of personal income shows striking differences between the counties, although trends in the mining sector are reflected in personal income fluctuations in both areas. As shown in Table 3.16-10, personal income in each county has generally trended upwards with the exception of reported income in 2009. The declines coincide with a decrease in mining in White Pine County, and an increase in earnings paid to workers employed in, but living outside of Eureka County, underscoring the synergy between the two counties.

Table 3.16-10 Personal Income by Place of Residence: Selected Years

Description	1995	2000	2005	2007	2008	2009	2010
White Pine County							
Personal Income of Residents ($M)	$202.1	$230.9	$308.7	$347.2	$367.2	$348.5	$371.8
Per Capita Income	$20,744	$25,577	$33,682	$36,072	$37,328	$35,198	$36,940
Derivation of Personal Income							
Earnings By Place of Work ($M)	$163.2	$143.3	$202.6	$231.5	$241.2	$232.0	$246.7
Residency Adjustment ($M)	(.3)	30.5	34.1	35.8	33.6	26.5	33.4
Social Security Deductions ($M)	(19.4)	(11.1)	(16.3)	(20.5)	(20.5)	(20.7)	(22.3)
Other Income for County Residents	58.6	68.2	88.3	100.5	112.8	109.7	114.0
Total Resident Personal Income	$202.1	$230.9	$308.7	$347.2	$367.2	348.5	$371.8
Eureka County							
Personal Income of Residents ($M)	$34.9	$38.7	$45.6	$55.3	$66.2	$62.7	65.7
Per Capita Income	$25,708	$23,684	$31,108	$32,882	$37,227	$32,577	$32,876
Derivation of Personal Income							
Earnings By Place of Work ($M)	$274.8	$308.7	$311.7	$455.0	$441.1	$463.9	$453.6
Residency Adjustment ($M)	(216.7)	(240.0)	(247.3)	(365.0)	(348.8)	(369.4)	(357.3)
Social Security Deductions ($M)	(34.8)	(41.9)	(32.5)	(49.4)	(43.9)	(48.6)	(48.0
Other Income for County Residents	11.6	11.9	13.7	14.6	16.8	16.9	17.3
Total Resident Personal Income	$34.9	$38.7	$45.6	$55.3	$66.2	$62.7	$65.7

Source: BEA, 2010b

The most notable difference between the components of personal income in the two counties is seen in the adjustment for residency in earnings by place of work. This is an adjustment that credits earnings made by residents living in one county but working in another county back to the county of residence.

In White Pine County, since 2000, there has been a positive net adjustment to earnings, reflecting the fact that there are more residents of White Pine County who work outside the county than there are workers commuting to the county to work. Between 2000 and 2012, the net adjustment to earnings in White Pine County has fluctuated between 11 percent and 21 percent of earnings by place of work. The positive net adjustment indicates that employment opportunities exist for residents of White Pine County within their county.

Per capita personal income (PCPI) in White Pine County in 2000 was $24,330, or about 80 percent of the state average of $30,436. By 2010, PCPI in White Pine County was at par with the state and just eight percent below the national average.

The adjustment to earnings in Eureka County is negative. For most years, the residency adjustment has reduced earnings by 79 percent; in other words, 79 percent of the earnings paid to workers by companies located in Eureka leave the county. Most of these workers reside in Elko County.

Although mining wages and salaries are higher than the average, PCPI in Eureka County lags behind the state level. In 1990, PCPI in Eureka exceeded the statewide average by $3,575 ($23,052 versus $19,477, 118% of the state average). In 2000, PCPI in Eureka County was $23,299, or about 78 percent of the state average. By 2010, PCPI in Eureka County gained some ground, but was still 11 percent below the state average of $36,938 and 18 percent below the nationwide average of $39,937.

Duckwater Shoshone Reservation

The BEA does not make income estimates for geographies smaller than county designations. However, income information is estimated by the Census in its American Community Survey Program. According to the most recent American Community Survey estimates for the Duckwater Reservation, estimated average per capita income between 2007 and 2011 was $24,855, significantly higher than the $13,100 enumerated in the 2000 Census. Based on these estimates, total income for residents of the Duckwater Reservation was approximately $3.88 million in 2010 and $1.95 million in 2000.

Agriculture

Agriculture has been an important component of the counties and communities in the affected area. The primary form of agriculture is cattle ranching. Much of the land used to graze cattle is range land managed by the BLM and other federal land management agencies (Eureka County, 2010). Neither the project area nor the adjacent land are primary grazing areas. Other portions of the grazing allotment containing the project area can satisfy existing grazing requirements.

Crop production in White Pine and Eureka counties is focused largely on hay. Table 3.16-11 shows selected components of the agricultural industry in each county.

Table 3.16-11 Agricultural Statistics: 2007

	White Pine County	Eureka County
Farm employment	158	157
Farm earnings	$2,717,000	$5,715,000
Number of farms	97	86
Average size (acres)	(D)	783,440
Value of agricultural products	$15,172,000	$25,015,000
Primary Products	Cattle, Hay	Cattle, Sheep, Hay

Source: BEA, 2010b; NASS, 2007
(D) = Not shown to avoid disclosure of confidential information. Estimates for this item are included in the totals.

While agriculture has been a mainstay in the White Pine County economy, it is becoming less important with the decline in number of operating farms. According to the 2007 Agricultural Census, there were 97 farms operating that year, down from 212 in 2002. Trends in farm employment reflect this decrease. In 2002, farm employment (both self-employment and wage employment) totaled 198. In 2007, farm employment dropped to 158. Since 2007, employment has fluctuated slightly, and by 2010, farm employment totaled 163 and farm earnings were almost $3.9 million.

The value of agricultural production in White Pine County dropped substantially from 2002 to 2007. The value of agricultural products produced on farms in White Pine County in 2007 was $15.2 million, compared to $76.0 million in 2002. About half of all farm operators in White Pine County had a principal occupation other than farming, and 37 percent worked more than 200 days off the farm in 2007 (NASS, 2007).

From 2002 to 2007, the number of farms in Eureka County increased from 73 to 86, with a corresponding jump in value of agricultural products of $25 million in 2007. From 2002 to 2007, farming employment increased from 127 to 157 with earnings totaling about $5.7 million. In 2010, farming employment was 163 with reported earnings of about $5.5 million (Eureka County, 2010). Seventy-six percent of all farm operators in Eureka County indicated that farming was their principal occupation in 2007, and just 30 percent worked more than 200 days off the farm (NASS, 2007).

Agricultural activities on the Duckwater Reservation are concentrated in the valley around Duckwater Creek. Individuals on the Duckwater Reservation operate up to 120-acre allotments, which are planted mainly with grasses and alfalfa. Portions of the Duckwater Reservation are also used for grazing cattle and horses (Emm et al., 2002).

Local Government Finances

White Pine and Eureka counties derive their revenues through a variety of taxes and fees, collected locally or at the state level for distribution to each county. At the local level, revenues

are primarily ad valorem property taxes on real and personal property and the net proceeds of mines. State-shared revenues include sales, motor vehicle, fuel, and gaming taxes.

Intergovernmental revenue includes state grants and state-shared revenue and federal pass-through grants, leases, and Payment in Lieu of Taxes (PILT). The 2011 revenues and expenditures for White Pine and Eureka counties are shown in Table 3.16-12.

Table 3.16-12 Local Government Finances: 2011

	White Pine County	Eureka County
Revenues		
Taxes	10,384,452	18,721,385
Licenses and Permits	44,956	12,933
Intergovernmental Revenues	8,056,329	9,656,369
Charges for Services	847,808	2,526,833
Fines and Forfeits	340,354	93,226
Miscellaneous	1,154,088	1,351,634
Total Revenues	**$20,827,987**	**$32,362,380**
Expenditures		
General Government	3,588,568	559,777
Public Safety	4,261,622	2,747,967
Judicial	2,259,818	1,991,514
Public Works	1,674,445	7,529,619
Health and Sanitation	81,075	3,776,439
Culture and Recreation	746,706	1,423,134
Community Support	347,348	542,040
Welfare	737,158	0
Intergovernmental Expense	0	4,213,581
Capital Outlay	3,183,502	
Total Expenditures	**$16,880,242**	**$27,824,071**
Excess Revenues Over (Under) Expenditures	**$3,947,745**	**$4,538,309**

Sources: White Pine County Finance Director, 2011 and Eureka County Recorder/Auditor's Office, 2011

Eureka County operates with a three-member Board of Commissioners that oversees the operations of the county and function as policy makers and administrators. White Pine County operates with a County Commission comprised of five commissioners elected at large.

In both counties, property taxes (or ad valorem taxes) were the largest revenue source, followed by intergovernmental revenue, primarily from state revenue sharing. Included in ad valorem tax revenues are net proceeds of mines which account for a substantial portion of the tax revenue in both counties. The largest component of intergovernmental revenue is "Consolidated Tax" of which the majority is sales tax.

In fiscal year 2011, Eureka County collected about $32.4 million and spent $27.8 million. The two largest revenue sources were property taxes (ad valorem taxes) including net proceeds of mines which totaled $14.3 million and almost $9.7 million in intergovernmental receipts. Net proceeds of mines accounted for 73 percent of total assessed valuation in the county in fiscal 2011. The net proceeds of mine revenues are driven by the high price of gold.

White Pine County collected $20.8 million in fiscal 2011 and spent almost $16.9 million. Property taxes totaled about $10.4 million, of which net proceeds of mines totaled $3.9 million, and accounted for about 39 percent of total assessed valuation in the county.

Dependence on tax revenues derived from ad valorem taxes is a particular concern for rural counties in Nevada due to fluctuations in the mining industry. Because the share of assessed valuation attributable to mining is substantial in both White Pine and Eureka counties, year-to-year variances in those assessed valuations would affect ad valorem tax revenues, which in turn influences local government operations. To help offset the economic impact when the mines close, Eureka County has established a Future Reserve Fund. At the end of fiscal year 2011, Eureka County's Future Reserve Fund had a reported balance of $9.4 million.

White Pine County also typically uses net proceeds of mine revenues to fund capital projects rather than operations. In 2010, the county had set aside $7.5 million in mitigation funds to help offset the economic impacts of a downturn in mining operations.

Intergovernmental revenues account for virtually all of the remaining revenue in each county. In fiscal 2011, intergovernmental revenue totaled $8.0 million in White Pine County and almost $9.7 million in Eureka County.

The PILT are an important component in White Pine County's budget. In fiscal 2011, White Pine County received $1.1 million in PILT, which accounted for 14 percent of all intergovernmental revenue received; Eureka received $288,663 (Reid, 2012).

Eureka County completed several large construction projects in fiscal 2011, including the Eureka Water Storage Project, Eureka Main Street Water/Sewer project, and a county-wide road-chip seal project. Two additional projects are underway, including the Devil's Gate General Improvement District (GID) arsenic treatment project and the Crescent Valley arsenic treatment project. These projects would carry over into fiscal year 2012 (Eureka County Recorder/Auditor's Office, 2011).

Neither county had any bonded debt as of fiscal year 2011. Both counties fund improvements using available resources in large part generated by mining activities. Given the current strength of the mining sector, funding improvements with debt is unnecessary.

The fiscal outlook for both counties would depend on mining and commodity prices. Current existing and future mine plans indicate that there would be sufficient reserves to sustain operations well into the future; however, variability in the prices of commodities (primarily gold and copper) may affect production levels and net proceeds revenue, and in turn, may affect the tax base in Eureka and White Pine counties.

Land Ownership

The distribution of land ownership in White Pine and Eureka counties is shown in Table 3.16-13. The majority of land in each county is managed by the federal government (BLM). The BLM oversees 79 percent of the land in Eureka County and about 96 percent in White Pine County. Almost 21 percent of all land in Eureka County is privately owned, while just 4.2 percent of all land in White Pine County is in private ownership.

Table 3.16-13 Land Ownership: White Pine County and Eureka County

	White Pine County		Eureka County	
	Acres	**Percent**	**Acres**	**Percent**
Bureau of Land Management	4,513,533	79.3	1,969,762	73.8
United States Forest Service	761,568	13.4	142,923	5.4
Other federal agencies	90,194	1.6	0	--
Tribal	69,766	1.2	0	--
State Government	18,344	<1.0	19	<1.0
Local Government	3,577	<1.0	1041	<1.0
Private Ownership	236,035	4.2	554,506	20.8
Totals	**5,693,016**	**100**	**2,668,251**	**100**

Sources: White Pine County Public Land Use Advisory Committee, 2007; Resource Concepts, Inc., 2005; and Eureka County Master Plan, 2010

The Duckwater Reservation is comprised of approximately 3,815 acres land, all of which is owned by the Tribe.

Community Facilities and Services

Information for this section was obtained from the White Pine County Economic Development Office, Eureka 2010 Master Plan, Mount Hope Project Socioeconomic Assessment, the Tribe, and secondary sources, as noted.

Education

The White Pine County School District is located in Ely and operates four elementary schools, one middle school, and three high schools. During the 2010/2011 school year, reported enrollments totaled 1,403, down slightly from the previous year. Enrollment at each school for the 2010/2011 school year is shown in Table 3.16-14.

Table 3.16-14 White Pine School District Public School Enrollment: 2010-11

School	Enrollment	School	Enrollment
Baker Elementary	9	White Pine Middle School	283
David E. Norman Elementary	400	Lund High School	37
Lund Elementary	51	White Pine High School	419
McGill Elementary	167	Steptoe Valley High School	37

Source: Nevada Department of Education, 2010

Over the past five years, school enrollments have remained steady in White Pine County, with only minor annual fluctuations (Table 3.16-15).

Table 3.16-15 White Pine County School District Enrollments: 2003-04 to 2010-11

Year	Enrollment	Year	Enrollment
2003-04	1,366	2007-08	1,422
2004-05	1,461	2008-09	1,417
2005-06	1,252	2009-10	1,427
2006-07	1,422	2010-11	1,403

Source: Nevada Department of Education, 2010

Public education in Eureka County is provided by the Eureka County School District, in the town of Eureka. The district operates one elementary school and a junior/senior high school in Eureka and an elementary school in Crescent Valley. Total enrollments during the 2010/2011 school year were 239, down about eight percent from the total enrollment reported for the previous school year. Enrollment at each school for the 2010/2011 school year is shown in Table 3.16-16.

Table 3.16-16 Eureka County School District Public School Enrollment: 2010-11

School	Enrollment
Crescent Valley Elementary	21
Eureka County Elementary	100
Eureka County Junior High School	118

Source: Nevada Department of Education, 2010

Over the past seven years, enrollments have fluctuated from a low of 220 in 2003/2004 to a peak of 259 in 2009/2010 in Eureka County. However, even at its peak, enrollments in Eureka schools were well below levels reported in the late 1990s, when school enrollments were above the 350 mark. Table 3.16-17 shows enrollment trends in the district since the 2003/2004 school year.

Table 3.16-17 Eureka County School District Enrollments: 2003-2004 to 2010-2011

Year	Enrollment	Year	Enrollment
2003-04	220	2007-08	246
2004-05	233	2008-09	257
2005-06	229	2009-10	259
2006-07	248	2010-11	239

Source: Nevada Department of Education, 2010

Eureka's elementary school has a physical design capacity of about 300 students, while the junior/senior high school has an optimum capacity of 140 students with a maximum capacity of 160 students. The Crescent Valley elementary school has a capacity of 120 to 140 students (kindergarten to the sixth grade). While enrollments at all schools in Eureka County are below optimum capacity levels, there may be a need for the county to dedicate land for schools, bus stops, etc. if there is a significant change in the county's population base.

There is one elementary school in Duckwater (Duckwater Elementary School), which provides education from kindergarten through eighth grade. In fiscal year 2011, there were 13 students enrolled in the Duckwater Elementary School. High school students living on the Duckwater Reservation attend school in Eureka.

Public Utilities

Water

The Eureka County Public Works Department manages three water systems in Eureka County, including water systems in the town of Eureka, Devil's Gate (Districts #1 and #2), and Crescent Valley.

The water system for the town of Eureka includes two wells: one is located in Diamond Valley, and the other is near springs south of Eureka. Water produced by the wells is pumped into three storage tanks with a combined capacity of 2,350,000 gallons. The Devil's Gate water system is made up of two wells, a water storage tank, a booster pump station, and the Devil's Gate Water Transmission Inter-tie Project pipeline. The water system for the town of Crescent Valley originates from two wells. A total of 672,000 gallons of water is stored in three tanks which supply the gravity fed system.

The City of Ely is responsible for water and sewer service within city boundaries but also provides water to areas adjacent to Ely. Portions of Ely's water distribution system reportedly date back to the 1930s, consisting mostly of cast iron pipe with leaded joints, while some portions consist of ductile iron pipe from the 1950s and transit pipe from the 1970s. Ely's water system relies on groundwater sources, and the quality of this water is generally good. Currently, the majority of water used by Ely is supplied by dewatering wells associated with the Robinson open pit mine to the east. Water not used by Ely is discharged to Murray Creek.

The McGill Ruth Consolidated Sewer & Water GID is an independent entity formed in the early 1980s in accordance with Nevada State law, and provides both water and sewer service to the communities of McGill and Ruth. Two groundwater wells supply water to McGill. The PVC distribution piping was installed in the 1980s, and McGill's water system is reportedly in good condition. Ruth's system is likewise reported to be in good condition. Ruth's primary water supply was originally from the diversion of four springs located on Ward Mountain, with backup water coming from Ely; however, this arrangement was modified in recent years and Ruth's water is now supplied from dewatering wells associated with the Robinson open pit mine, and distributes water through PVC distribution piping installed in the 1980s.

Available utilities on the Duckwater Reservation include domestic water, electricity, telephone, solid waste disposal, and sanitation. These are considered adequate for rural domestic needs. Electricity is supplied by Mt. Wheeler Power (MWP). Solid waste, including household trash, is taken to a landfill in Tonopah. Water is supplied to homes by individual wells and community water systems. Homes on the Duckwater Reservation use individual septic tanks or the community sewer system.

Waste Water

Wastewater treatment services within the town of Eureka are provided by the Eureka Wastewater Treatment Facility (WWTF) managed by the county public works department. The WWTF is currently permitted to discharge a maximum of 100,000 gallons per day (gpd). The outfall pipe at the WWTF would only allow for an additional 100 connections before it exceeds capacity.

Crescent Valley, Beowawe, Diamond Valley, and all rural areas are sewered by septic systems.

The City of Ely is responsible for water and sewer service within the city's municipal boundaries as well as areas adjacent to Ely within the county. The majority of Ely's central wastewater collection system reportedly dates to 1905 through 1910 and consists of vitrified clay pipe. Upgraded and/or expanded portions of the system were constructed with reinforced concrete pipe installed from the 1950s to present, as well as portions constructed with ductile iron pipe and PVC. The Ely system relies almost exclusively on gravity for collection and conveyance, with the exception of a lift station and force main that serves the industrial park area located north of central Ely along U.S. Highway 93 in White Pine County. The Ely wastewater treatment system is permitted by the NDEP to treat up to 1.5 million gallons per day (MGD) through a modified extended aeration plant process.

The McGill Ruth Consolidated Sewer & Water GID, formed in the early 1980s, provides both water and sewer service to the communities of McGill and Ruth. McGill's and Ruth's wastewater collection and treatment systems are similar and are reported to be adequate and sound. Wastewater collection systems have been largely upgraded to PVC within the last 30 years. Ruth relies on gravity for collection and conveyance, while McGill relies primarily on gravity but also maintains a sewage lift station to serve approximately 30 residential customers on the west side of town. Both systems convey wastewater to the community wastewater treatment plants,

which consist of treatment ponds. In Ruth, a total of six facultative ponds treat up to 0.06 MGD of wastewater flow. In McGill, wastewater is treated in a single partial mix/aerated pond that has been divided into two cells by a baffle, after which treated water is discharged through six rapid infiltration basins.

Solid Waste

The Eureka County Public Works Department operates the Class-II-rated Whiskey Flat landfill on the west end of the town of Eureka and a transfer site located near Crescent Valley. At current disposal volumes (less than 20 tons per day) the landfill should have over 20 years of remaining life. Eureka County has proposed to acquire 80 acres from the BLM for expansion of the Eureka landfill.

A private vendor provides solid waste collection services in the town of Eureka and surrounding area.

The City of Ely Municipal Utilities Board operates the regional landfill on the northwestern boundary of the city. The outlying communities are provided with transfer stations. A private disposal company provides pick-up service countywide. The regional landfill has been awarded a Class I permit through the NDEP, and it has submitted an application for a Class III permit for construction waste. The regional landfill is using its available capacity at a rate faster than anticipated, and the NDEP has expressed concerns about the detection of solvents in groundwater in the vicinity of the regional landfill. The long-term goal is to identify and begin to develop an alternative landfill site to accommodate the future needs of the White Pine County population.

Electrical Power

MWP, Wells Rural Electric Company, and NV Energy supply electrical power to various regions of Eureka County, including the 18 megawatts of power used by Diamond Valley and the town of Eureka. In general, the power supply to Eureka County is considered adequate.

MWP also serves Ely, McGill, and Ruth in White Pine County, and the Duckwater Reservation.

MWP indicated that their existing electrical power distribution system is in good condition, and there is adequate capacity for servicing existing member-owner power demands.

Gas

Residential and commercial gas is provided in Eureka County by private propane vendors. Approximately 32 percent of the housing units in White Pine County are heated with propane or heating oil. The county is served by one propane dealer, two heating oil dealers, and one coal dealer. There is no natural gas service in White Pine County.

Telephone Service

Telephone service in Eureka County is provided by SBC Nevada Bell. A fiber optic line extends north-south through the county providing high-speed internet communication to the Eureka

County administrative and school district offices only. Although very inconsistent, cellular phone coverage is also available across some of the county. ALLTEL Communications provides the majority of cellular telephone service in Eureka County.

AT&T provides telephone service for White Pine County. There is a 10,000 line capacity of which approximately 4,800 access lines are in use. The vast majority of the lines are digitally switched. Although the county does not have access to high speed fiber optic lines, improvements in telecommunications services include access to DSL services and wireless internet access via microwave and satellite.

Law Enforcement

The Nevada Highway Patrol (NHP) provides law enforcement on the interstate highways and state highways, and has a substation in Ely.

White Pine County is served by the White Pine County Sheriff's Office, and includes 15 patrol officers, five dispatchers, five jailers, and two part time deputies, one each in Baker and Lund. The county's law enforcement officers are supplemented by the Nevada Division of Investigation, based in Ely, to serve the northeastern part of the state, and by NHP officers. Under the cooperative agreement between the city and county, the sheriff also serves as Ely's chief of police and the Ely Police Department provides law enforcement for the City of Ely. The Ely Shoshone Tribal Council provides law enforcement and judicial services on tribal lands.

The Eureka County Sheriff's Office provides law enforcement for the entire county, operates the county's detention facilities, and provides dispatch services for all public safety functions in the southern portion of the county. This includes NHP and emergency medical and fire-suppression activities. The central administration offices are located in the town of Eureka and include administration, patrol, and investigation for the county. There is a substation located in Crescent Valley.

The Duckwater Reservation has its own on-reservation law enforcement program with two full-time police officers. These officers are also commissioned as federal officers and are available to respond to calls in other parts of Nye County.

Emergency Response

<u>Fire Protection</u>

Fire protection in White Pine County is provided by the City of Ely Fire Department and a county fire district with volunteer units in McGill, Ruth, Lund, Baker, Cherry Creek, Cross Timbers (Lackawanna), and Cold Creek. Ely has five full-time fire fighters, supplemented by 31 volunteers, and is able to adequately meet the fire protection needs within the city.

The Nevada Division of Forestry (NDF) is responsible for fire protection on all non-federal lands in White Pine County with the exception of the City of Ely. The NDF conservation camps in Ely and Pioche provide Type 2-trained hand crews for wildland fire suppression. Additional fire

suppression resources are available in White Pine County through mutual aid agreements with the BLM Ely District Office, the Humboldt-Toiyabe Ely Ranger District, and the Great Basin National Park (GBNP) Fire Department.

The Eureka County Volunteer Fire Department provides fire suppression in and around Eureka County. As of 2010, there were approximately 24 volunteer fire fighters in Eureka, 20 in Diamond Valley, 13 in Crescent Valley, 17 in Pine Valley, 10 in Dunphy, and 10 in Beowawe. These volunteers are on-call, and there are no full-time employees. These departments, along with NDF and BLM, maintain mutual-aid agreements to augment the capacities of any given department should the need arise. Eureka County provides funds to NDF to aid in fire suppression activities.

The Duckwater Reservation has a volunteer fire department under Nye County.

Emergency Medical/Ambulance Services

Emergency Medical Services are provided in White Pine County through volunteer Emergency Medical Technicians (EMTs) and Fire-Med Services. The White Pine County Ambulance Service is located in Ely in the new Emergency Response Complex. Dispatch services are provided through the sheriff's office. Fire departments provide back-up (as first responders) for ambulance runs to assist with rescue operations.

A concern for both fire and EMT services in White Pine County is the difficulty in recruiting and retaining volunteer forces. The demands for additional training and the burden of maintaining services with reduced population increases the time each volunteer must devote to the program. Issues such as hazardous materials involved in accidents increase concerns for personal safety. Midway will have a Spill Prevention, Control, and Countermeasure Plan and will have trained staff to assist with emergencies of all kinds on-site.

Emergency medical care and transportation in Eureka are provided by the Eureka County Emergency Medical Service (EMS), which serves the entire county. Ambulance service is available in three locations throughout the county. In the southern portion of the county, the EMS staff consists of a full-time paid EMS coordinator and 14 volunteers.

Emergency medical care and transportation for residents of the Duckwater Reservation are provided by ambulance services out of Lund in White Pine County. Emergency cases are transported to William Bee Ririe Hospital in White Pine County.

Health Care

Health care facilities in White Pine County include William Bee Ririe Hospital in Ely (a 25-bed short-stay facility), the hospital's out-patient clinic, and the White Pine Care Center, Ely (a 98-bed skilled-nursing facility, owned by a private entity). The hospital provides primary care, obstetrical services, surgical services, some pediatric and cardiovascular services, and physical and respiratory therapy. The hospital has two operating suites, three intensive care rooms, one security room for inmate health care, and seven obstetrical beds. Visiting physicians include a

radiologist; orthopedist; urologist; one cardiologist and ECHO team; dermatologist; podiatrist; audiologist; ear, nose, and throat specialist; and a board-certified endocrinologist. Patients needing additional specialized care are referred to larger hospitals in Reno, Salt Lake City, and Las Vegas.

Eureka County has two medical clinics. Health care in southern Eureka County is provided at the Eureka Medical Clinic located in the town of Eureka. The clinic is open during normal business hours, Monday through Friday, with 24/7, on-call service available at other times. The clinic is staffed by one physician, one physician's assistant, a medical assistant, and an office manager.

The second clinic is located in Crescent Valley and is under the administration of the Nevada Health Center located in Carlin, Nevada.

Most patients requiring hospital care use hospitals in Elko (115 miles away). Patients requiring specialized care often access facilities in Reno.

The Ely Mental Health Center is part of the state's rural clinics program and serves White Pine, Lincoln, and Eureka counties. Services include individual and family counseling, psychiatric evaluation, family and group therapy, and substance abuse counseling in conjunction with other mental health diagnoses.

Routine health care is provided to residents of the Duckwater Reservation at the Health Clinic located on the reservation.

Waste Rock Disposal Site Design Alternative

The existing conditions for the Waste Rock Disposal Site Design Alternative are the same as those for the Proposed Action.

Southwest Power Line Alternative

The existing conditions for the Southwest Power Line Alternative are the same as those for the Proposed Action.

No Action Alternative

The existing conditions for the No Action Alternative include the authorized exploration activities as discussed in Section 2.2.

3.17 Environmental Justice

On February 11, 1994, President Clinton issued EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. This EO was designed to focus the attention of federal agencies on human health and environmental conditions in minority communities and low-income communities. In an accompanying Presidential memorandum, the President emphasized that existing laws, including NEPA, provide opportunities for federal agencies to address environmental hazards in minority and low-income communities. In April 1995, the EPA released the document titled Environmental Justice Strategy: Executive Order 12898. The document established EPA-wide goals and defined the approaches by which the EPA would ensure that disproportionately high and adverse human health or environmental effects on minority communities and low-income communities are identified and addressed.

3.17.1 Area of Analysis

Proposed Action

The direct effects area of analysis occurs within the project area which includes the associated access road and power line.

Waste Rock Disposal Site Design Alternative

The direct effects area of analysis for the Waste Rock Disposal Area Design Alternative occurs within the project area.

Southwest Power Line Alternative

The direct effects area of analysis for the Southwest Power Line Alternative occurs within the project area and within the 400-foot power line analysis area.

No Action Alternative

The direct effects area of analysis for the No Action Alternative occurs within the approved exploration POO boundary.

3.17.2 Data Sources and Methods

Proposed Action

Data assembled for Nevada from the 2010 Census (Census, 2011a) was used to characterize the minority and ethnic composition of the populations within the area of analysis. Minority and ethnic composition was characterized for both Eureka and White Pine counties, Ely and the Eureka Census Designated Place (i.e., Eureka Township).

Data taken from the 2006-2010 American Community Survey (Census, 2011b) was used to characterize the income and poverty status of the populations within the area of analysis. The 2006-2010 American Community Survey data was also displayed graphically as a map using the EPA's EJView (EPA, 2012c) to characterize income and poverty status. EJView known as the Environmental Justice Geographic Assessment Tool, is a mapping tool provided by the EPA

that allows the public to create maps and generate reports based on geographic areas and various data sets.

Waste Rock Disposal Site Design Alternative

The sources of data and methodology for the Waste Rock Disposal Site Design Alternative are the same as those described for the Proposed Action.

Southwest Power Line Alternative

The sources of data and methodology for the Southwest Power Line Alternative are the same as those described for the Proposed Action.

No Action Alternative

The sources of data and methodology for the No Action Alternative are the same as those described for the Proposed Action.

3.17.3 Existing Conditions

Proposed Action

Minority Population

In accordance with the *Final Guidance for Incorporating Environmental Justice Concerns in the U.S. EPA's NEPA Compliance Analyses* (EPA, 1998), minority populations should be identified when either the minority population of the affected area:

- Exceeds 50 percent; or
- Is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

The 2010 Census Summary File 1 contains population characteristics collected from all people during the 2010 Census, including counts for many races. The data is provided for the entire United States, as well as for each of the 50 states and the District of Columbia in a hierarchical sequence down to the block level for many tabulations and counts (Census, 2012a). According to the 2010 Census Summary File 1 data for Nevada (Census, 2011a), the minority composition of the populations of Eureka and White Pine counties is less than 50 percent and is not meaningfully different from the minority composition of the population for the state of Nevada. The composition of the populations of Eureka and White Pine counties, and the state of Nevada is summarized in Table 3.17-1.

Table 3.17-1 Environmental Justice Indicators – Minority Populations

Indicator (2010 Census)	Eureka County		White Pine County		State of Nevada	
	Number	Percent	Number	Percent	Number	Percent
Total Population	1,987	100	10,030	100	2,700,551	100
White Persons	1,775	89.3	8,575	85.5	1,786,688	66.2
Black Persons	2	0.1	395	3.9	218,626	8.1
Native Americans	47	2.4	419	4.2	32,062	1.2
Asian Persons	18	0.9	97	1	195,436	7.2
Pacific Islanders	0	0	10	0.1	16,871	0.6
Hispanic or Latino persons (of any race)[1]	238	12	1,326	13.2	716,501	26.5
Minority Population[2]	325	15.4	2,378	23.7	1,238,470	45.9

Source: Census, 2011a

[1]Persons who identify their origin as Spanish, Hispanic or Latino may be of any race or combination of races; therefore the number and percentage of all the race groups may total more than the total population (100 percent).

[2]Minority population includes persons of any race or combination of races who identify their origin as Hispanic or Latino, and persons of a minority race or combination or races who are not of Hispanic or Latino origin. More complete tallies that show race categories for persons of Hispanic or Latino origin and persons of other origins separately are also available.

Within the area of analysis, the nearest major population center to the project area is Eureka, which is located approximately 16 miles northwest of the project area. According to the 2010 Census Summary File 1 data for Nevada (Census, 2011a), the minority composition of the population within the Eureka Census Designated Place (i.e., town of Eureka) is less than 50 percent. Additionally, the percentage of the Eureka Census Designated Place population considered to be of minority composition is not meaningfully different from the minority composition of the population for the state of Nevada. The next major population center nearest to the project area is Ely. According to the 2010 Census Summary File 1 data for Nevada (Census, 2011a), the population of Ely is less than 50 percent, and also not meaningfully different than the minority composition of the state population. The composition of the populations of the Eureka Census Designated Plan and Ely is summarized in Table 3.17-2.

A second provision described in the final guidance by the EPA (1998) requires consideration of "impacts that may affect a cultural, historical, or protected resource of value to an Indian tribe or a minority population, even when the population is not concentrated in the vicinity."

Table 3.17-2 Environmental Justice Indicators – Minority Populations

Indicator (2010 Census)	Eureka Census Designated Place		City of Ely	
	Number	Percent	Number	Percent
Total Population	610	100	4,255	100
White Persons	546	89.5	3,733	87.7
Black Persons	2	0.3	34	0.8
Native Americans	17	2.8	180	4.2
Asian Persons	7	1.1	40	0.9
Pacific Islanders	0	0	5	0.1
Some Other Race	27	4.4	148	3.5
Two or More Races	11	1.8	115	2.7
Hispanic or Latino persons (of any race)[1]	71	11.6	600	14.1
Minority Population[2]	104	17.0	897	21.1

Source: Census, 2011a

[1]Persons who identify their origin as Spanish, Hispanic or Latino may be of any race or combination of races; therefore the number and percentage of all the race groups may total more than the total population (100 percent).

[2]Minority population includes persons of any race or combination of races who identify their origin as Hispanic or Latino, and persons of a minority race or combination or races who are not of Hispanic or Latino origin. More complete tallies that show race categories for persons of Hispanic or Latino origin and persons of other origins separately are also available.

Low-Income Population

Final guidance from the EPA (1998) recommends that, pursuant with CEQ guidance (CEQ, 1997), low-income populations in an affected area should be identified with the annual statistical poverty thresholds from the Census Current Population Reports. Poverty thresholds are the dollar amounts that the Census uses to determine the poverty status of a family or person (Census, 2012b). If the gross money-income of a family or an individual is less than the dollar value of their corresponding poverty threshold, then that family or that individual are considered to be in poverty (Census, 2012b). In conjunction with Census data, final guidance from the EPA (1998) indicates that state and regional low-income and poverty definitions should be considered, as appropriate. In identifying low-income populations, agencies may consider as a community a group of individuals living in geographic proximity to one another or set of individuals where either type of group experiences common conditions of environmental exposure.

According to the Census (2008), the American Community Survey is designed to provide communities with reliable and timely demographic social, economic, and housing data every year. Data collected from the American Community Survey is released in the form of both single-year and multi-year estimates. Among the data reported is the percentage of persons below the poverty level. The value is computed by dividing the sum of persons living below the poverty level by the number of persons for whom poverty status is determined (Census , 2010b). Poverty status is determined by comparing the income of persons in an area to their corresponding poverty threshold, as described above.

The 2006-2010 American Community Survey for the state of Nevada (Census, 2011b) was used to determine the percentage of persons below the poverty level within the area of analysis and for the state of Nevada. The percentage of persons below the poverty level in Eureka County, according to data reported for the five-year estimate by the U.S. Census Bureau (2011b), was 16.2 percent, while the percentage in White Pine County was 15.5 percent. During the same five-year period between 2006 and 2010, the Census (2011b) reported that the percentage of persons below the poverty level for the entire state of Nevada was 11.9 percent. Table 3.17-3 summarizes the poverty data reported in the 2006-2010 American Community Survey for Eureka and White Pine counties, and the entire state of Nevada (Census, 2011b). The per capita income and median household income reported in the 2006-2010 American Community Survey is also summarized in Table 3.17-3.

Table 3.17-3 Environmental Justice Indicators – Low-Income Populations

Indicator	Eureka County	White Pine County	State of Nevada
Persons Below Poverty Level	16.2 %	15.5 %	11.9 %
Per Capita Income	$ 30,306	$ 21,615	$ 27,589
Median Household Income	$ 61,400	$ 48,545	$ 55,726

Source: Census, 2011b

The percentage of persons below the poverty level reported in the 2006-2010 American Community Survey for the county-level geographic area is one of the available data sets in EJView. According to the EJView map depiction of the data set (EPA, 2012c), the percentage of persons below the poverty level was between 10 percent and 20 percent in nearly every county within the state of Nevada. The only exceptions were Churchill, Douglas, Elko, and Storey counties, where less than 10 percent of persons were below the poverty level (EPA, 2012c).

Analysis of the percentage of persons below the poverty level in Eureka County and White Pine County as well as each of the other counties in the state of Nevada reveals that the incidence of poverty in the area of analysis is not meaningfully different from elsewhere in the state.

Protection of Children

The protection of children is an additional component of the Environmental Justice analysis, intended to determine if an action would place undue burden on children. EO 13045, Protection of Children from Environmental Health Risks and Safety Risks, recognizes a growing body of scientific knowledge that demonstrates that children may suffer disproportionately from environmental health risks and safety risks. These risks arise because: 1) children's bodily systems are not fully developed; 2) children eat, drink, and breath more in proportion to their body weight; 3) their size and weight may diminish protection from standard safety features; and 4) their behavior patterns may make them more susceptible to accidents. Based on these factors, federal agencies are directed by the office of the President to identify and assess the environmental health risks and safety risks that may disproportionately affect children and make them a high priority. Federal agencies were also directed to ensure that their policies, programs,

activities, and standards address disproportionate risks to children that result from environmental health risks and safety risks.

The number of children and the percentage of the total population comprised of children within Eureka and White Pine counties are provided in Table 3.17-4. The table also provides a summary of the population of children for the state of Nevada. The percentage of the population comprised of persons under five years old and persons under 18 years old within Eureka and White Pine counties is not meaningfully different from the percentage of the state population that are under five and 18 years old.

Table 3.17-4 Environmental Justice Indicators – Protection of Children

Indicator (2010 Census)	Eureka County		White Pine County		State of Nevada	
	Number	Percent	Number	Percent	Number	Percent
Total Population	1,987	100	10,030	100	2,700,551	100
Persons Under 5 years old	144	7.2	634	6.3	187,478	6.9
Persons Under 18 years old	481	24.2	2,173	21.7	665,008	24.6

Source: Census, 2011a

Waste Rock Disposal Site Design Alternative

The existing conditions within the area of analysis for the Waste Rock Disposal Site Design Alternative are the same as the existing conditions described for the Proposed Action.

Southwest Power Line Alternative

The existing conditions within the area of analysis for the Southwest Power Line Alternative are the same as the existing conditions described for the Proposed Action.

No Action Alternative

The existing conditions within the area of analysis for the No Action Alternative are the same as the existing conditions described for the Proposed Action.

3.18 Hazardous Materials and Wastes

3.18.1 Area of Analysis

Proposed Action

The direct effects area of analysis occurs within the project area which includes the associated access road and power line. The area of analysis also includes potential transportation routes to the project area from the following major hubs from which materials would be transported (Figure 3.18-1).

- From Eureka via U.S. Highway 50 (Lincoln Highway) to the east, and south via the proposed access road to the Pan Mine Operations;

- From Ely via U.S. Highway 50 to the west, and south via the proposed access road to the Pan Mine Operations; or

- From Elko via Interstate 80 east or west from Utah, south on U.S. Highway 93 to Ely, west on U.S. Highway 50 and south via the proposed access road to the Pan Mine Operations.

From Elko, it was determined, that heading south on SR 227 and south on SR 228/892 (Strawberry Road) to the project area, would not typically be used as a transportation route because it parallels the Ruby Lakes National Wildlife Refuge, and this is considered a sensitive receptor. Bulk chemicals and supplies would typically be transported to the site on trucks via U.S. Highway 50 from either the east (Ely) or west (Eureka) and the major connecting highways including Interstate 80 via U.S. Highways 93 and 278; and Interstate 15 via U.S. Highways 50 and 6, 93, and 6. Table 2.3-5 describes the number of expected shipments for reagents to the site. There are no current restrictions on delivery times, and no restrictions are proposed.

Waste Rock Disposal Site Design Alternative

The direct effects area of analysis for the Waste Rock Disposal Site Design Alternative occurs within the project area.

Southwest Power Line Alternative

The direct effects area of analysis occurs within the project area and within the 400-foot power line analysis area.

No Action Alternative

The direct effects area of analysis for the No Action Alternative occurs within the approved exploration POO boundary.

3.18.2 Data Sources and Methods

Proposed Action

The following indicators were used when describing the affected environment for hazardous and solid waste materials:

- Potential transportation routes between the major hubs in the project vicinity; and
- Locations of water sources along the major transportation routes.

Data sources for this section were acquired from existing documents and satellite imagery.

Waste Rock Disposal Site Design Alternative

The data sources and methods used for the Waste Rock Disposal Alternative are the same as those used for the Proposed Action.

Southwest Power Line Alternative

The data sources and methods used for the Southwest Power Line Alternative are the same as those used for the Proposed Action.

Figure 3.18-1 Proposed Action Hazardous Materials and Wastes and Transportation Routes

No Action Alternative

The data sources and methods used for the No Action Alternative are the same as those used for the Proposed Action.

3.18.3 Existing Conditions

Proposed Action

The affected environment for hazardous materials and solid and hazardous waste includes air, soil, biological resources, and water that could be potentially affected by an accidental release during transportation to and from the project area and during storage and use on the project site. Figure 3.18-1 shows the major rivers and stream crossings along the potential transportation routes.

A list of primary fuels and reagents that are proposed for use on the project area is provided in Table 2.3-5, and the fuel and reagent storage locations are shown in Figure 2.3-1. As discussed in Section 3.18.1, there are three access routes to the project area. Bulk chemicals would typically be transported to the site on trucks via one of these access routes and any hazardous wastes would be transported from the site using the same routes.

The project area is undeveloped with no history of hazardous or solid waste generation or disposal. Mining activity has taken place in the general region since 1876; however, exploration of the Pan deposit did not occur until 1978, and no mining has occurred in the project area. Previous exploration activities have resulted in existing surface disturbances, some of which have been reclaimed.

A hazardous substance, as identified by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) is defined as a substance identified in the following statutes:

- Toxic Substances Control Act, Section 7 (EPA, 2002a).
- Clean Water Act, Sections 307(a) and 311 (EPA, 2002b);
- Resource Conservation and Recovery Act, Section 3001 (EPA, 1976);
- Clean Air Act, Section 112 (EPA, 2004); and

Pursuant to regulations promulgated under CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986, reporting the release of a hazardous substance to the environment must occur immediately upon knowledge of a release of a reportable quantity to the National Response Center (40 CFR 302). NAC 445A.347 also requires immediate reporting of a release of a reportable quantity of a hazardous substance to the Nevada Division of Emergency Management. The NDEP's Water Pollution Control Permit program also includes requirements for reporting as soon as possible, but no later than 24 hours to the NDEP, Bureau of Corrective Actions. A list of primary fuels and reagents that would be transported to project area and utilized by the Proposed Action is provided in Table 2.3-5.

The NDEP Bureau of Waste Management regulates the hazardous waste program in the state of Nevada. Hazardous waste management is subject to specific requirements that are dependent upon the amount of hazardous waste produced at a facility in a calendar month. Hazardous waste generators are required to adhere to specific on-site management, transportation, record keeping, and reporting requirements. All hazardous wastes must be stored, packaged, and manifested in compliance with applicable local, state, and federal regulations. No hazardous and/or solid wastes or hazardous materials exist in the project area.

Waste Rock Disposal Site Design Alternative

The existing conditions for the Waste Rock Disposal Site Design Alternative are the same as those used for the Proposed Action area.

Southwest Power Line Alternative

The existing conditions for the Southwest Power Line Alternative are the same as those used for the Proposed Action area.

No Action Alternative

The existing conditions for the No Action Alternative are the same as those used for the Proposed Action area.