3.0 AFFECTED ENVIRONMENT

How to Read Chapter 3.0

Chapter 3.0 provides background information on the various resources, resource uses, and programs managed by the Ely Field Office, and describes their existing conditions, trends, and current management. These subsections contain the following information:

- Existing Conditions – description of each resource, resource use, or program.
- Trends – description of the changes that are occurring in the existing conditions.
- Current Management – description of how the Ely Field Office is currently managing the resource, resource use, or program.

This format does not lend itself equally well to every resource, resource use, or program. Where a subsection is not applicable (e.g., trends for special designations), this is noted in the text.

NEPA regulations require that an EIS contain a description of the environmental conditions that would be affected by the Proposed Action and alternatives. Thus rather than being encyclopedic, the Affected Environment chapter must focus on those resources and uses that would be impacted by the management direction presented in Chapter 2.0 for Alternatives A through E.

The amount of quantitative information that is available to describe existing conditions and particularly trends varies from resource to resource. In general, resources that have formal administrative requirements, such as livestock grazing, have more quantitative information available than resources that are used casually, such as recreation. Where quantitative information is available, it is reflected in the existing conditions and trends descriptions. Where it is not available, the descriptions rely on the observational knowledge of the District developed by the Ely Field Office staff.

All maps referenced in Chapter 3.0 are bound at the end of the chapter.

3.1 Introduction

Given its size, topographic and geologic diversity, and the isolated nature of habitats within the basin and range landscape, it is not surprising that the Great Basin ecological region ranks second in diversity of imperiled species (Nichols et al. 1998; Rosenzweig 1995; Stein et al. 2000). The vast, visually monotonous areas of sagebrush and salt desert shrublands have a tendency to cloak the great diversity that exists in these ecological systems. Some biologists also have erroneously concluded that the area has relatively low biological diversity (Ehrlich et al. 1988).

The Ely District lies in the middle of the Great Basin and exemplifies much of this biological diversity. The large variety of plant species has resulted in an abundance of habitats which are also reflected in the soils

and their distribution on the District. Soils can indicate the natural mosaic in a landscape or watershed as the complex geology, climate, topography, vegetation, and time work together as factors of soil formation.

Soil surveys are inventories of soils that indicate their spatial distribution. As an example, **Map 3.1-1** shows the distribution of soil mapping units in Egan Basin, a small watershed on the Ely District. The soil map unit descriptions indicate where soils occur within map unit polygons and in what percentages they occur. Soil map unit descriptions also explain the relationship of soil types to their correlating plant communities.

The restoration and maintenance of healthy ecological systems within watersheds is a primary focus for the future management of the Ely District. Healthy ecological systems are geographically diverse and change over time. They are compatible with soil potential and are resilient to disturbance.

Resources and resource uses would be managed to restore or maintain ecological health. Certain resource management changes and active treatments may need to be implemented, in portions of watersheds, to accomplish this objective. Adaptive management would be pursued to avoid deteriorating conditions favoring invasive plants and catastrophic fires. Any projects would be implemented so as to result in a mosaic of vegetation within a watershed.

In the long term, natural disturbance (such as drought or fire) would occur and fewer treatments would be needed to maintain ecological health. The result would be a variety of vegetation phases within a watershed, which would provide diverse, healthy conditions for future generations.

By designing landscape projects within the capabilities of the soils, we are able to:

- Initiate watershed restoration using the adaptive management model and best available science.
- Develop strategies and implement actions to restore landscapes to an ecologically functioning condition.
- Address all vegetation communities within the landscape with respect to vegetation state and transition pathways.
- Have negligible adverse effects on soils.
- Develop local watershed assessments based on ecological site potential.
- Identify where current roads and trails may not be suited to the soil potentials and suggest a better alignment or configuration.

3.2 Air Quality and Climate

3.2.1 Existing Conditions

Air Quality

The current condition of air quality in the Ely District is good, relative to other areas of the nation. The air resource is primarily affected by particulate matter produced by land management activities or natural events on federally administered lands, including wildfire, prescribed burning, road or wind-blown dust, construction, mining, and vehicle use. Of these emission sources, most of the particulate matter of concern is produced from wildfires. Smoke emissions consist mostly of particulate matter with an aerodynamic diameter of 10 microns or less (PM_{10}), as well as fine particulates with an aerodynamic diameter of 2.5 microns or less ($PM_{2.5}$). According to Sisler et al. (1996), on a national level, the lowest concentrations of fine particulates occur in the Great Basin in Nevada. In other parts of the nation, the largest mass fractions of the fine aerosol are sulfate and organics; however, organic carbon (presumably from wildland burning) is the largest single component in the Great Basin (Sisler et al. 1996).

Climatology and Meteorology

Most of the District is internally drained and surface runoff is confined to the basins. A few drainages in the southern part of the District in Lincoln County drain into the Virgin River. Those drainages are, from west to east, Coyote Spring Valley, Meadow Valley Wash, and Toquop Wash. The White River Valley, which is located on the eastern edge of Nye County and extends into White Pine County, drains into the Coyote Spring drainage. The Virgin River drains into the Colorado River at Lake Mead, south of the Ely Districts southern boundary.

The Ely District is located in the center of the Great Basin. Terrain is internally and externally drained. External drainage is south to the Colorado River. Otherwise, valley drainage is typical of the Great Basin and is covered with a variety of desert shrubs and grasses. The terrain consists of alternating mountain ranges and valleys primarily situated in the Basin and Range physiographic province. The southern portions of the District are more arid and consist of mixed aggraded desert plains situated between elevated terrain in north-south oriented mountain ranges. Elevations in the southern part of the District range from approximately 2,000 to more than 7,400 feet above mean sea level.

Baseline meteorology, air quality, and dispersion conditions for the Ely District were characterized by data collected at the Ely airport starting in 1948 and continuing through the present. Data from Caliente were used to characterize the climate in the aggraded desert plains in the southern portions of the District. The climate in the northern portion of the Ely District is classified as a cool semi-arid steppe, and the southern portion of the Ely District is classified as a hot arid desert. The climate is characterized by low rainfall, low humidity, clear skies, and relatively large annual and diurnal temperature ranges (Brown 1974).

Because of the typically dry atmosphere, bright sunny days and clear nights frequently occur. This in turn allows rapid heating of the ground surface during daylight hours and rapid cooling at night. The average

range between the highest and the lowest daily temperatures is about 30 to 35 degrees Fahrenheit. Daily ranges are larger in summer than the winter. Since heated air rises and cooled air sinks, winds tend to blow upslope during the day and downslope at night. This up-slope and down-slope cycle generally occurs in all the geographical features, including mountain range slopes and river courses. The larger the horizontal extent of the feature, the greater the volume of air that moves in the cycle. Terrain diversity causes complex movements in the cyclic air patterns, with thin layers of moving air embedded within the larger scale motions. The low-level, thermally driven winds also are embedded within larger scale upper wind systems (synoptic winds). Synoptic winds in the region are predominantly west to east, are characterized by daily weather variations that enhance or diminish the boundary layer winds, and are substantially channeled by regional and local topography.

Atmospheric Dispersion

The most important meteorological factors that influence the dispersion of pollutants in the atmosphere are mixing height, wind speed, wind direction, and stability. Mixing height is the thickness of the layer of air above ground within which rising warm air from the surface would mix by convection and turbulence. Local atmospheric conditions, terrain configuration, and source location determine the degree to which pollutants are diluted in this mixed layer. Mixing heights vary diurnally, with local weather systems, and with season. For the RMP area, the mean annual morning mixing height is estimated to be approximately 980 feet, and the mean annual afternoon mixing height is approximately 7,800 feet (Holzworth 1972).

Winds

The Ely District is located at a latitude that places it within the belt of prevailing westerly winds that circle the globe around the earth's northern hemisphere. However, much of the area consists of complex terrain where the winds are affected by local topographic features. This is evident in the wind data collected at the Ely airport that show prevailing winds are from the south during all months of the year. Wind speed has an important effect on area ventilation and the dilution of pollutant concentrations from individual sources. Light winds, in conjunction with large source emissions, may lead to an accumulation of pollutants that can stagnate or move slowly to downwind areas. During stable conditions, downwind usually means down valley or toward lower elevations. Wind speeds are most frequently observed in the 5- to 10-mile per hour range and the annual average wind speed at Ely is 10.3 miles per hour.

Temperature

Observed normal temperatures at Ely range from the teens to upper 30s (degrees Fahrenheit) in winter and from nearly 50 to the upper 80s (degrees Fahrenheit) in summer (WRCC 2003). **Figure 3.2-1** depicts average, maximum, and minimum normal temperatures and precipitation at Ely measured during the period of record 1971 to 2000. At Caliente, average maximum temperatures for all seasons are about 5 to 10 degrees warmer than Ely. **Figure 3.2-2** depicts average, maximum, and minimum normal temperatures

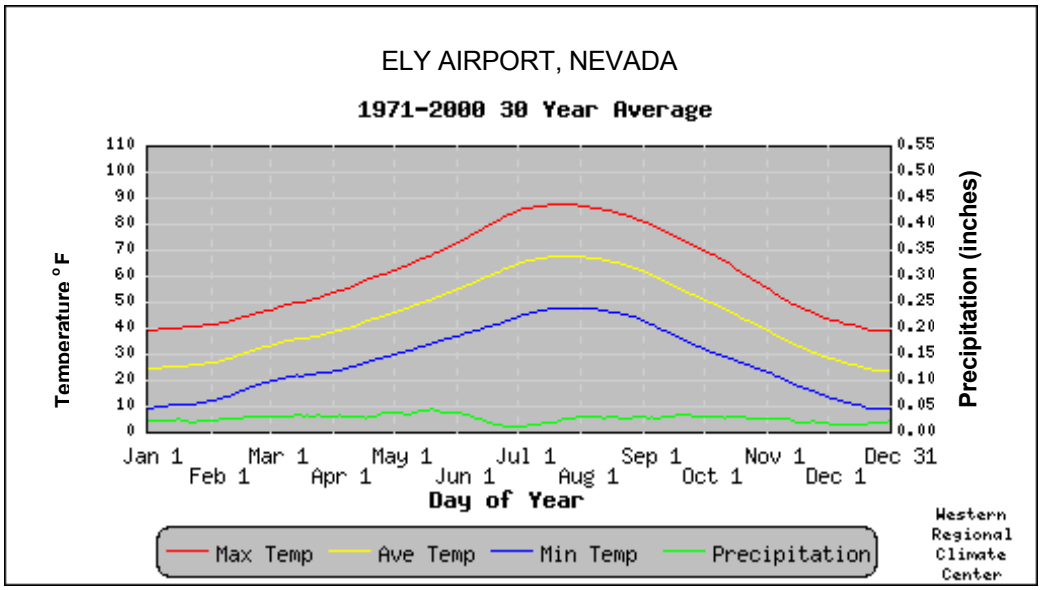


Figure 3.2-1. Climate Data for Ely, Nevada

and precipitation at Caliente measured during the period of record 1971 to 2000. Summer conditions in the area are typically hot and dry except in the higher mountain ranges. Precipitation is spread throughout the year, and much of the annual precipitation results from spring snow storms and summer convective thunderstorms. The average total annual precipitation measured is slightly less than 10 inches of water equivalent.

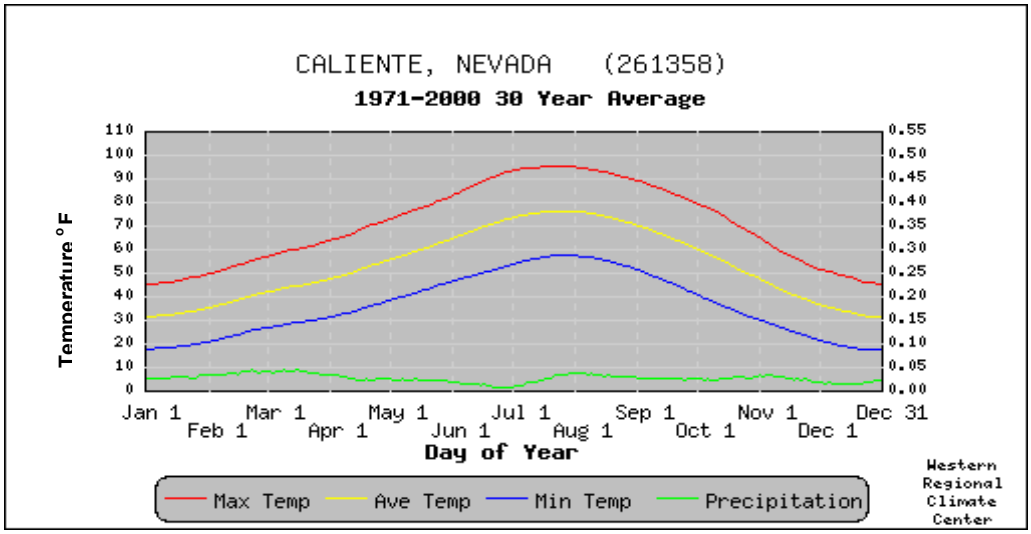


Figure 3.2-2. Climate Data for Caliente, Nevada

Stability

Morning atmospheric stability conditions tend to be stable because of the rapid cooling of the layers of air nearest the ground. Afternoon conditions, especially during the warmer months, tend to be neutral to unstable because of the rapid heating of the surface under clear skies. During the winter, periods of stable afternoon conditions may persist for several days in the absence of synoptic scale storm systems to generate higher winds with more turbulence and mixing. A high frequency of inversions at lower elevations during the winter can be attributed to the nighttime cooling and sinking air flowing from higher elevations to the low lying areas in the basins. Although winter inversions generally are quite shallow, they tend to be more stable because of reduced surface heating.

Precipitation

Nevada lies on the eastern, lee side of the Sierra Nevada Range, a massive mountain barrier that markedly influences the climate of the state. One of the greatest contrasts in precipitation found within a short distance in the U.S. occurs between the western slopes of the Sierras in California and the valleys just to the east of this range. The prevailing winds are from the west, and as the warm moist air from the Pacific Ocean ascends the western slopes of the Sierra Range, the air cools, condensation takes place, and most of the moisture falls as precipitation. As the air descends the eastern slope, it is warmed by compression and very little precipitation occurs. The effects of this mountain barrier are felt not only in the west but throughout the state, with the result that the lowlands of Nevada are largely desert or steppes.

A summer precipitation maximum occurs in the eastern portion of the state where thunderstorms are most frequent. Precipitation is lightest over the southern portions of the Ely District where the average annual precipitation is less than 5 inches. In eastern Nevada, precipitation increases to 18 inches in Lamoille Canyon on the western side of the Ruby Mountains. In Ely and Caliente, the average annual precipitation is just under 10 inches during the period of record (1971-2000) (WRCC 2003). Variations in precipitation are due mainly to differences in elevation and exposure to precipitation-bearing storms. The average annual number of days with precipitation of 0.01 inch or more varies considerably; Las Vegas averages 23, Reno 49, Winnemucca 67, Ely 72, and Elko 78. Higher elevations in the Ely District would have more frequent precipitation events and would receive more annual rainfall than either Ely or Caliente.

Floods

Mountain snowfall forms the main source of water for stream flow. Melting of the mountain snow pack in the spring usually causes some flooding in northern and western streams during April to June, but damaging floods of this type are infrequent. However, extensive flooding from melting of heavy snow pack has occurred in both the southern and northern parts of the state. Flooding also can be caused by a combination of warm rains and melting snow, especially in the western section. Heavy summer thunderstorms occasionally cause flooding of local streams, but they usually occur in sparsely settled mountainous areas. These storms, locally termed cloudbursts, may bring to a locality as much rain in a few hours as would normally fall in several months.

Severe Storms

Thunderstorms in most areas of the state are infrequent, with the average annual number of days, during the period of record being 13 at Reno, 15 at Las Vegas and Winnemucca, 21 at Elko, and 33 at Ely (WRCC 2003). So the number and intensity of thunderstorms is greater in eastern portions of the state, and lightning caused wildfires would be more likely in the Ely District than in most other areas of the state. Tornadoes are rare, but have occurred in all months from April through September (WRCC 2003). Winds are generally light. Storms with high winds rarely occur and seldom cause appreciable damage, except locally along the east slope of the Sierras.

3.2.2 Trends

Air Quality

Emissions from wildland fires have occurred in the planning area ecological systems for thousands of years. Wildfires substantially affect the air resource. Current wildfires produce higher levels of smoke emissions than historical fires, because fuel available to be consumed by wildfire has increased. Within the Ely District, the current trend in increased prescribed fire use also is expected to result in an increase of smoke emissions, although over shorter time periods.

3.2.3 Current Management

Regulatory Framework

The Clean Air Act, originally enacted in 1955 by Congress and amended several times since then, is the primary legal instrument used to regulate and protect air quality. The Clean Air Act requires the U.S. Environmental Protection Agency to, among other things, identify and publish a list of common air pollutants that could endanger public health or welfare. These commonly encountered pollutants, referred to as "criteria pollutants," are listed by the U.S. Environmental Protection Agency along with the results of studies documenting the health effects of various concentrations of each pollutant. For each criteria pollutant, the U.S. Environmental Protection Agency has designated a concentration level above which the pollutant would endanger public health or welfare. These levels are called the National Ambient Air Quality Standards. To date, the National Ambient Air Quality Standards have been established for six criteria pollutants:

- Sulfur dioxide;
- Particulate matter (PM_{10} and $PM_{2.5}$);
- Carbon monoxide;
- Ozone;
- Nitrogen dioxide; and
- Lead.

Except in certain developed urban and industrial areas, these standards are not typically violated where the general public has access throughout the entire nation.

If National Ambient Air Quality Standards are violated in an area, the area is designated as a "nonattainment area," and the state is required to develop an implementation plan to bring it back into compliance with these standards. The Clean Air Act and the Federal Land Use Policy and Management Act require that actions conducted or approved by BLM comply with all applicable local, state, Tribal, and federal air quality requirements. Pollutants such as oxides of nitrogen and sulfur are of concern to federal land managers because of their potential to cause adverse effects on plant life, water quality, and visibility. However, the sources of these pollutants generally are associated with urbanization and industrialization rather than with natural resource management activities. Therefore, these pollutants will not be considered further in this RMP/EIS. However, particulates, ozone, and carbon monoxide are criteria pollutants that can be created by fire; these pollutants are discussed in this RMP/EIS. The pollutant of greatest concern for management activities in the Ely District is particulate matter. Three elements of the Clean Air Act generally apply to management activities that produce emissions in the project area:

- Protection of National Ambient Air Quality Standards (Section 109);
- Conformity with State Implementation Plans (Section 176[c]); and
- Protection of Visibility in Class I Areas (Section 169A).

Because fire and smoke are a natural part of forestland and rangeland ecological systems, particulate matter produced from fire does not seriously affect these ecological systems. However, it does have effects on human health. Particulate matter (PM_{10} and $PM_{2.5}$) can be drawn deep into the alveolar region of the lungs, the part of the respiratory system most sensitive to chemical injury. Wood smoke also contains certain carcinogenic compounds, including poly-aromatic hydrocarbons.

Air Quality

Air quality is: 1) dependent on the amount and character of air pollutant emissions, climatology including dispersion conditions, and topography; 2) interpreted as specific pollutant concentrations for specific time periods; and 3) evaluated for potential harm to public health and welfare, based on scientifically defined criteria. Measurement of pollutants in the atmosphere is expressed in units of parts per million or micrograms per cubic meter. Both long-term climatic factors and short-term weather fluctuations are considered part of the air quality resource because they control dispersion and affect concentrations. Physical effects of air quality depend on the characteristics of the receptors and the type, amount, and duration of exposure. Air quality standards specify acceptable upper limits of pollutant concentrations and duration of exposure. Air pollutant concentrations below the standards are not considered detrimental to public health and welfare.

The relative importance of pollutant concentrations can be determined by comparison with an appropriate national and/or state ambient air quality standard. National and state ambient air quality standards are presented in **Table 3.2-1**. These are the standards applicable to Nevada and the Ely District. An area is designated by the U.S. Environmental Protection Agency as being in attainment for a pollutant if ambient

Table 3.2-1
Ambient Air Quality Standards Applicable in the Ely District

Pollutant	Averaging Time	Nevada Standards[1]		National Standards[2]		
				Primary[3,4]		
		(parts per million)	(micrograms per cubic meter)	(parts per million)	(micrograms per cubic meter)	Secondary[3,5]
Ozone	1 hour	0.12	235	0.12	235	Same as primary
	8 hour	0.08	157	0.08	157	Same as primary
Carbon monoxide (less than 5,000 feet above mean sea level)	8 hours	9	10,000	9	10,000	None
Carbon monoxide (at or greater than 5,000 feet above mean sea level)	8 hours	6	6,670	NA	NA	
Carbon monoxide (at any elevation)	1 hour	35	40,000	35	40,000	
Nitrogen dioxide	Annual arithmetic mean	0.053	100	0.053	100	Same as primary
Sulfur dioxide	Annual arithmetic mean	0.03	80	0.03	80	None
	24 hours	0.14	365	0.14	365	
	3 hours	0.5	1,300	--	--	0.5 parts per million (1,300 micrograms per cubic meter)
PM_{10}	Annual arithmetic mean	--	50	--	50	Same as primary
	24 hours	--	150	--	150	--
$PM_{2.5}$	Annual arithmetic mean	--	15	--	15	Same as primary
	24 hours	--	65	--	65	
Lead	Quarterly arithmetic mean	--	1.5	--	1.5	Same as primary
Visibility	Observation		In sufficient amount to reduce the prevailing visibility[6] to less than 30 miles when humidity is less than 70 percent	--	--	--
Hydrogen sulfide	1 hour	0.08	112	--	--	--

[1]These standards must not be exceeded in areas where the general public has access.
[2]These standards, other than for ozone, particulate matter, and those based on annual averages, must not be exceeded more than once per year. The 1-hour ozone standard is attained when the expected number of days per calendar year with a maximum hourly average concentration above the standard is equal to or less than one. The 24-hour standard for PM_{10} is attained when the expected number of days per calendar year with a 24-hour average concentration above the standard, rounded to the nearest 10 micrograms per cubic meter, is equal to or less than one. The expected number of days per calendar year is generally based on an average of the number of times the standard has been exceeded per year for the last 3 years.
[3]Where applicable, concentration is expressed first in units in which it was adopted. All measurements of air quality that are expressed as mass per unit volume, such as micrograms per cubic meter, must be corrected to a reference temperature of 25 degrees Celsius and a reference pressure of 760 millimeters of mercury (1,013.2 millibars); parts per million in this table refers to parts per million by volume, or micromoles of regulated air pollutant per mole of gas.
[4]National primary standards are the levels of air quality necessary, with an adequate margin of safety, to protect the public health.
[5]National secondary standards are the levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a regulated air pollutant.
[6]For the purposes of this section, prevailing visibility means the greatest visibility which is attained or surpassed around at least half of the horizon circle, but not necessarily in continuous sectors.
[7]The ambient air quality standard for hydrogen sulfide does not include naturally occurring background concentrations.

Source: Nevada Administrative Code NAC 445B.22097 Standards of quality for ambient air. (NRS 445B.210, 445B.300)

concentrations of that pollutant are below the National Ambient Air Quality Standards. An area is not in attainment if violations of National Ambient Air Quality Standards for that pollutant occur. Areas where insufficient data are available to make an attainment status designation are listed as unclassifiable and are treated as being in attainment for regulatory purposes. A maintenance area is a former nonattainment area that has improved to the point where ambient air quality standard violations no longer occur.

The existing air quality of the Ely District is typical of the largely undeveloped regions of the western U.S. There are no monitoring networks currently measuring air quality in the Ely area. Monitors in the state and local programs are concentrated in population centers. Nonetheless, for the purposes of statewide regulatory planning, this area has been designated as in attainment for PM_{10} and as unclassified for other criteria air pollutants. The region is designated as a Class II area under the Prevention of Significant Deterioration regulations. The Class II designation allows for moderate growth or some degradation of air quality within certain limits above baseline air quality. These limits include the National Ambient Air Quality Standards referred to above and shown in **Table 3.2-1** as well as other incremental limits set by the Nevada Department of Environmental Protection.

As natural air pollutant emission sources, wildfires are not subject to air quality regulations, whereas prescribed fires (including wildfire managed for natural resource purposes) are subject to applicable smoke management regulations, including permitting.

State Implementation Plans

The Clean Air Act requires each state to develop, adopt, and implement a State Implementation Plan to ensure that the National Ambient Air Quality Standards are attained and maintained for the criteria pollutants. These plans must contain schedules for developing and implementing air quality programs and regulations. State Implementation Plans also contain additional regulations for areas that have violated one or more of the National Ambient Air Quality Standards (nonattainment areas). The general conformity provisions of the Clean Air Act (Section 176[c]) prohibit federal agencies from taking any action within a nonattainment area that would cause or contribute to a new violation of the National Ambient Air Quality Standards, increase the frequency or severity of an existing violation, or delay the timely attainment of a standard. The federal conformity analysis and determination regulations are applicable for certain actions within either nonattainment or maintenance areas. Federal agencies are required to ensure that their actions conform to applicable State Implementation Plans. The U.S. Environmental Protection Agency developed and finalized criteria and procedures for demonstrating and ensuring conformity of federal actions to State Implementation Plans. However, as written, they apply only to federal actions that occur within nonattainment areas. As of the printing of this RMP/EIS, none of the national forests or BLM districts in the project area lie within nonattainment areas. Therefore, requirements of the conformity regulations do not apply to management actions proposed in this RMP/EIS. However, federal actions still must comply with the State Implementation Plans.

Visibility in Class I Areas

Congress, in the Clean Air Act, declared as a national goal "the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I federal areas which impairment results from manmade air pollution." Class I areas include wilderness areas of at least 5,000 acres or national parks of at least 6,000 acres that were in existence by August 7, 1977. The Clean Air Act also has enabled tribes to classify areas as Class I areas.

The entire Ely District is Prevention of Significant Deterioration Class II, and the nearest mandatory federal Prevention of Significant Deterioration Class I area is the Jarbidge Wilderness Area, located on the Nevada-Idaho border. Several Nevada wilderness areas (including Mount Moriah) were created after 1977, and therefore are not mandatory Prevention of Significant Deterioration Class I areas.

To assure protection of visibility in mandatory Class I areas, some states have adopted (or will adopt) visibility protection requirements as part of their State Implementation Plans, to limit the amount of air pollutant emissions that can take place (including prescribed fire emissions). However, the State Implementation Plan for Nevada does not currently include visibility protection requirements. Class I areas are subject to the most limiting restrictions regarding how much additional pollution can be added to the air. Fine particulate matter ($PM_{2.5}$) is the primary cause of visibility impairment. Emissions from wildfires and prescribed burning, which stay suspended for long time periods and distances, are typically in the 0.1 to 2.5 micron size class and reduce visibility.

Federal land managers have an obligation to complete smoke management reports and apply appropriate mitigation measures to reduce potential impacts on air quality. Managers use, although they are not limited to, available computer software to estimate fuel consumption, emissions, and smoke dispersion from prescribed burns.

3.3 Water Resources

3.3.1 Existing Conditions

Groundwater

Carbonate Rock Aquifer Province. Groundwater of the Carbonate Rock Aquifer Province is stored in ancient consolidated marine sediments, which underlie much of southern and eastern Nevada and extend into western Utah, eastern California, and southeastern Idaho (Dettinger 1995). The carbonate rocks consist of thick discontinuous sequences of limestone and dolomite of Paleozoic age, underlain by clastic and crystaline rocks of Cambrian and Pre-Cambrian age. Some major springs found along faults, such as Murray Springs, may represent the surface expression of these deep carbonate aquifers. The extensive springs along the western side of Ruby Lake in northern White Pine County are another example of such springs. Currently the carbonate aquifer systems are not extensively utilized. The availability of groundwater in the carbonate province is believed to be extensive and water quality generally is good.

Basin-Fill (alluvial) Aquifers. In Nevada, the Great Basin is divided into 14 closed or semi-closed hydrographic basins. Each hydrographic area in the region is underlain by a structural basin partially filled with clastic material eroded from adjacent mountains. These deposits form basin-fill aquifers that are bounded by the consolidated rocks of the structural basin. Most are connected hydraulically to adjacent or underlying carbonate-rock aquifers (Harrill and Prudic 1998). Alluvial aquifers of the Great Basin typically consist of two distinct units: a deep older unit and a younger shallow aquifer separated by a clay layer of Pliocene age. These alluvial aquifers have a wide range of beneficial uses.

Table 3.3-1 summarizes water availability in the shallow alluvial aquifers of the Ely District. The perennial yield shown in **Table 3.3-1** identifies the water in shallow alluvial aquifers that can be withdrawn without creating substantial drawdown in the water table. The perennial yield generally is about equal to the estimated net annual recharge. The committed resources represent the total volume of permitted, certificated, and vested groundwater rights recognized by the Nevada Division of Water Resources in each basin (Nevada Division of Water Planning 1992).

Groundwater quality in shallow alluvial aquifers of the Ely District is highly variable (Thompson and Chappell 1984). Most basins have groundwater chemistry dominated either by calcium bicarbonate or sodium bicarbonate. Often, a basin will grade from calcium bicarbonate water along the mountain front recharge area to sodium bicarbonate water in the interior of the basin. Springs in the alluvial basins are usually the surface expression of the shallow alluvial groundwater table. Alluvial basin recharge generally occurs due to springtime mountain runoff. This runoff percolates through the alluvial pediment gravel at the mountain fronts, recharging the shallow groundwater table. This recharge maintains the water table and is expressed as springs near the interior of the basins. These springs are used extensively by wildlife and by ranchers. Flow rates in the springs are variable, with maximum flow rates in the range of 100 to 400 gallons per minute during spring runoff (Pupacko et al. 1984). During the summer months andespecially during periods of drought, the springs cease to flow. The water quality in the springs reflects the water quality in the shallow alluvial aquifer.

Table 3.3-1
Water Availability in Shallow Alluvial Aquifers[1]

Hydrographic Basin	Basin Number	Perennial Yield (acre-feet/year)	Committed Resources (acre-feet/year)	Designated Groundwater Basin[2]
White Pine County				
Humboldt River Basin				
Huntington Valley	47	25,000	8,124	Yes
Central Region				
Diamond Valley	153	30,000	134,176[3]	Yes
Newark Valley	154	18,000	12,035	No
Little Smokey Valley-north	155A	5,000	3,484	No
Railroad Valley-north	173B	75,000	40,820	No
Jakes Valley	174	12,000	54	No
Long Valley	175	6,000	3,307	No
Ruby Valley	176	53,000	33,822	Yes
Butte Valley-south	178B	14,000	318	No
Steptoe Valley	179	70,000	78,531[3]	Yes
Cave Valley	180	2,000	13	No
Lake Valley	183	12,000	28,981[3]	Yes
Spring Valley	184	100,000	24,778	No
Tippett Valley	185	3,500	472	No
Antelope Valley-south	186A	800	637	No
Antelope Valley-north	186B	1,700	613	No
Great Salt Lake Basin				
Deep Creek Valley	193	2,000	0	No
Pleasant Valley	194	1,500	976	No
Snake Valley	195	25,000	12,389	No
Hamblin Valley	196	5,000	368	No
Colorado River Basin				
White River Valley	207	37,000	25,007	No
Lincoln County				
Central Region				
Emigrant Valley-Groom Lake	158A	2,800	12	No
Emigrant Valley-Papoose	158B	10	0	No
Frenchman Flat	160	16,000	0	No
Three Lakes Valley-north	168	4,000	0	No
Tikapoo Valley-north	169A	1,300	7	No
Tikapoo Valley-south	169B	3,000	0	No
Penoyer Valley	170	4,000	19,768[3]	Yes
Coal Valley	171	6,000	25	No
Garden Valley	172	6,000	366	No
Railroad Valley-north	173B	75,000	40,820	No
Cave Valley	180	2,000	13	No
Dry Lake Valley	181	2,500	56	No
Delamar Valley	182	3,000	7	No
Lake Valley	183	12,000	28,981[3]	Yes
Spring Valley	184	100,000	24,778	No

Table 3.3-1 (Continued)

Hydrographic Basin	Basin Number	Perennial Yield (acre-feet/year)	Committed Resources (acre-feet/year)	Designated Groundwater Basin[2]
Great Salt Lake Basin				
Hamblin Valley	196	5,000	368	No
Escalante Desert Basin				
Escalante Desert	197	1,000	2	No
Colorado River Basin				
Dry Valley	198	1,000	7,207[3]	No
Rose Valley	199	100	1,660[2]	No
Eagle Valley	200	300	297	No
Spring Valley	201	4,100	1,164	No
Patterson Valley	202	4,500	5,435[3]	No
Panaca Valley	203	900	28,134[3]	Yes
Clover Valley	204	1,000	3,690[3]	No
Lower Meadow Valley Wash	205	5,000	29,680[3]	Yes
Kane Springs Valley	206	0	0	No
White River Valley	207	37,000	25,007	No
Pahroc Valley	208	21,000	7	No
Pahranagat Valley	209	25,000	9,714	No
Coyote Springs Valley	210	18,000	0	Yes
Lower Moapa Valley	220	16,500	5,660	Yes
Tule Desert	221	1,000	4	No
Virgin River Valley	222	3,600	13,307[3]	Yes
Nye County				
Central Region				
Little Smokey Valley-north	155A	5,000	3,484	No
Little Smokey Valley-central	155B	100	2	No
Little Smokey Valley-south	155C	1,000	17	No
Hot Creek Valley	156	5,500	4,219	No
Coal Valley	171	6,000	25	No
Garden Valley	172	6,000	366	No
Railroad Valley-north	173B	75,000	40,820	No
Colorado River Basin				
White River Valley	207	37,000	25,007	No
Pahroc Valley	208	21,000	7	No

[1]Source: Nevada Division of Water Resources 2003. The information is current as of August 2003, but may be revised by the Division as necessary in ongoing water resources administration.
[2]Designated groundwater basins are basins where permitted ground water rights approach or exceed the average annual recharge and the water resources are being depleted or require additional administration. State-declared preferred uses may include, among others, municipal and industrial, domestic, and/or agriculture. The Nevada State Engineer has additional authority to administer water resources in a designated groundwater basin.
[3]The shallow alluvial groundwater resource currently is fully allocated by the Nevada Division of Water Resources.

Groundwater evapotranspiration losses have been studied in Nevada since the 1940s. More recent research using current data and techniques has been carried out to revise regional groundwater evapotranspiration and groundwater budgets in the Great Basin of eastern Nevada (Nichols 2000). As Nichols' estimates indicate, evapotranspiration by phreatophytic plant communities accounts for a significant consumption of groundwater recharge resources. In the Great Basin, plants considered phreatophytes (basically, those that normally reach and consume groundwater by root system adaptations) consist of riparian-area trees, shrubs, grasses, and grass-like plants; some salt-desert shrubs and grasses; and in some cases, sagebrush.

In addition to groundwater consumption by phreatophytes, shrubs, and tree species common to the District develop extensive near-surface lateral root systems that capture rainfall and snowmelt. Although they may generate deep taproot systems, pinyon, juniper, and big sagebrush frequently have a high proportion of active roots at shallow soil depths (Evans 1988; Flanagan et al. 1991; Gedney et al. 1999). In addition to their winter transpiration demand, pinyon and juniper are particularly efficient at utilizing summer precipitation (Flanagan et al. 1991). This may result in the increased growth and competition of these species in areas where such seasonal rainfall forms an important part of the annual average.

Consumptive use of soil moisture and groundwater by plant transpiration is one of the major factors affecting water availability in the Ely District. Numerous studies have been made of evapotranspiration rates in arid and semi-arid settings. The research is useful for comparative purposes. Annual water use by pinyon-juniper woodlands ranges from about 14.5 to 27.5 inches (American Society of Civil Engineers 1989). Big sagebrush consumes on the order of 8 to 12 inches per year, and saltcedar water consumption generally ranges from 30 to 70 inches per year. Upland grass communities utilize about 6 to 12 inches per year (American Society of Civil Engineers 1989).

Canopy cover and interception losses also affect water availability on the District. Interception is the component of precipitation captured by the vegetation canopy or underlying debris. Rangeland interception losses are generally between 20 and 40 percent of precipitation, but may have a wider range in juniper (Wilcox et al. 2003; Gedney et al. 1999). Subsequent evaporation prevents much of this water from reaching the soil surface and therefore, it is not available for other plant species. Pinyon and juniper stands intercept large quantities of precipitation and thus reduce water available for groundwater recharge.

Surface Water

Surface water resources in the eastern Great Basin include perennial, intermittent, and ephemeral streams, marshlands and small lakes, intermittently inundated playas, and manmade impoundments. The springs are discussed above under "Groundwater." The overall combination of limited precipitation, upstream agricultural diversions, soil and geologic conditions, and evapotranspiration demand in the District has resulted in limited streamflows in general, and few intermittent or perennial streams. Most streams in the District are ephemeral and flow from the mountains to the alluvial basins in response to spring snow melt or heavy rains. Most perennial streams that flow from the mountain fronts seep into unconsolidated deposits or are diverted for irrigation. **Map 3.3-1** shows the location of perennial streams and mapped springs within the

overall boundary of the planning area. Water data are available from the U.S. Geological Survey for perennial streams in the Ely District (U.S. Geological Survey water data web site: www.water.usgs.gov).

Approximately 6,800 square miles occur within the Colorado River drainage of the Ely District (NDWR 2003b). The primary streams in the Ely District that drain into the Colorado River system include Lower Meadow Valley Wash and the White River, both of which are tributaries to the Virgin River. About 25 million people rely on the Colorado River for drinking water supplies, and approximately 3.5 million acres of farmlands can be supported with irrigation withdrawals and returns (USGS 2000). Other water uses include livestock, industry, recreation, and hydropower generation. The river is highly regulated, with 93 reservoirs in its basin. Over the last several decades, salinity in the Colorado River has become a primary water quality concern.

National, state, and local programs based on the Clean Water Act and the Colorado River Basin Salinity Control Act have been developed to regulate water quality in the Colorado River Basin. In 1994, the BLM was directed (by amendment to the Colorado River Basin Salinity Control Act) to develop a comprehensive program for minimizing salt contributions from lands it administers (USBR 2004). The agency objective is to reduce the salt load of the Colorado River by 89,000 tons per year by 2015 (BLM-NARSC 1999). Land management activities within the Colorado River watershed must consider the agency's role and objectives as a member of the multi-agency Colorado River Basin Salinity Control Forum.

In addition, a objective within BLM is to reduce the density and distribution of saltcedar (tamarisk) along drainages (Medlyn 2004). As saltcedar displaces native vegetation, the original habitat values for many native wildlife species are reduced (Lovich 1996). In addition to being an aggressive weed, the biological characteristics of saltcedar can cause undesirable modifications in the surrounding environment. Common changes include increased soil salinity that inhibits native plant germination and growth, and increased water consumption (Wiesenborn 1996). In areas where vegetation has declined because of overgrazing, wildfires, or other land disturbing activities, soil erosion has caused an increase in the total suspended sediments in streams. Springs attract cattle and wildlife. Water quality immediately downgradient of ephemeral or intermittent streams or flowing springs may exhibit a decline due to physical site alteration and concentration of animal fecal material (Tippets et al. 2001; Rockwell 2002; Health Effects Review 1996).

The Nevada Division of Environmental Protection classifies water bodies based on the degree of impact from human activities, such as urban drainage, industrial activity, agricultural irrigation, and waste disposal. Class A waters are those least affected by human activity, while Class D waters are substantially affected. The classification of waters in White Pine, northeastern Nye, and Lincoln counties (Nevada Administrative Code 445A.124 to 445A.127) are presented in **Table 3.3-2**. This table shows that many reservoirs are Class B or Class C waters, while most streams in the Ely District are Class A waters.

Table 3.3-2
Classification of Waters in the Ely District[1]

Water Body	Hydrographic Region	Hydrographic Basin	Comments
Class A Waters (Relatively pristine waters not affected by industrial or agricultural activity.)			
Nye County			
Bailey Creek	10	140	
Currant Creek	10	173	
Pine Creek	10	140	
Stoneberger Creek	10	140	
White Pine County			
Huntington Creek	4	47	
Lehman Creek	11	195	
Silver Creek	11	195	
Berry Creek	10	179	
Bird Creek	10	179	
Cave Creek	10	179	
Cleve Creek	10	184	
Currant Creek	10	173	
Duck Creek	10	179	
East Creek	10	179	
Goshute Creek	10	179	
North Creek	10	179	
Pine Creek	10	184	
Ridge Creek	10	184	
Silver Creek	10	195	
Timber Creek	10	179	
Baker Creek	11	195	
Hendry's Creek	11	195	
White River	13	207	
Class B Waters (Waters with light-moderate human habitation, light industrial activity, light-moderate agricultural use, and moderate influence of human activity on the watershed.)			
Lincoln County			
Clover Creek	13	204	
Eagle Valley	13	200	
Eagle Valley Reservoir	13	201	
White Pine County			
Cave Lake	10	179	
Illipah Reservoir	10	174	
Silver Creek Reservoir	11	195	
White River	13	207	National Forest to Ellison Creek
Nye County			
Currant Creek	10	177	

Table 3.3-2 (Continued)

Water Body	Hydrographic Region	Hydrographic Basin	Comments
Class C Waters (Waters with moderate urban use, moderate industrial activity, intensive agricultural use, and a watershed altered by man.)			
Lincoln County			
Echo Canyon Reservoir	13	199	
Nesbitt Lake	13	209	
Pahranagat Reservoir	13	209	
Schroeder Reservoir	13	222	
White Pine County			
Comins Reservoir	10	179	
Gleason Creek	10	179	
Snake Creek	11	195	
Willow Reservoir	10	179	
Class D Waters (Waters in industrial areas, agricultural waters, and waters subject to multiple discharge of wastes.)			
White Pine County			
Gleason Creek	10	179	Highway 44 to Murray Creek
Murry Creek	10	179	Gleason Creek to south line

[1]Based on ongoing Nevada Division of Environmental Protection investigations regarding potential sources of potable waters of the state. Additional information regarding aquatic and stream resources for fisheries and wildlife is presented in Section 3.6

3.3.2 Trends

Groundwater

Current trends in Nevada have been toward the development of groundwater for municipal, industrial, and agricultural uses. Nevada, especially eastern Nevada, has seen increasing demand for groundwater appropriations that involve interbasin transfer of water. These transfers are from primarily agricultural areas to large municipalities or areas of residential and recreational development adjacent to municipalities. Areas around Reno, Carson City, and especially Las Vegas have experienced an increasing demand for water that only can be met by groundwater development in agricultural areas or undeveloped basins, and transfer of the water to the more populated regions. In the past decade or so, the Las Vegas metropolitan area has experienced record population growth and associated water demand increases. This trend is projected to continue, with an additional approximately one million residents predicted for Clark County by 2030 (SNWA 2004a). The Southern Nevada Water Authority has identified several water supply options to address current and future water supply issues in the area (SNWA 2004b). Surface water transfers from the Muddy River (Hydrographic Basin 219, **Table 3.3-1**) and the Virgin River Valley (Hydrographic Basin 222, **Table 3.3-1**) are alternatives that could be pursued. Groundwater diversion applications for between 125,000 and 200,000 acre-feet per year from White Pine, Nye, and Lincoln counties have been filed with the Nevada Division of Water Resources by the Southern Nevada Water Authority (SNWA 2004b). Groundwater would be piped from the source regions into the Las Vegas metropolitan area.

Table 3.3-1 shows the groundwater demands and estimated perennial yield in the Ely District. In White Pine County, these basins are Diamond Valley, Steptoe Valley, and Lake Valley. In Lincoln County, these basins are Indian Springs Valley, Penoyer Valley, Railroad Valley (south) Lake Valley, Dry Valley, Rose Valley, Patterson Valley, Panaca Valley, Clover Valley, Lower Meadow Wash Valley, and the Virgin River Valley. Many of these over-committed basins are designated basins, indicating that the Nevada Division of Water Resources will closely monitor future groundwater use and may not issue new groundwater permits.

Surface Water

All surface waters within the planning area have been appropriated.

3.3.3 Current Management

Water Rights

The State Engineer administers water rights. All surface water in Nevada is fully appropriated (Nevada Division of Water Resources 1999) and no new applications for permits to appropriate surface water rights may be approved. Federal reserved water rights are water rights reserved by applicable Executive Orders or legislation. The doctrine of federal reserved rights evolved to ensure that public lands would have sufficient water to meet the purposes for which they were reserved. The priority date for federal reserved rights is the signing date of the reservation. If BLM identifies a need for a new water development on public lands, the BLM will apply to the Nevada State Engineer for a permit to appropriate water for a single beneficial use

recognized in NRS533. Public Water Reserves are federal reserved rights created by Presidential Executive Order to preclude monopolization of water sources on arid rangelands of the west. They reserve water from springs and water holes specifically for livestock watering or domestic use only. All other beneficial uses of such springs or water holes require application for a state appropriative right. By agreement BLM notifies the State Engineer of all claimed Public Water Reserves.

Water Quality

The Nevada Division of Environmental Protection administers the Clean Water Act as amended (P.L.10 0-4) for waters of the State of Nevada. A Memorandum of Understanding for Water Quality Management Activities (dated September, 2004) was approved by Nevada Division of Environmental Protection and BLM which identified opportunities for cooperation to administer the Clean Water Act to the extent practical and as allowed by other applicable laws and available resources. These opportunities include: development of best management practices, coordinated water quality monitoring programs, review of policies and procedures, and cooperative efforts to establish water quality standards. Further, BLM agrees to recognize the state's beneficial uses of water, water quality standards, and monitoring and nonpoint source program objectives. The state acknowledges the BLM's role and responsibility for the maintenance of water quality consistent with the Clean Water Act and state regulations.

3.4 Soil Resources

3.4.1 Existing Conditions

The soil types in the Ely District are strongly associated with landforms and physiographic location (Blackburn 1998). The types of soils that have developed have been strongly influenced by the type of bedrock geology. As discussed in Section 3.18, Geology and Mineral Extraction, the valley areas are typified by unconsolidated sedimentary deposits including alluvial and lakebed deposits. The areas adjacent to the mountain ranges (piedmonts) are composed of alluvial fans and related features. The mountain ranges are composed generally of sedimentary, metamorphic, and igneous rocks.

Soils can be found in the following four major settings in any of the valleys and adjacent mountain ranges.

Basin Floors. These soils occupy level to gentle slopes and can be very deep. Texture ranges from moderately coarse to fine-grained. They generally show little soil profile development, although in some cases, accumulations of soluble salts or silica occur at depth. Only a few of these soils are subject to high water tables, and they are seldom flooded.

Alluvial Fans and Stream Terraces. Soils in these areas occupy level to moderate slopes, and consist of fine to coarse textures. They generally exhibit little profile development. Some of the soils are associated with high water tables and occasionally can be flooded.

Fan Piedmonts. These soils formed where alluvial fans coalesce into a single linear feature that parallels a mountain front (Blackburn 1998). These soils have level to moderately steep slopes and can be shallow to very deep. Texture ranges from moderately course or gravelly to moderately fine. Silica and lime cementation may be present in some of these soils.

Hills and Mountains. These soils are found on mountain slopes, and the sides of hills and are very shallow to deep. They contain gravel and coarse-textured material and in many places are underlain by bedrock at shallow depths. These soils, while not subject to flooding, may be at risk for erosion, especially on steeper slopes.

Biological soil crusts (also referred to variously as cryptogamic, microbiotic, crytpobiotic, and microphytic crusts) are found in the Great Basin and parts of the Mojave Desert. Living organisms and their byproducts form the biological crusts by binding soil particles together with organic materials. These biological crusts contribute to important ecological functions such as soil stabilization, water infiltration, and plant establishment. Although they tolerate harsh growing conditions, biological crusts are not well adapted to physical disturbances.

3.4.2 Trends

Soil erosion and related losses of productivity are ongoing concerns within the District. The primary concerns are related to sites where herbaceous vegetation is sparse to absent. Where understory

vegetation is eliminated or degraded, soil erosion potential is greatly increased. Based on increasing density and abundance of woody species, such as pinyon and juniper, along the foothills of the local mountain ranges combined with field observations of erosion features, soil resources appear to be on a trend of increasing risk.

Available literature and an understanding of erosion processes indicate that surface water runoff is highly correlated to erosion and generally correlated to sediment yield (Blackburn 1975; Blackburn and Skau 1974; Pierson et al. 2003; Wilcox et al. 2003). Runoff and erosion rates vary primarily with specific storm duration and intensity, topography, infiltration and soil profile characteristics, vegetative canopy and ground cover, and surface roughness. Studies in a semi-arid watershed in south-central Oregon indicated that the highest sediment production rates were found in juniper woodlands (approximately 1,640 kilograms/hectare, or about 0.73 ton per acre) (Buckhouse and Mattison 1980). Big sagebrush communities typically had sediment yields of approximately 1,440 kilograms per hectare (0.64 ton per acre), with substantial increases where juniper was encroaching. Low sagebrush/grass and grassland communities had the lowest sediment yields, about 785 kilograms per hectare (0.35 ton per acre) (Buckhouse and Mattison 1980). Mean annual precipitation in that study area is approximately 340 millimeters (13.4 inches) (Eddleman and Miller 1991).

These findings are generally consistent with studies done elsewhere on western semi-arid and arid watersheds. In large-plot rainfall simulations, Pierson et al. (2003) found that uncut juniper-dominated plots began to run off after rainfall was applied equivalent to a 2-year return period thunderstorm. In contrast, plots studied 10 years after juniper was cut did not run off until the equivalent of a larger, 100-year return period storm was applied. The uncut plots also produced high quantities of interrill and rill erosion in comparison to much smaller levels measured on the plots where juniper had been removed 10 years earlier (Pierson et al. 2003).

Studies on or near the Ely District indicate larger variations in sediment production for several watersheds (Blackburn and Skau 1974). Canopy and herbaceous understory cover were not described, but substantial variation in infiltration and sediment yield was noted between the watersheds, and between the different community types on a given watershed. This is probably due to factors discussed below. Sediment yields from juniper and pinyon/juniper woodlands yielded 0.003 to 0.42 ton per acre of sediment, and sagebrush communities yielded 0.01 to 0.64 ton per acre. The highest infiltration rates and lowest sediment production were observed in the Steptoe watershed southeast of Ely, whereas the lowest infiltration rates and the highest sediment production were found in the Duckwater watershed southeast of Eureka. The smallest sediment yield in the Duckwater watershed came from singleleaf pinyon/Utah juniper communities, and the largest quantities of sediment came from big sagebrush, shadscale, and winterfat communities. In contrast, on the Steptoe watershed, the singleleaf pinyon/Utah juniper community consistently produced greater sediment than other sampled types (Blackburn and Skau 1974). The least sediment yield came from big sagebrush and crested wheatgrass (reseeded) types, although there was no significant difference or trend in sediment production compared to unseeded sagebrush/grass communities on the watershed.

On the Pine and Mathews Canyon watershed southeast of Caliente, the largest sediment yields were observed from the big sagebrush/rubber rabbitbrush community and from the singleleaf pinyon/Utah juniper/black sagebrush/serviceberry community (Blackburn and Skau 1974). The lowest sediment

production came from Utah juniper/crested wheatgrass, black sagebrush/intermediate wheatgrass and Utah juniper/big sagebrush/ squirreltail types. Vegetation communities that were railed and seeded or chained and seeded showed no statistically significant difference in sediment production from their unseeded counterparts, although there was a trend of increasing sediment production from the untreated sites (Blackburn and Skau 1974).

In further analysis, the amount of space between coppice dunes (areas of accumulated soil and litter under shrub or grass cover) was found to be associated with sediment production. Typically as dune interspaces increase and vesicular soil horizons form, sediment production increases (Blackburn and Skau 1974; Blackburn 1975). (Vesicular soil horizons are surface layers having strong platy or massive soil structure with numerous interconnected pores or air pockets; they are relatively unstable when saturated). Similar relationships with increasing sediment yields were found for percent bare ground and percent silt. As organic matter, percent sand, coppice dunes and litter increase, sediment production decreases. The large variation in sediment yields overall can be explained by the variation in plot slope and the location of coppice dunes and interspaces (Blackburn 1975). Similarly, on a watershed basis, erosion and sediment yields vary according to precipitation, soils, topography, and vegetation characteristics. Significantly, the unstable, massive or platy vesicular horizons form in arid and semi-arid areas of sparse vegetation, and tend to increase where herbaceous vegetation is removed between the protected accumulations of litter and soil under shrubs and grasses (Blackburn and Skau 1974). The instability of the massive or platy vesicular soil horizons accounts for larger sediment production from these areas.

In addition, accelerated soil erosion and sediment delivery to aquatic resources commonly are observed soon after catastrophic fires, especially on steep slopes. Regional trends toward increasing fuels and increased fire frequency and severity contribute further to the increasing risk of soil erosion on the District. Also, trampling by livestock, wild horses, or wildlife, and increasing recreational use and severe wildfires affect biological crusts. When the crusts are diminished, soil erosion potential increases.

3.4.3 Current Management

Erosion rates are predicted and evaluated using the Revised Universal Soil Loss Equation prior to substantial ground disturbing activities on the District. Best management practices typically are used to minimize soil erosion and sediment yield on the site-specific local level. Soil inventories are conducted by the U.S. Department of Agriculture Natural Resource Conservation Service.

Implementation of watershed studies, as described in Section 3.19, Watershed Management, and associated treatment methods, as discussed in Section 3.5, Vegetation, also aid in controlling soil erosion and sedimentation.

3.5 Vegetation

3.5.1 Existing Conditions

The Ely District is located in a dry climate characterized by annual losses of water through evaporation and transpiration that exceed annual water gains in precipitation. Two divisions of dry climates commonly are recognized: the arid desert and the semiarid steppe (U.S. Department of Agriculture Natural Resources Conservation Service 2003). The greatest portion of the Ely District (northern two-thirds) lies within the semiarid, cold desert steppe better known as the Great Basin ecological system. The southern portion of the District lies within the arid, hot desert, Mojave Desert ecological system with a transitional vegetation zone between it and the Great Basin. The Great Basin and the Mojave Desert are distinguished by the presence of distinctive native shrub communities, dominated by sagebrush and creosote, respectively.

The District lies within all or portions of five Major Land Resource Areas as delineated by the U.S. Department of Agriculture Natural Resources Conservation Service and modified to reflect current knowledge from recent soils data (**Map 3.5-1**). The general characteristics of these Major Land Resource Areas are summarized in **Table 3.5-1**. Actual land cover types representing major vegetation types are displayed in **Map 3.5-2**. The vegetation types that occur on the District within the broad cover classes are listed in **Table 3.5-2** with their relative abundance.

The array of vegetation types on the District (except riparian/wetland and Mojave Desert communities) are broken down in **Table 3.5-3** with respect to their current conditions relative to the range of desired conditions discussed in Section 2.5. Existing conditions of the major vegetation types are further discussed in the remainder of this section.

Shrub Lands

Approximately 70 percent of the Ely District is characterized as sagebrush, salt desert shrub, or Mojave Desert (**Table 3.5-2**). Within the shrub land vegetation type there are many plant communities described, of which creosote, blackbrush, shadscale, salt desert scrub, winterfat, and sagebrush are most widespread on the District.

At the lower elevations in the hot desert climate regime of Major Land Resource Area 30, ephemeral vegetation grows in response to infrequent precipitation events and tolerates extended dry periods. Perennial vegetation associated with Major Land Resource Area 30 also is adapted to extended dry periods, and responds similarly to ephemeral vegetation by growing immediately after infrequent precipitation events. In this area, shrub communities are variously dominated by blackbrush, creosote, saltbush, bursage, and shadscale. Salinization is a dominant phenomenon resulting from high evaporation. Salty crusts accumulate on the soil surface. Salt-loving plants, or halophytes, such as saltbush and shadscale dominate large portions of the area because other plants have few or no physiological capabilities to tolerate the high salt conditions. Winterfat occurs both in pure monospecific stands and as a primary component of mixed shrub communities, commonly with shadscale. Distribution of salt desert shrub vegetation within the District is shown on **Map 3.5-3**.

Table 3.5-1
General Characteristics of Major Land Resource Areas of the Ely District

Area Designation	Name	General Descriptor	Major Climate	Average Annual Precipitation (inches)	Major Landforms	Average Elevations (feet above mean sea level)	Major Vegetation
25	Owyhee High Plateau	Northern Great Basin	Precipitation is evenly distributed throughout the year.	8 to 15; up to 30 in the mountains.	Rolling plateaus and gently sloping basins. Steep north-south mountains.	4,590 to 7,540; up to 12,000 in the mountains.	Shrub-grassland characterized by big sagebrush or low sagebrush. Plateaus or benches have pinyon-juniper woodland and mountain mahogany. Higher elevations support montane forest types.
28A	Great Salt Lake area	Central Great Basin with a monsoonal influence	Precipitation occurs predominantly during winter and spring. Sporadic moisture in association with summer monsoonal influence also occurs.	5 to 8; up to 20 in the mountains.	Rolling plateaus and gently sloping basins. Steep north-south mountains.	4,000 to 6,500; up to 13,000 in the mountains.	Shadscale, greasewood, sagebrush, saltbush, pinyon-juniper woodland and upper montane forests.
28B	Central Nevada Basin and Range	Central Great Basin	Driest period occurs between mid-summer and mid-autumn.	5 to 25	Rolling plateaus and gently sloping basins. Steep north-south mountains.	4,500 to 6,500; up to 12,000 in the mountains.	Shadscale, greasewood, sagebrush, saltbush, pinyon-juniper woodland and upper montane

Table 3.5-1 (Continued)

Area Designation	Name	General Descriptor	Major Climate	Average Annual Precipitation (inches)	Major Landforms	Average Elevations (feet above mean sea level)	Major Vegetation
							forests.
29	Southern Nevada Basin and Range	Transitional	Substantial precipitation occurs in summer.	3 to 20	Rolling plateaus and gently sloping basins. Steep north-south mountains. Extensive Pleistocene lake sediments and alluvium in the valley bottoms.	3,000 to 6,000; up to 11,000 in the mountains	Shadscale, greasewood, sagebrush, saltbush, pinyon-juniper woodland, and upper montane forests.
30	Sonoran Basin and Range	Mojave Desert	Precipitation primarily occurs during winter and early spring.	3 to 20	Broad basins, valleys, and old lakebeds predominate.	500 to 6,000; most valleys between 2,000 and 4,000.	Creosote, bursage, shadscale, and Joshua tree.

Table 3.5-2
Vegetation Types Found on the Public Lands in the Ely District

Vegetation Type	Approximate Area (acres)	Proportion of District (percent)
Pinyon-juniper	3,593,400	31.5
Aspen	7,000	0.1
High elevation conifers	56,000	0.5
Salt desert shrub	1,221,000	10.7
Sagebrush[1]	5,619,500	49.3
Mountain mahogany	46,000	0.4
Mojave Desert vegetation	850,000	7.5
Riparian/wetland	3,100	0.0
Total	**11,396,000**	**100.0**
Non-native seedings[2]	269,500	2.4

[1]Sagebrush category includes broad array of sagebrush species and communities as well as grassland inclusions.
[2]Seedings duplicate areas listed in other categories.

Source: BLM unpublished data.

Within Major Land Resource Areas 29, 28a, and 28b, the mid-elevations are dominated by various species, forms, and densities of sagebrush. Nearly all species and varieties of sagebrush are endemic to the western U.S. where this group of species is the most widely distributed of all shrubs (**Map 3.5-4**). The most widespread of these on the Ely District are black, Wyoming big, mountain big, and big sagebrush, although others occur. The local sagebrush species and varieties are separated along ecological gradients related to soil and climate conditions (Young and Evans 1986). For example, the occurrence of deep soils coincides with the distribution of big sagebrush in the Great Basin (Hironaka 1986). The 12-inch mean annual precipitation line generally divides the ranges of Wyoming big and mountain big sagebrush.

Mountain mahogany sites occur on slopes at the mid to higher elevations. Mountain mahogany is long-lived, and many stands are mature with individual plants reaching tree size in height and diameter. Mature mahogany tends to be shade intolerant and loses its competitive advantage when overtopped by conifers (Schulz et al. 1990). Distribution of mountain mahogany sites within the District is illustrated on **Map 3.5-5**. Most mountain mahogany sites occur within the same elevation range as mountain big sagebrush.

Native perennial bunchgrasses, such as bluebunch wheatgrass, bottlebrush squirreltail, Indian ricegrass, and Great Basin wildrye, historically were associated with the interspaces between sagebrush plants. In many areas today, the perennial bunchgrasses have been largely replaced by a variety of invasive annual species such as halogeton and cheatgrass, as the result of fires, lack of fires, inappropriate grazing practices, or various soil disturbances (**Map 3.5-6**). For further discussion of cheatgrass on the District, refer to Section 3.21, Noxious and Invasive Weed Management. Crested wheatgrass, an introduced species, has been seeded in some areas, and has become well established in some areas. In addition to its value for livestock, wild horses, and wildlife, it has proven to have both fire resistance and soil-binding abilities. Where crested wheatgrass occurs, it can preclude dominance by cheatgrass.

Table 3.5-3
Current Conditions of Major Vegetation Types

Pinyon-Juniper		
	Herbaceous State	9%
	Herbaceous State (Immature Woodland Phase)	1%
	Tree State (Mature Woodland Phase)	9%
	Tree State (Overmature Woodland Phase)	81%
	Tree State (Annual Invasives Phase)	0%
Aspen		
	Herbaceous State (Herbaceous, and Herbaceous-Shrub and Sapling Phase)	0%
	Herbaceous State (Immature Phase)	0%
	Tree State (Mature Woodland Phase)	40%
	Tree State (Over-Mature Woodland Phase)	60%
High-elevation Conifer		
	Herbaceous State (Herbaceous, and Herbaceous/Sapling Phase)	0%
	Herbaceous State (Immature Woodland Phase)	0%
	Tree State (Mature Phase)	43%
	Tree State (Over-Mature Phase)	57%
Salt Desert Shrub		
	Herbaceous State	18%
	Shrub State	64%
	Altered: Annual Invasive/Exotic	18%
	Altered: Perennial Nonnative Seeded	0%
Sagebrush		
	Herbaceous State	17%
	Shrub State	54%
	Tree State	17%
	Annual	9%
	Seeded	2%
Mountain Mahogany		
	Herbaceous State (Herbaceous Phase)	0%
	Herbaceous State (Shrub Phase)	0%
	Shrub State (Shrub - Herbaceous Phase)	5%
	Shrub State (Shrub Phase)	42%
	Shrub - Tree Like State (No Understory Phase)	53%
Nonnative Seeding		
	Herbaceous State	4%
	Shrub State	80%
	Tree State	15%
	Altered: Annual Invasive	1%

Forests and Woodlands

Approximately 31 percent of the Ely District is pinyon-juniper woodlands, dominated by single leaf pinyon pine and/or Utah juniper (**Table 3.5-2**) (**Map 3.5-7**). Pinyon-juniper woodland is predominant at the lower elevations of the mountain slopes. Less than 1 percent of the area is occupied by ponderosa pine, white fir, spruce, aspen, and bristlecone pine distributed primarily on steep mountain slopes and ridges.

Approximately 86 percent of the pinyon-juniper woodland type contains high tree densities and high canopy closure with little or no understory. Annuals, mainly cheatgrass, dominate the understory of an estimated 9 percent of the woodland type.

The restoration and maintenance of healthy ecological systems within watersheds is a primary focus for the future management of the Ely District. Healthy ecological systems are geographically diverse and change over time. They are compatible with soil potential and are resilient to disturbance.

Resources and resource uses would be managed to restore or maintain ecological health. Certain resource management changes and active treatments may need to be implemented, in portions of watersheds, to accomplish this objective. Adaptive management would be pursued to avoid deteriorating conditions favoring invasive plants and catastrophic fires. Any projects would be implemented so as to result in a mosaic of vegetation within a watershed.

In the long term, natural disturbance (such as drought or fire) would occur and fewer treatments would be needed to maintain ecological health. The result would be a variety of vegetation phases within a watershed, which would provide diverse, healthy conditions for future generations.

Aspen plant communities on the District generally occur as small stands in isolated pockets, mainly on northern and eastern slopes at higher elevations on the mountains and within drainages (**Map 3.5-8**). Approximately 7,000 acres of this type are identified on the Ely District. Of those identified, approximately 60 percent are characterized as being over-crowded with coniferous trees. Many of these stands have little or no aspen regeneration.

Kay (2001) found in his study of aspen communities in central Nevada that excessive herbivory, primarily by domestic livestock, is a key factor limiting regeneration of these stands. Because environmental conditions are rarely favorable for growth and establishment of aspen seedlings, the species spreads and regenerates primarily through vegetative propagation, i.e., root sprouting. The young shoots, both leaves and stems, are highly palatable to various grazing animals including livestock and elk.

High elevation conifer forests cover an estimated 56,000 acres of the District (**Map 3.5-9**). Approximately half (57 percent) are characterized as being in the over-mature phase of the tree state with canopy cover exceeding 40 percent.

Riparian/Wetland Vegetation

As discussed in Section 3.3, Water Resources, there is a limited amount of surface water on the Ely District that manifests in perennial and ephemeral streams, small lakes, and groundwater springs. Riparian areas are transition areas between permanently saturated wetlands and the surrounding upland areas. These areas are characterized by vegetation or physical characteristics that reflect the relatively higher availability of moisture. Definitions contained in BLM Technical Reference 1737 exclude ephemeral streams and washes where riparian vegetation is absent as riparian areas in need of special management (BLM 1998c).

Riparian wetland sites on the District are lentic, which refers to standing water as in lakes, springs, and bogs, or lotic, where water is flowing as in rivers and streams. There are approximately 188 miles and 3,100 acres of riparian/wetland vegetation on the Ely District associated with lotic and lentic environments, respectively (Eastern Nevada Landscape Restoration Project, MacFarlane 2001). Riparian/wetland

vegetation communities are diverse in composition and structure, ranging from herbaceous wetlands to drainages dominated by woody plants. Sedges, rushes, and cattails characterize herbaceous wetlands on the District. Virtually all of the riparian areas on the District are classified as emergent herbaceous wetlands. Important woody riparian plants on the District include narrow-leaf cottonwood, willows, aspen, chokecherry, water birch, and dogwood, depending primarily on elevation and stream gradient.

One of the most substantial riparian habitats on the District is Meadow Valley Wash, located predominantly in Major Land Resource Area 30. Meadow Valley Wash is one of only two perennial streams within Major Land Resource Area 30. Altered hydrologic conditions in Meadow Valley Wash are subject to frequent flash floods. This riparian area has been noted to have unstable soils and high levels of runoff, which have led to landslides and associated increases in sediment loading to the stream.

3.5.2 Trends

Shrub Lands

Substantial alterations of shrub communities in various portions of the Great Basin have been identified and attributed to historical poor grazing management, the introduction and rapid expansion of annual bromes on degraded rangelands, and the resulting changes in fire regime (Pellant 1990; Whisenart 1990, Sparks et al. 1990; Billings 1994). Within the Ely District these alterations are less advanced, but definitely present as pending threats that may occur throughout the planning period. In creosote and sagebrush dominated communities, shrub recovery after fire is slow, because most of the shrub species are easily killed by fire and have no adaptations to fire, such as resprouting. Pre-settlement fire return intervals in the sagebrush zones of the Great Basin varied from 25 to 200 years (see Section 3.20). According to Perryman et al. (2004), sagebrush communities at higher elevations and moisture levels have experienced decreasing fire frequencies (lengthened fire return intervals) that have been accompanied by increasing abundance of pinyon and juniper trees in these communities and reduced abundance of perennial herbaceous understory species. In lower elevation, drier sagebrush communities and salt desert shrub communities, the reduction in perennial herbaceous understory species, due largely to improper grazing practices and increased competition from shrubs in the absence of a normal fire regime, has been accompanied by substantial increases in the abundance of invasive annual grasses. This transition provides sporadic periods of abundant fine fuels for increased fire frequencies.

Frequent fire in the salt desert shrub and sagebrush types in portions of the Great Basin over the last 25 years is a recent trend, largely attributable to the establishment of cheatgrass (West 1994). The reduction in shrub cover following major fires has facilitated a rapid and extensive conversion to a cheatgrass system with short fire return intervals (Meyer et al. 2001). (Also see Section 3.21, Noxious and Invasive Weed Management). Altered fire regimes have further affected species composition, shrub densities, fuel loads, and processes such as nutrient cycling (Perryman et al. 2004).

At some mid and low elevations, decades of fire suppression and improper grazing have led to shrub dominant sagebrush systems that cover large portions of the landscape. These areas are characterized by

sagebrush plants with few perennial herbaceous grasses and forbs in the understory. Monocultures of even-aged sagebrush are common on the District.

Rowland et al. (2003) estimated that approximately 43 percent of the sagebrush communities in the Ely District are at moderate and 24 percent at high risk of displacement of sagebrush by cheatgrass. They similarly estimated 21 percent moderate risk and 36 percent high risk for displacement of other susceptible native species by cheatgrass. They rate approximately 3 percent of the sagebrush communities at moderate risk and 32 percent at high risk for replacement of sagebrush cover types by pinyon-juniper woodlands. Connelly et al. (2004) indicate that the displacement of sagebrush by the expansion of pinyon-juniper woodlands has severely reduced the area of the sagebrush ecological system and degraded its habitat quality.

Pinyon and juniper trees have been expanding into grass and shrub lands throughout the west for decades as described below under Forest and Woodlands. Tree presence appears to be highest in black sagebrush communities.

Forests and Woodlands

The recent trends within the pinyon-juniper woodland are increasing abundance of young trees, increasing density of trees in mature stands, and increasing number of young trees in shrub-dominated vegetation communities. Junipers tend to be more widespread than the pinyons and first to establish in lower elevations. Principal factors contributing to changes in tree density and distribution have been identified as historic improper grazing, fire suppression, global warming, and increased carbon dioxide, all of which favor woody species proliferation (Vernon et al. 2002).

Blackburn and Tueller (1970) concluded that the invasion of pinyon and juniper into black sagebrush communities at several sites in the Ely District was very limited until the late 1800s and early 1900s when rapid expansion of the woodland species occurred at numerous locations. At these sites, the most rapid invasion by both pinyon and juniper occurred after 1920. They attributed the accelerated invasion by both species to a combination of overgrazing, fire suppression, and climatic changes (particularly when a series of drought years is followed by several moist years). Tausch et al. (1981) conducted a study of pinyon-juniper woodlands in 18 randomly selected mountain ranges in the Great Basin and found that approximately 40 percent of the sampled plots had trees establishing during the past 150 years. They note that this period generally coincides with introduction of heavy livestock grazing, harvest of trees for mining and smelting activity, and increased fire suppression following settlement of the region.

Most researchers agree that fire was historically the controlling factor preventing pinyon and juniper trees from invading into shrub communities, and the lack of fire has allowed pinyon and juniper seedlings to increase in shrub communities adjacent to their historic landscape position on ridgetops and high rocky ground (Burkhardt and Tisdale 1969, 1976; Miller and Tausch 2001). Historic livestock grazing that decreased herbaceous plant densities has further facilitated the current rates of woody plant encroachment.

Increased tree density and distribution has led to two distinct trends within the pinyon-juniper woodland zone. Increased tree densities contribute to fuel loading, and when ignitions do occur, they may sustain extremely hot fires under suitable conditions. Secondly, increased tree densities have caused a widespread reduction of herbaceous understory components through competition for sunlight and nutrients, which has led to accelerated rates of soil loss (Naillon et al. 1999; Perryman et al. 2004; Tausch and West 1995; West 1999). Tausch (undated) found that measurable declines in herbaceous understory production occur when 20 percent canopy of woodland species is reached.

Tree densities within the pinyon-juniper woodland were found to increase by 2 percent and 12 percent per year by Chambers (1999) and Tausch (undated), respectively. Other estimates of the rate of change include a 2 and 8 percent increase in extent per year by Chambers (1999) and Tausch (undated), respectively.

As a community type, aspen has been declining in the Intermountain West since shortly after European settlement (Kay 2001). Kay's (2001) studies of aspen communities in central Nevada concluded that generally poor conditions prevail, and that many stands have not reproduced in over 100 years. As discussed in Section 3.5.1, this absence of regeneration appears to be primarily the result of herbivory by livestock.

Native and non-native insect and disease populations currently known to be affecting local forest and woodland areas include the pinyon Ips beetle, dwarf mistletoe, and white pine blister rust. A recent, dramatic increase in pinyon mortality in various localities throughout the west has been attributed to pinyon Ips responding to prolonged drought that weakened trees and a series of mild winters that have enabled rapid increases in beetle populations. A Nevada BLM news release of July 2, 2004, indicates that "Insect damage to pinyon and juniper woodlands is severe in…White Pine County…" Climate change is, and will continue to be, a major factor determining insect and disease conditions.

White pine blister rust is an introduced disease, which is infecting and causing widespread mortality in all five-needle pines. It recently has been found in the Jarbidge and Ruby Mountains and is expected to infect neighboring mountains in the foreseeable future (U.S. Department of Agriculture Forest Service 2003; Vogler and Charlet 2004). There is concern that white pine blister rust could have substantial adverse effects upon bristlecone pine populations, if it becomes established in close proximity.

Riparian/Wetland Areas

Declines in native woody riparian species have been documented throughout the West and Great Basin. The extent to which woody riparian vegetation has been reduced from its former distribution on the Ely District is not known.

The exotic tree saltcedar has become established in waterways throughout the Intermountain West including available habitat on the Ely District, where it has replaced native woody riparian species such as cottonwood and willows. Inventories to date have located saltcedar infestations on approximately 12,500 acres and along 123 miles of watercourses.

A total of 108 sites (primarily springs) have been assessed for proper functioning condition, representing approximately 393 acres of lentic communities. Of these, 294 acres or 75 percent were classified as being in proper functioning condition; 85 acres or 22 percent were classified as functioning at risk (**Table 3.5-4**). The remainder were determined to be non-functional. Throughout the entire District, it is estimated that approximately 713 acres of riparian communities are non-functional or functioning at risk.

Table 3.5-4
Riparian Conditions of Select Sites on the Ely District Based on Field Assessment of Proper Functioning Condition in Lentic Environments

	Function Class					
	Proper Functioning Condition		Functioning At Risk		Non-functioning	
Trend	Number of Sites	Acres	Number of Sites	Acres	Number of Sites	Acres
Upward	8	7	3	15	0	0
Downward	0	0	9	26	0	0
Unknown	62	287	13	44	13	14
Totals	**70**	**294**	**25**	**85**	**13**	**14**

Source: Unpublished BLM data.

3.5.3 Current Management

Vegetation resources are managed by and for different disciplines to meet objectives for such purposes as forage production, wildlife habitat, watershed function, noxious weed control, and fire management. Forage resources are discussed in Section 3.6, Fish and Wildlife, and Section 3.16, Livestock Grazing. Vegetation products are discussed in Section 3.17, Woodland and Native Plant Products. Noxious weeds are discussed in Section 3.21, Noxious and Invasive Weed Management.

Non-native seedings are represented on approximately 270,000 acres of the District. These are largely characterized by crested wheatgrass, which was planted extensively in the Great Basin over several decades.

Vegetation treatments conducted on the District between 1990 and 2003 are tabulated in **Table 3.5-5** according to type of activity. Over a 13-year period, an average of approximately 9,500 acres per year actively were managed primarily through burning, seeding, and chaining. Seeding with aerial- and ground-based equipment accounts for 80 percent of the acres treated during this period. The highest number of acres is attributable to seeding activities accomplished in 2000 and 2001 after wildfires (see Section 3.20, **Figure 3.20-1)**. Fire rehabilitation during 1990 and 1997 also coincide with wildfire activity.

Table 3.5-4
Acres of Vegetation Treated per Year on the Ely District
1990 through 2003[1]

Year	Treatment Type (acres)				Total Acres Treated	Managed Natural Fires
	Seeding[1]	Mechanical Including Chaining[2]	Prescribed Fire[1]	Fire Rehabilitation[3]		
1990	0	600	0	7,180	7,780	2,022
1991	600	0	0	0	600	205
1992	15	0	0	0	15	2,603
1993	400	0	0	0	400	37,669
1994	200	855	100	21,683	22,838	58,917
1995	0	1,650	0	0	1,650	874
1996	0	580	0	11,785	12,365	51,504
1997	430	1,034	0	8,247	9,711	10,255
1998	0	634	0	16,942	17,576	14,439
1999	0	0	0	6,559	6,559	39,737
2000	0	0	0	21,698	21,698	31,831
2001	0	1,137	0	12,209	13,346	16,236
2002	309	1,152	0	16,159	17,620	17,844
2003	0	0	0	382	382	219
2004	950	1,320	2,260	9,925	14,733	278
Total Acres	**2,904**	**8,962**	**2,360**	**132,769**	**147,273**	**284,633**

[1]Excluding chemical weed treatments.
[2]Source: Range improvement projects database.
[3]Source: Unpublished BLM data.

Chaining and other methods such as fire, herbicide, and traditional tree cutting are used to reduce canopy cover of woody species, primarily pinyon and juniper trees. Although not accounted for in **Table 3.5-5**, saltcedar removal has been occurring in riparian habitats on the District consistent with the listing of saltcedar as a noxious weed by the State of Nevada.

Although riparian areas are a small portion of the eastern Nevada landscape, they are disproportionately valuable for watershed function, wildlife habitat, and recreation. In 1989, the BLM issued a Riparian Policy and Procedures Handbook, which increased the level of special management direction for riparian areas.

The BLM's Riparian Wetlands Initiative for the 1990s directed field units to restore or maintain riparian-wetland areas so that 75 percent or more would achieve proper functioning condition by 1997.

In order to integrate disturbance ecology, management activities, and vegetation growth and development across large and variable landscapes for site evaluation and management purposes, state and transition models were conceived in the 1980s. The models provide a means for organizing complex sets of ideas about the different interrelated processes directing ecological system change and the role management can

take in affecting those processes. Use of the model can improve analysis, monitoring, and management in semi-arid rangelands (see Appendix C).

Based on the state and transition models, the Science Committee of the Eastern Nevada Landscape Coalition has developed management recommendations based on general draft state and transition models for vegetation communities on the Ely District. To date, management recommendations, threshold indicators, and desired conditions are available for black Wyoming big, and mountain big sagebrush; winterfat; and shadscale communities. Additional recommendations for aspen and mountain shrub types are in progress.

The Ely Field Office currently manages the three designated natural areas and two research natural areas described in **Table 3.22-1**. These areas bring attention to, and protect selected components of the special and unique native flora within the District. These five special designations total approximately 12,600 acres and feature bristlecone pine, pygmy sage, swamp cedar, and riparian gallery forests.

The restoration and maintenance of healthy ecological systems within watersheds is a primary focus for the future management of the Ely District. Healthy ecological systems are geographically diverse and change over time. They are compatible with soil potential and are resilient to disturbance.

Resources and resource uses would be managed to restore or maintain ecological health. Certain resource management changes and active treatments may need to be implemented, in portions of watersheds, to accomplish this objective. Adaptive management would be pursued to avoid deteriorating conditions favoring invasive plants and catastrophic fires. Any projects would be implemented so as to result in a mosaic of vegetation within a watershed.

In the long term, natural disturbance (such as drought or fire) would occur and fewer treatments would be needed to maintain ecological health. The result would be a variety of vegetation phases within a watershed, which would provide diverse, healthy conditions for future generations.

3.6 Fish and Wildlife

3.6.1 Aquatic Habitat and Fisheries

Existing Conditions

Aquatic habitat in the planning area includes a mixture of perennial, intermittent, and ephemeral streams, springs, lakes, and reservoirs that support fish (game and native nongame species) and invertebrate species for at least a portion of the year. In total, the planning area contains over 50 perennial stream segments on BLM-administered land (**Table 3.6-1**). Most of the perennial stream segments with game fish species are located in White Pine County. The majority of the lakes and reservoirs in the planning area are located on private or state-administered lands, which are not included in **Table 3.6-1**. BLM-administered land adjoins the boundary of a limited number of the reservoirs in White Pine County (i.e., Cold Creek Reservoir, Bassett Lake, and Comins Lake). Illipah Reservoir is included in this list because the BLM has developed and maintained recreational facilities (campsites and picnic areas) adjacent to the reservoir. No reservoirs or lakes in Lincoln or Nye counties are touched by BLM-administered land. Springs and their associated stream segments provide persistent habitat for fish and aquatic invertebrates. Based on inventories within the planning area, over 2,600 undeveloped springs have been mapped (see **Map 3.3-1**). Spring habitats provide important requirements for aquatic species such as water, food, and cover consisting of bottom substrate and vegetation.

Habitat quality in planning area waterbodies depends on numerous factors such as annual precipitation, flow regimes or water volumes, extent of riparian vegetation, diversity of habitat features (i.e., pools, runs, and riffles), bank stability, types of fish cover, food sources, and water quality. Habitat quality varies by stream reach, with forested, higher-elevation stream segments generally containing better conditions compared to low-gradient, non-forested areas. Most of the waterbodies located within the Ely District are considered low quality aquatic habitat due to the lack of persistent year-round stream flow, relatively high water temperatures, and limited riparian vegetation.

Both cold water or warm water fish species occur in watersheds within the District. Cold water fish are represented by trout species such as rainbow, brown, brook, Bonneville cutthroat, and rainbow-cutthroat hybrid. Warm water game fish species include largemouth bass and northern pike. Except for Bonneville cutthroat trout (native species), these species were introduced in Nevada. One of the game species, Bonneville cutthroat trout, also is a BLM-sensitive species and is discussed in Section 3.7, Special Status Species. The occurrence of game fish species in streams, reservoirs, and lakes within the planning area is provided in **Table 3.6-1**. The basis for the list is that at least a portion of the stream segment is located on BLM-administered land. Numerous other streams in the Humboldt National Forest streams also support trout populations. Trout may move downstream during high flow periods and may be present on BLM-administered land. However, these streams were not included in the list since these stream segments typically do not provide year-round habitat for aquatic species.

Table 3.6-1
Game Fish Resources in the BLM Ely Planning Area

County/Waterbody	Location (Township, Range)	Species
Lincoln		
Bennett Springs	T2S, R68E	Largemouth bass
Beaver Dam Wash	T3S, R71E	Rainbow trout
Clover Creek	T4S, R67E	Rainbow trout
Meadow Valley Wash	T2S, R69E	Rainbow trout, brown trout
Nye		
Cherry Creek	T3N, R57E	Rainbow trout, brown trout
North Fork Cottonwood Creek	T2N, R56E	Brook trout
Forest Home Creek	T6N, R59E	Brown trout
Pine Creek	T3N, R56E	Brook trout
White Pine		
Baker Creek	T13N, R68E	Rainbow trout, rainbow-cutthroat hybrid, brook trout
Bassett Creek	T18N, R66E	Rainbow trout
Bassett Lake	T13N, R68E	Rainbow trout, brown trout, northern pike, largemouth bass
Bastian Creek	T15N, R66E	Rainbow trout
Big Springs Creek	T12N, R70E	Rainbow trout
Big Wash Creek	T12N, R70E	Bonneville cutthroat trout
Bird Creek	T18N, R65E	Rainbow trout, brook trout
Cherry Creek	T24N, R63E	Rainbow trout
Chin Creek	T25N, R67E	Rainbow trout
Cleve Creek	T16N, R66E	Rainbow trout, brown trout
Cold Creek	T23N, R55E	Rainbow trout
Cold Creek Reservoir	T23N, R55E	Rainbow trout
Comins Lake	T15N, R64E	Rainbow trout, brown trout, brook trout
Duck Creek	T17N, R65E	Rainbow trout, brown trout, brook trout
Duck Creek	T19N, R63E	Northern pike, largemouth bass
East Creek	T19N, R65E	Rainbow trout
Egan Creek	T22N, R62E	Rainbow trout
Eightmile Creek	T18N, R68E	Rainbow trout
Ellison Creek	T14N, R59E	Rainbow trout
Geyser Creek	T9N, R65E	Rainbow trout, brook trout
Goshute Creek	T25N, R63E	Bonneville cutthroat trout
Hampton Creek	T16N, R70E	Rainbow trout, Bonneville cutthroat trout
Hendry's Creek	T16N, R70E	Bonneville cutthroat trout
Huntington Creek	T25N, R55E	Rainbow trout, brown trout
Illipah Creek	T17N, R59E	Rainbow trout, brown trout
Illipah Reservoir	T17N, R59E	Rainbow trout, brown trout
Indian Creek, Big	T21N, R65E	Rainbow trout, brook trout
Kalamazoo Creek	T20N, R66E	Rainbow trout, brown trout, brook trout
Mattier Creek	T21N, R64E	Rainbow trout, brook trout
McCoy Creek	T18N, R66E	Rainbow trout, brown trout
Meadow Creek	T19N, R66E	Brown trout
Muncy Creek	T20N, R66E	Rainbow trout, brown trout, cutthroat trout
North Creek	T10N, R65E	Rainbow trout, brook trout
Odgers Creek	T18N, R66E	Rainbow trout

Table 3.6-1 (Continued)

County/Waterbody	Location (Township, Range)	Species
Paris Creek	T25N, R62E	Brook trout
Piermont Creek	T19N, R66E	Brown trout
Pine Creek	T13N, R68E	Bonneville cutthroat trout
Pinto Creek	T19N, R54E	Rainbow trout
Seigel Creek	T22N, R66E	Rainbow trout
Shingle Creek	T13N, R68E	Brown trout, rainbow-cutthroat hybrid
Silver Creek	T14N, R70E	Rainbow trout, brown trout, brook trout
Snake Creek	T12N, R70E	Rainbow trout, brown trout, brook trout
Steptoe Creek	T16N, R65E	Rainbow trout, brown trout, brook trout
Strawberry Creek	T14N, R69E	Bonneville cutthroat trout
Sunkist (North) Creek	T21N, R65E	Brook trout
Taft Creek	T17N, R66E	Rainbow trout, brook trout
Tailings Creek	T18N, R63E	Rainbow trout, brown trout, brook trout
Timber Creek	T18N, R65E	Rainbow trout, brook trout
Unnamed	T16N, R68E	Rainbow trout, brown trout, brook trout
Vipont (Stephens) Creek	T16N, R66E	Rainbow trout
Water Canyon Creek	T19N & T20N, R55E	Rainbow trout, brook trout
White River	T13N, R61E	Rainbow trout, brown trout, brook trout
Willard Creek	T13N, R68E	Rainbow trout, rainbow-cutthroat hybrid
Willow Creek	T14N, R63E	Rainbow trout, brown trout

Source: Crookshanks 2004, 2003; Hutchings 2004, 2003; and NDOW 2003a,b.

Water bodies in the District also support native nongame fish species, which mainly comprise the sucker, minnow, and killifish families. Habitat used by native nongame fish species includes perennial streams, springs, spring outflows, reservoirs, and lakes. In general, the sucker species prefer stream habitats, while the killifish species usually are found in springs and slow-moving stream segments. The native minnow species utilize both flowing and standing water environments. Some of the native fish are discussed in Section 3.7, Special Status Species.

Game fish species in the planning area utilize a variety of habitat conditions. Trout have adapted to a wide range of habitat conditions including lakes, reservoirs, and small to large-size streams (Sigler and Sigler 1987). Cover in the form of undercut banks, instream structure, and overhanging vegetation are important aspects of quality habitat for trout species. Natural reproduction for trout species occurs within numerous stream segments such as Goshute Creek (Bonneville cutthroat trout) and Clover Creek (rainbow trout). Spawning occurs in the spring for these species. Brown trout and brook trout are fall spawners. Largemouth bass and northern pike occur in reservoirs, lakes, slow-moving streams such as Duck Creek, or spring pools such as Bennett Springs. Both species usually are associated with instream structure and aquatic vegetation (Sigler and Sigler 1987). Largemouth bass is a spring and summer spawner, while northern pike breed in the spring. Habitat preferences and spawning periods for game fish species are provided in **Table 3.6-2**.

Table 3.6-2
Game Fish Habitat Preferences and Spawning

Species	Habitat	Spawning	References
Rainbow trout	Optimum riverine habitat is characterized by clear, cold water with silt-free rocky substrate in riffle-run areas, abundant instream cover, and well-vegetated banks. Lake/reservoir habitat is characterized by clear water, cool temperatures, and available deeper water.	Spring, almost exclusively in streams.	Raleigh et al. 1984
Brown trout	Riverine habitat consists of clear, cool to cold water; a relatively silt-free rocky substrate in riffle-run areas; mixture of pools, riffles and runs; well vegetated streambanks and abundant instream cover. Most cover-oriented of all trout species. Lake/reservoir habitat is the same as described for rainbow trout.	Fall, typically stream spawners.	Raleigh et al. 1986
Cutthroat trout	Habitat preferences are similar to rainbow trout. Cutthroat tend to occupy headwater stream areas when other trout are present in the same river system.	Spring, stream spawners.	Hickman and Raleigh 1982
Brook trout	Habitat preferences are similar to other trout species except that they are quite adaptable to a headwater streams, large rivers, ponds, and large lakes. Species is most commonly found in headwater streams.	Fall, stream spawners but utilize spring upwelling areas of lakes and ponds.	Raleigh 1982
Largemouth bass	Riverine habitat preferences include large, slow-moving rivers or pools of streams with soft bottoms and some aquatic vegetation. Lake/reservoir habitat conditions include excessive shallow areas with submergent vegetation and some deeper water.	Spring, usually in lakes/reservoirs.	Stuber et al. 1982
Northern pike	Habitat consists of lakes/reservoirs with backwater areas or large rivers with pools.	Spring, vegetated areas with shallow depths and no current.	Inskip 1982

Trends

Limited information is available to make documented statements about trends in aquatic habitat quality or fish populations in the Ely District. Habitat surveys have been conducted by the Nevada Department of Wildlife and the BLM in some streams during the past 5 years, but in most cases, previous data are lacking for comparison and trend analysis (Crookshanks 2003). Stream segments on BLM-administered land exhibit varying habitat conditions from low to moderate quality habitat. Fish population numbers are not monitored or censused on a frequent basis. Most of the streams listed in **Table 3.6-1** maintain viable fish populations through natural spawning. Stream stocking only occurs in upper White River, Cleve Creek, and Steptoe Creek, which is used to supplement natural spawning in these popular fishing streams.

Threats to native and nonnative fishes in the planning area include habitat alterations, water depletions, disease, predation, competition, and hybridization. Climatic events involving drought have contributed to reduced water levels for aquatic species.

Current Management

The restoration and maintenance of healthy ecological systems within watersheds is a primary focus for the future management of the Ely District. Healthy ecological systems are geographically diverse and change over time. They are compatible with soil potential and are resilient to disturbance.

Resources and resource uses would be managed to restore or maintain ecological health. Certain resource management changes and active treatments may need to be implemented, in portions of watersheds, to accomplish this objective. Adaptive management would be pursued to avoid deteriorating conditions favoring invasive plants and catastrophic fires. Any projects would be implemented so as to result in a mosaic of vegetation within a watershed.

In the long term, natural disturbance (such as drought or fire) would occur and fewer treatments would be needed to maintain ecological health. The result would be a variety of vegetation phases within a watershed, which would provide diverse, healthy conditions for future generations.

In Nevada, fish species and their habitat in public waters are managed by the Nevada Department of Wildlife in cooperation with the BLM. The Nevada Department of Wildlife determines the species being managed (both game and nongame) and the management policies involving fishing regulations and habitat protection. Management direction and guidance is provided by Nevada Administrative Code, Chapter 503 – Hunting, Fishing and Trapping/ Miscellaneous Protective Measures. The Federal Land Policy and Management Act of 1976 also states that public lands will be managed in a manner "…that will provide food and habitat for fish and wildlife…" Beneficial use for aquatic life is included in all Nevada water quality classifications (A, B, C, and D) (see Section 3.3, Water Resources). The Recreational Fisheries Conservation Plan Implementation Strategy (Implementation Memorandum WO-97-053) also identified a goal to increase fishing opportunities nationwide through conservation, restoration, and enhancement of aquatic systems and fish populations by increasing fishing access, education, and partnership opportunities.

The Nevada Department of Wildlife has prepared fisheries management plans for several reservoirs (Cold Creek and Illipah) that are bordered by BLM land or have adjacent recreational facilities maintained by the BLM (NDOW 1996; Haskins 1989). Trout species are managed using various coldwater fishery concepts under the *Nevada Coldwater Fishery Program Management Concepts*. Fishery management concepts for these reservoirs are listed in **Table 3.6-3**.

Stocking efforts have involved trout releases in a selected number of reservoirs and stream segments such as rainbow trout in Cave Lake, Cleve Creek, Steptoe Creek, White River, Comins Lake, Illipah Reservoir, and Cold Creek Reservoir in White Pine County (NDOW 2003c). No recent stocking has been done in waterbodies on BLM-administered land in Lincoln County. In 2003, Nevada Department of Wildlife stocked rainbow trout and brown trout in Eagle Valley and Echo Canyon reservoirs. Some of these fish may be washed downstream (e.g., to Meadow Valley Wash). Limited fishing exists in the Meadow Valley Wash segments bordered by BLM-administered land.

Table 3.6-3
Reservoir Fishery Management

Reservoir	Concept	Objectives
Cold Creek	Quality Fishery	Meet harvest objectives of 0.5 fish per hour (2 fish per day) with harvested fish being 50 percent larger than stocking size, while maintaining carryover of 30 percent of the year's stocked fish.
Illipah	General Quality Fishery	Meet harvest rates of 2.0 to 2.5 fish per angler and 0.5 to 0.75 per hour, with harvested fish being 75 percent larger than stocking size (and 25 percent being at least 50 percent larger than stock size). Harvest rates should be attainable in all but low water years.

3.6.2 Wildlife

Existing Conditions

A diversity of wildlife resources typical of the Great Basin and the Mojave Desert ecological systems occupy a variety of wildlife habitats on the Ely District. The vegetation types or communities that comprise the primary wildlife habitats on the District include sagebrush, pinyon-juniper woodland, and salt desert shrub. Other, less abundant wildlife habitats that occur on the District include high elevation conifer/aspen forests, Mojave Desert shrub, and riparian/wetland habitats (see Section 3.5, Vegetation). The riparian habitat associated with wetlands and perennial stream channels is considered the highest value habitat for area wildlife. Available water for wildlife consumption and riparian vegetation for cover, breeding, and foraging are the predominant limiting factors for wildlife on the District. Therefore, riparian habitats, particularly those with multistoried canopies and open (free) water, typically support a greater diversity and population density of wildlife than the drier, upland habitats.

Surface water sources potentially available to wildlife are described in Section 3.3, Water Resources. Riparian and associated wetlands range from lower-elevation lakes, streams, wetlands, stock ponds, or isolated springs that primarily are composed of small, narrow drainages or moist soils with scattered patches of emergent vegetation to higher-elevation springs that maintain a greater-value riparian habitat for wildlife use. Important habitat characteristics for wildlife include the amount of open water; the extent of both woody and herbaceous vegetation for cover, foraging, and breeding activities; the quality of plant communities relative to the long-term use by wildlife (i.e., community longevity); and the diversity of plant species present.

Big Game. Big Game species within the Ely District consist primarily of Rocky Mountain elk, mule deer, pronghorn antelope, and desert bighorn sheep. Other big game species within the District include Rocky Mountain bighorn sheep, mountain goat, and mountain lion.


Elk at Guzzler
Photo by BLM

Rocky Mountain Elk. Rocky Mountain elk occur in a wide variety of habitats from mid to upper elevations within the District. Summer habitats include ponderosa pine, white-fir, mixed conifer, Engelmann spruce, aspen, and higher elevation pinyon-juniper woodlands and meadows above 6,200 feet in elevation. Winter habitat consists primarily of pinyon-juniper woodlands and sagebrush-grasslands between 6,200 and 9,500 feet in elevation. Pinyon-juniper, aspen, mixed-conifer forests, and mountain mahogany provide thermal and escape cover. Shrub species, including antelope bitterbrush and sagebrush, also provide important cover and forage for elk. Although elk forage largely on grass species, they also consume a wide variety of forbs and shrubs (BLM 2001). Important elk ranges within the District are presented in **Map 3.6-1**.

Possibly extirpated from the Ely District by 1900, recovery efforts for Rocky Mountain Elk resulted in a series of releases in White Pine County. A reintroduction release of Yellowstone elk occurred in 1932. Augmentation releases occurred in the late 1980s, early 1990s, and in 2001. Elk also are reported to have immigrated into the District from transplanted populations in western Utah (TRT 1999b). Elk presently occupy the majority of mountain range within the District. The largest herd occurs in the Egan and Schell Creek ranges of the Nevada Department of Wildlife Management Areas 11 and 22. Since the late 1990s, elk populations in Lincoln and White Pine Counties have been managed under the guidance of the Lincoln and White Pine Elk Management Sub-plans to the Statewide Elk Species Management Plan. These management sub-plans established population objectives by management unit.

Mule Deer. Mule deer are widespread within the District and typically are associated with middle to upper elevations. Habitat for mule deer within the District includes big sagebrush, low sagebrush, shadscale, and grasslands. Deer generally are classified as browsers, foraging primarily on forbs and shrubs. However, the importance of forage type tends to vary by season and climate. Forbs and grasses are an integral part of the mule deer diet during the spring and fall growth seasons when succulence is greatest. Shrubs are utilized more heavily during dry summer and winter periods. Important forage on range for mule deer includes snowberry, sagebrush, serviceberry, antelope bitterbrush, and mountain mahogany. Mountain mahogany and pinyon-juniper woodlands are important for thermal and escape cover during winter. During summer, mule deer tend to rely on riparian and mountain sagebrush communities. Important mule deer ranges within the District are presented in **Map 3.6-3**.

Pronghorn Antelope. From 1950 to 2003 Nevada Department of Wildlife has released a total of 2,310 pronghorn antelope in White Pine, Lincoln, and Nye counties. Currently, pronghorn are found in all major valleys in White Pine County, and in the central and northern portions of Lincoln and Nye counties within the District (NDOW 2003b). Pronghorn prefer gently rolling to flat topography that provides good visibility of the surrounding area. The majority of Nevada's pronghorn inhabit Great Basin sagebrush/grassland habitat types (NDOW 1983). Water is a key component of pronghorn habitat. The amount of drinking water required for pronghorns is related both to maximum air temperatures and the amount of moisture in the forage (NDOW 1983). Pronghorn diet consists of grasses, forbs, and browse plants. Within the Ely District, pronghorn depend on sagebrush for both food and cover. Other important forage include sagebrush, antelope bitterbrush, saltbush, rabbitbrush, cheatgrass, Indian ricegrass, crested wheatgrass, and shadscale. During the summer, pronghorn are widely distributed throughout the valleys and mountain foothills and primarily are associated with low sagebrush habitat with mixed vegetation (i.e., grasses, forbs, and shrubs). Important pronghorn ranges within the District are presented in **Map 3.6-2**.

Desert Bighorn Sheep. Typical desert bighorn sheep habitat consists of rough, rocky, and steep terrain, broken by canyons and washes. Bighorn sheep require access to freestanding water during the summer months, and throughout the year during drought conditions. The diet of bighorn sheep consists primarily of grasses, shrubs, and forbs. Preferred species include squirreltail grass, galleta grass, big sagebrush, winterfat, shadscale, and Mormon tea (NDOW 1978).

Historically, the desert bighorn occupied suitable habitat in all 17 counties throughout Nevada. However, due to a multitude of various land and resource uses associated with the westward expansion of humans, desert bighorns became extirpated from much of their range in Nevada. By 1960, the distribution of desert bighorns was restricted to five counties in Nevada including Clark, Lincoln, Nye, Esmeralda, and White Pine. Of the remaining desert bighorn populations, those considered the most significant were located in Clark and Lincoln counties. In 1936, 1.5 million contiguous acres were established in these two counties as the Desert National Wildlife Range to primarily benefit desert bighorn conservation. In addition to establishing the Desert National Wildlife Range, considerable funding and effort has been expended in subsequent decades by state and federal agencies, as well as private organizations, to stabilize and expand Nevada’s bighorn sheep populations. These efforts include habitat enhancement projects within potentially suitable habitat.

From the late-1980s to present, the Nevada Department of Wildlife has been reintroducing desert bighorn sheep into a number of mountain ranges within the District including the Pahanagat, Egan, Hiko, South Pahroc, and the Delamar ranges (Scott 2004). These releases were conducted as a result of a number of habitat management plans that evaluated bighorn sheep habitat suitability for potential reintroduction or augmentation on the Ely District (BLM-NDOW 1987, 1989, 1991; BLM 1987). Subsequent to the releases, sheep have expanded their distribution to the Mount Irish Range. The primary limiting factor to the success of these reintroductions is the spread of disease from domestic sheep that graze in areas adjacent to reintroduction sites (Scott 2004). Potential bighorn sheep habitat within the District is presented in **Map 3.6-4**.

Rocky Mountain Bighorn Sheep. Rocky Mountain bighorn sheep prefer high, steep rocky slopes that are in close proximity to suitable feeding sites. Primary forage includes grasses, grass-like plants, forbs, and shrubs. Twelve Rocky Mountain bighorn sheep were reintroduced to Mount Grafton in the late 1980s. To date, limited populations of Rocky Mountain bighorn sheep occur on Mount Moriah and Mount Wheeler in White Pine County, and on Mount Grafton in Lincoln County.

Mountain Goat. Mountain goat habitat consists of steep rocky cliffs, projecting pinnacles, ledges, and talus slopes. Mountain goats are limited to the northwestern-most portion of the Ely District boundary in the southern reaches of the Ruby Mountains (NDOW Management Unit 103) on U.S. Forest Service-administered lands and in the vicinity of Bald Mountain (NDOW Management Unit 108).

Mountain Lion. Mountain lions occupy the higher mountain elevations within the Ely District, but will move down into the lower elevations following the resident mule deer populations. This species is managed as a game species by the Nevada Department of Wildlife and are controlled as a predator species by the Animal and Plant Health Inspection Service. From 2002 to 2003, the Ely District accounted for 46 mountain lions and approximately 32 percent of the statewide mountain lion harvest. The average mountain lion harvest within the District from 1998 to 2003 was 67 lions and approximately 41 percent of the statewide harvest.

Small Game. Upland game birds that occur within the Ely District include greater sage-grouse, blue grouse, chukar partridge, Gray (Hungarian) partridge, mourning dove, Gambel's quail, and Rio Grande turkey. Although the greater sage-grouse is a small game species, it also is considered a special status species and is discussed in Section 3.7, Special Status Species.

Blue grouse occupy open stands of conifer or aspen with an understory of brush. Winter habitat consists of dense conifers at higher elevations. Chukar partridge occur at lower elevations and typically are associated with more rugged slopes, canyons, and drainages in proximity to open water. The limiting factor for chukar is water availability during the late summer months when daytime temperatures are at their maximum and water is least available. The gray (Hungarian) partridge is considered widespread but not common and is associated with grassland, shrubland, and agricultural areas. Mourning dove is one of the more commonly observed game species within the District, particularly during the spring, summer, and early fall. Mourning dove typically prefer habitats in close proximity to sources of open water. Gambel's quail occur in scrublands and brushy thickets of the Mojave Desert ecological system, and in agricultural areas. Rio

Grande turkey releases within the District boundary have occurred in southern Lincoln County since early 1999. However, because brood surveys have not been conducted in Lincoln County, the status of this species is unknown (NDOW 2003). Recently, releases also have occurred on the east side of the Snake Range near Baker in White Pine County. Rio Grande turkeys prefer riparian woodlands associated with oak-pine and pinyon-juniper woodlands.

Small game mammal species that are found in the study area include pygmy and cottontail rabbits and black-tailed jackrabbits.

Common waterfowl that occupy open water and wetland habitats within the District include American coot, mallard, green-winged teal, and Canada geese. Other waterfowl that occur on the District include gadwall, pintail, and a variety of diving ducks (e.g., lesser scaup, canvasback, and redhead).

Furbearers that occur within the District include bobcat, beaver, muskrat, coyote, red fox, gray fox, and kit fox.

Nongame Species. A diversity of nongame species (e.g., small mammals, raptors, passerines, amphibians, and reptiles) occupy a variety of trophic levels and habitat types within the Ely District. Nongame mammal species in the study area include a variety of shrews, bats, ground squirrels, rabbits, woodrats, and mice. These small mammals provide a substantial prey base for area predators including mammals (e.g., coyote, fox, badger, skunk), raptors (e.g., eagles, buteos, and owls), and reptile species.

Some of the more common bird species that occur within the project area include a wide range of neotropical migrant species such as sage thrasher, lark sparrow, Brewer's sparrow, and chipping sparrow. These bird species are considered integral to natural communities and commonly are viewed as environmental indicators based on their sensitivity to environmental changes caused by human activities. Other bird species that occur within wetland habitats include American bittern, killdeer, common snipe, long-billed curlew, American avocet, willet, and a variety of sandpiper species.

Many raptor species also are known to breed within the Ely District including eagles (golden eagle), falcons (prairie falcon, American kestrel, and peregrine falcon), accipiters (sharp-shinned hawk, Cooper’s hawk, goshawk), buteos (ferruginous hawk, red-tailed hawk, Swainson's hawk), northern harrier, and owls (e.g., great-horned owl, burrowing owl, long-eared owl, and short-eared owl).

Trends

Habitat Trends. In recent years, land management direction, in combination with long-term climatic shifts and the introduction and spread of noxious weeds and exotic species have resulted in substantial alterations of wildlife habitats and degraded rangeland within the Great Basin and Mojave Desert ecological systems (BLM 2001, 1999; Dobkin et al. 1998; Fleischner 1994).

The sagebrush community provides food and cover for about 100 bird species, 70 mammal species, and 23 amphibian and reptile species, including a number of important game species (e.g., mule deer,

pronghorn, Rocky Mountain elk, Rocky Mountain bighorn sheep, sage-grouse, Gray partridge, and valley quail) within the District region (BLM 1999). However, with the establishment of cheatgrass and other exotic vegetation (e.g., red brome, and medusa head) over the last 25 years (West 1994), sagebrush and other shrub communities such as salt desert scrub, have been converted to an exotic dominated environment that provides little or no food for wildlife (BLM 2001; 1999). Rowland (2003) estimates that approximately 3.06 million acres of vegetation (including 1.11 million acres of sagebrush vegetation) is at risk of displacement from cheatgrass invasion on the Ely District. Conversely, some sagebrush communities at mid to low elevations have stagnated as late phase sagebrush communities, resulting from decades of altered fire regimes and poor grazing management. Because of altered fire regimes and poor grazing management within sagebrush communities, the overall habitat trends are a loss or reduction of important grass and forb species for wildlife consumption and a reduction in overall habitat quality for wildlife that depend on these resources. In addition, displacement of sagebrush by the expansion of pinon-juniper woodlands has placed additional stress on the sagebrush ecological system, which has been severely reduced in area and degraded in habitat quality (Connelly et al. 2004) (see **Map 4.5-2**). It is estimated that the Ely District has the largest amount of sagebrush (greater than 1.41 million acres) that is at high risk of displacement from pinon-juniper (Rowland 2003).

As discussed in Section 3.5, Vegetation, recent trends within the pinyon-juniper woodland community include increasing age and density of trees, increasing establishment of woody species within ecological conditions that typically support shrub-dominated and grassland communities, and decreasing herbaceous understory as a result of increased tree density. Although these trends benefit species that occur primarily in woodland habitats, these trends also lead to loss in forage (grass and forb) production within dense stands and a reduction of species diversity.

As discussed above, riparian habitat is considered the highest value habitat for area wildlife. In the Great Basin region, as elsewhere throughout the intermountain west, riparian habitats are considered crucial centers of biodiversity (Dobkin et al. 1998), providing essential wildlife habitat for breeding, wintering, and migration (Fleischner 1994). One of the most substantial riparian habitats on the District is Meadow Valley Wash, which drains through both the Great Basin and Mojave Desert ecological systems. Declines in native riparian habitats throughout the west and Great Basin are attributed to extensive livestock grazing (both past and present), wild horse use, water developments that divert water, and invasive weeds.

Species Trends.

Elk. In general, elk have been increasing both numerically and geographically throughout the District with slight to moderate upward trends depending on the management area. However, except for Unit 24, which is included in the latest planning effort being conducted by the Lincoln County Technical Review Team, populations remain within the objectives of the management plans.

Mule Deer. Mule deer have experienced declining trends throughout the District. Contributing factors to declining population trends include habitat degradation, pinyon-juniper increase, invasive species, poorly managed grazing, wildfire, and drought (Warley 2004).

Pronghorn. Pronghorn populations within the District have experienced static to upward trends over the last 10 years. However, the prolonged drought conditions have slowed population growth or resulted in slightly declining pronghorn population trends on the District.

Desert Bighorn Sheep. Desert bighorn sheep populations have experienced a slight downward trend from 2002. This trend is attributed to severe drought conditions that have resulted in an overall reduction in lamb recruitment (NDOW 2003a). Overall, desert bighorn sheep populations remain well below historic levels and distribution.

Rocky Mountain Bighorn Sheep. Rocky Mountain bighorn sheep populations in the Snake Range in White Pine County are stable at low population numbers. However, bighorn sheep populations on Mount Grafton in Lincoln County have been reduced to only a few individuals (Scott 2004).

Mountain Lion. The mountain lion population trend in the District is considered to be stable; however, future trends of mountain lions within the District will depend on status and trends of area deer herds (NDOW 2003a).

Small Game and Non-game Species. Data currently are not available for small game or non-game species population trends. However, in general, these species' populations fluctuate in response to habitat trends, which are discussed above. Greater sage-grouse and pygmy rabbits are discussed under Section 3.7.3, Special Status Species, under Wildlife.

Current Management

Populations of wildlife game species and furbearers are managed by the Nevada Department of Wildlife. The Nevada Department of Wildlife determines the species being managed and the management policies involving hunting regulations and habitat protection. Management direction and guidance for wildlife is provided by the Nevada Administration Code, Chapters 502, 503, and 504, and Nevada Revised Statutes 502, 503, and 504.

Management guidelines and objectives for elk management within the District are presented in the White Pine County and Lincoln County Elk Management Plans (TRT 1999a,b). These management plans present short- and long-term management actions and strategies that are designed to meet the requirements of an elk management sub-plan as referenced in Assembly Concurrent Resolution Number 46.

Management guidelines and objectives for desert bighorn sheep are presented in the Meadow Valley - Arrow Canyon - Delamar Habitat Management Plan (BLM-NDOW 1991), the Pahranagat Habitat Management Plan (BLM-NDOW 1989), the North Hiko Range Habitat Management Plan (BLM 1987), and the South Hiko Habitat Management Plan (BLM-NDOW 1987). Current management for desert bighorn sheep is focused on managing historic remote summer habitat as yearlong habitat since lower elevation winter habitat currently is inadequate for wintering sheep because of existing land management practices.

Guidelines for pronghorn management are presented in the Policy for the Management of Pronghorn Antelope (NDOW 2003).

Migratory birds are protected under the Migratory Bird Treaty Act (16 U.S. Code 703-711) and Executive Order 13186 (66 Federal Register 3853). A list of Birds of Conservation Concern was developed as a result of a 1988 amendment to the Fish and Wildlife Conservation Act. This Act mandates that the U.S. Fish and Wildlife Service "identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act of 1973." The goal of the Birds of Conservation Concern list is to prevent or remove the need for additional Endangered Species Act bird listings by implementing proactive management and conservation actions. As a result, Birds of Conservation Concern species would be consulted on in accordance with Executive Order 13186 (USFWS 2002c). A total of 29 Birds of Conservation Concern potentially could occur within the Great Basin ecological system of the Ely District, and 28 Birds of Conservation Concern potentially could occur within the Mojave Desert ecological system of the District (USFWS 2002).

Partners in Flight is a multi-faceted organization with the goal of documenting and reversing population declines of neotropical migratory birds and improving their habitats. Partners in Flight Priority Bird Species that potentially could occur within plant communities on the Ely District are identified in the 1999 Nevada Partners in Flight Bird Conservation Plan (NPF 1999).

A draft Memorandum of Understanding among the BLM, U.S. Forest Service, and U.S. Fish and Wildlife Service was drafted pursuant to Executive Order 13186 to promote conservation and protection of migrating birds. Specific measures to protect migratory bird species and their habitats have not been identified within the Executive Order document, but instead, the Executive Order provides guidance to agencies to promote best management practices for the conservation of migratory birds. As a result, the Nevada State BLM prepared Migratory Bird Best Management Practices for the Sagebrush Biome to assist BLM field offices in the consideration of migratory birds in land management activities (BLM [no date]).

3.7 Special Status Species

Special status species are those species for which state or federal agencies afford an additional level of protection by law, regulation, or policy. Included in this category are federally listed and federally proposed species that are protected under the Endangered Species Act, species considered as candidates for such listing by the U.S. Fish and Wildlife Service, U.S. Fish and Wildlife Service species of concern, BLM sensitive species, and species that are state protected.

In accordance with the Endangered Species Act, the lead agency in coordination with the U.S. Fish and Wildlife Service must ensure that any action they authorize, fund, or carry out would not adversely affect a federally listed threatened or endangered species. In addition, as stated in Special Status Species Management Policy 6840 (6840 Policy) (Rel. 6-121), it is BLM policy "to conserve listed species and the ecological systems on which they depend, and to insure that actions requiring authorization or approval by the BLM are consistent with the conservation needs of special status species and do not contribute to the need to list any special status species, either under the provisions of the Endangered Species Act or other provisions" identified in the 6840 Policy. It also is BLM policy to rely on the Nevada Natural Heritage Program database for current status and distribution records of special status species on the District. The BLM as the lead federal agency for the proposed RMP revision is preparing a Biological Assessment for submittal to the U.S. Fish and Wildlife Service in accordance with Section 7(c) of the Endangered Species Act.

3.7.1 Plant Species

Existing Conditions

A total of 34 special status plant species, including two federally listed species, are known or suspected to occur in the Ely District (see **Table P-1** in Appendix P). These plant species occur in a variety of vegetation communities and in a variety of geographic habitats within the District. Many are found on distinctive soil types, such as badlands or gypsiferous soils, or in association with unique vegetation communities, such as riparian areas. Approximately two-thirds primarily are associated with the southern portions of the District within Major Land Resource Areas 29 and 30. Approximately half of the District's sensitive plants are found within habitat types known in the Mojave Desert and transition zone to the north, such as the salt desert shrub and creosote-dominated communities. Approximately 50 percent are associated with pinyon-juniper woodland or sagebrush complexes. A small number are known to occur on rock outcrops, ledges, cliffs, and other barren areas. Although a preponderance of these rare plant species are located in hot desert ecological systems, only one is a member of the cactus family.

Federally Listed Species

Ute ladies'-tresses. Ute ladies'-tresses (*Spiranthes diluvialis*) typically inhabit moist, sub-irrigated, or seasonally flooded soils at elevations between 1,800 and 6,800 feet (USFWS 1995). A wide variety of soils are inhabitable by the Ute ladies'-tresses including sandy or coarse cobbley alluvium to calcareous, histic or fine-textured clays and loams. Suitable soils can be found in locations such as valley bottoms, gravel bars,

or floodplains along springs, lakes, rivers, or perennial streams. Sites where Ute ladies'-tresses are known to occur are characterized by short vegetation cover and periodic exposure to disturbances like flooding or livestock grazing (BLM 2003).

The Ute ladies'-tresses was listed as federally threatened in 1992. This species does not have designated critical habitat (57 Federal Register 2048). Records document a historic population of Ute ladies'-tresses within the project area that once occupied a wet meadow adjacent to the Meadow Valley Wash just north of Panaca in Lincoln County (USFWS 1995). Heritage data indicates that this population occurred on private land. However, the precision of the mapped coordinates is classified as reliable only to the minute level, and therefore, there is some uncertainty regarding the location record for this species. Despite searches, there have been no observations of this population since 1936 (USFWS 1995). This population is the westernmost known occurrence of this species. The extirpation of this population in Nevada and several others in Utah and Colorado caused genetic losses that most likely led to its need for federal protection.

There are 21,835 acres of riparian habitat in the project area. It is unknown how much of this area is suitable or potential habitat for the Ute ladies'-tresses.

Federal Species of Concern

Sunnyside green gentian. The sunnyside green gentian (*Frasera gypsicola*) typically inhabits dry, open areas at elevations between 5,180 and 5,510 feet. A wide variety of soils are inhabitable by the sunnyside green gentian including whitish, alkaline, often salt-crusted or spongy silty-clays. Suitable soils can be found in locations such as calcareous flats and barrens, with little if any gypsum content. Sites where the sunnyside green gentian may occur would be characterized by sagebrush, greasewood, and occasionally barberry and swamp cedar vegetation (Nevada Natural heritage Program 2005, Miscow 2005).

There have been three locations where the sunnyside green gentian has been reported in the Ely District. Observations were reported at two sites within Nye County; both in the White River Valley near the White River and at one site in White Pine County, SSW of Lund, Nevada near White River (Nevada Natural Heritage Program 2005, Miscow 2005).

BLM Sensitive Species. The remaining special status species include 32 BLM sensitive species (see Appendix F).

Trends

In general, special status species are those species for which population viability is of concern, based on a current or predicted downward trend in population numbers or density, or habitat capability that would limit a species' distribution. As such, special status species are afforded an additional level of protection by law, regulation, or policy from state and federal agencies.

Systematic surveys for the federally listed Ute ladies'-tresses in Nevada have been conducted to monitor trends and distribution, but likely remain incomplete. Based on available sampling results from 1997,

estimated individual species numbers and estimated area of occurrence is unknown. Species inventory searches were conducted until 1997; however, no populations have been identified since 1936.

Threats to the Ute ladies'-tresses were identified in the U.S. Fish and Wildlife Service's Draft Recovery Plan (USFWS 1995). Factors that have affected these populations include urbanization, river or stream damming, population displacement as a result of weed invasion, heavy summer livestock grazing and hay mowing, and agricultural conversion. Threats to the sunnyside green gentian and BLM sensitive species are considered to be similar to factors identified for federally listed species.

Distribution and occurrence information is available for BLM sensitive species within the planning area (Appendix F). The current trend within their associated vegetation communities is described in Section 3.5, Vegetation.

Current Management

The management of rare plants on BLM-administered lands occurs under existing policy. Under the Endangered Species Act, consultation with the U.S. Fish and Wildlife Service takes place if federally listed plants or their habitat may be affected by an action. The majority of rare plant management on the District is conducted in response to proposed disturbance activities. This entails field surveys to identify potential impacts and mitigation measures, as needed. Few, if any, general surveys are conducted for inventory or monitoring.

The Recovery Plan for the federally listed Ute ladies'-tresses orchid does not include specific guidelines for management of potential orchid populations or habitat in Nevada. It does recommend that "some type of population and habitat monitoring should be initiated in each watershed until such time as a complete monitoring plan is designed and implemented," and that "drainages, seeps and springs in … Nevada should be inventoried" (USFWS 1995). General threats to sensitive plant populations in the Ely District have been reported to include; illegal collecting, habitat destruction and disturbance associated with resource extraction or utility and road construction, and livestock and wildlife trampling.

No management plan or recovery plan has been developed for the sunnyside green gentian at this time.

Three of the ACEC's (Kane Spring, Mormon Mesa, and Beaver Dam Slope) contain sensitive plant species populations. These populations are managed in accordance with the ACEC-specific management prescriptions.

Trends

Little information is available regarding population trends of specific rare plants on the Ely District. The current trend within their associated vegetation communities is described in Section 3.5, Vegetation.

Current Management

The management of rare plants on BLM-administered lands occurs under existing policy. Under the Endangered Species Act, consultation with the U.S. Fish and Wildlife Service takes place if federally listed plants or their habitat may be affected by an action. The majority of rare plant management on the District is conducted in response to proposed disturbance activities. This entails field surveys to identify potential impacts and mitigation measures, as needed. Few, if any, general surveys are conducted for inventory or monitoring.

Three of the ACECs (Kane Springs, Mormon Mesa, and Beaver Dam Slope) contain sensitive plant species populations. These populations are managed in accordance with the ACEC-specific management prescriptions.

3.7.2 Aquatic Species

Existing Conditions

The general area encompassing the Ely District provides habitat for seven federally listed fish species and one federal candidate amphibian species (Columbia spotted frog) (**Map 3.7-1**). Habitat is present on BLM-administered land for three fish species, Big Spring spinedace in Meadow Valley Wash, Pahrump poolfish in the Shoshone Ponds Resource Area, and White River springfish in Ash Springs. Habitat for Hiko White River springfish, Railroad Valley springfish, Pahranagat roundtail chub, and White River spinedace is located on private or state land that is surrounded by or adjacent to BLM-administered land. The BLM would be responsible for any actions on public land that potentially could affect habitat for these federally listed species. Woundfin and Virgin River chub are present in the Virgin River watershed, which is located outside the Ely District. However, watersheds in the southern portion of Lincoln County drain into the Virgin River system. The listing designation and distribution of these species are described in Appendix F. Except for Big Spring spinedace, woundfin, and Virgin River chub, the fish species are mainly associated with springs or pool habitats. Critical habitat has been designated for all of the fish species except Pahranagat roundtail chub and Pahrump poolfish. A summary of the occurrence and habitat information for the federally listed species is provided below.

Federally Listed Species

Big Spring Spinedace. Originally, the Big Spring spinedace was collected from the outflow stream of Panaca Spring and its adjacent wet meadow near Panaca, Nevada in Lincoln County (USFWS 1993). This population was extirpated from these areas due to habitat modification and nonnative fish species introductions. The present distribution of this species is restricted to a 4-mile section of Meadow Valley Wash called the Condor Canyon reach, which is located northeast of Panaca. The boundaries of the occupied habitat area are defined by perennial flow. A barrier falls at one end of the canyon restricts movement. Previous surveys in Meadow Valley Wash showed that the species occurred throughout most of the canyon. The largest numbers were collected in a plunge pool below the barrier falls. Critical habitat also

was designated for the species in a 4-mile section of Meadow Valley Wash (above and within Condor Canyon) in Lincoln County near Panaca, Nevada (USFWS 1985).

The primary constituent elements of critical habitat for this species include: 1) clean, permanent-flowing, spring-fed habitat with deep pools and shallow marshy areas along the shore; and 2) the absence of nonnative fishes (USFWS 1993). Habitat characteristics of occupied habitat in Meadow Valley Wash pool areas with depths of 1 to 3 feet, moderate to slow stream velocities, undercut banks, and floating aquatic vegetation (USFWS 1993). Bottom substrate consisted of clay and gravel (Sigler and Sigler 1987).

Railroad Valley Springfish. This species is native to thermal spring systems in Railroad Valley, Nye County, Nevada (USFWS 1996). The Railroad Valley springfish is native to only two areas (Lockes Ranch area and Duckwater areas), both of which are located in Railroad Valley, Nevada. Nine thermal springs have populations of the species, six at Lockes and three at Duckwater. In addition to these populations, there are four springs where this species has been introduced; Chimney Warm Springs, Hot Creek Canyon (Dugan Ranch), and Sodaville Warm Springs. An introduction at Warm Springs failed. Critical habitat also was designated at the time of listing, which included six springs historically occupied by this species. The locations included the springs along with portions of the outflow streams and marshes, and a 15-meter (50-foot) riparian zone around each of the springs. The springs occur in three locations: 1) Big Warm Spring (T13N, R36E, NE¼ of Section 31, SE¼ of Section 31, and NW¼ of Section 32; 2) Little Warm Spring (T12N, R56E, Section 5; and 3) North Spring, Hay Corral Spring, and Reynolds Springs (T8N, R55E, SW¼ of Section 11, NW¼ of Section 14, SW¼ of Section 14, SE¼ of Section 15, NE¼ of Section 15, and SW¼ of Section 15 (USFWS 1996).

Railroad Valley springfish are adapted to survive in spring environments with relatively high water temperatures (860 to 1000 degrees Fahrenheit) at the spring source and low dissolved oxygen concentrations (1.5 to 6.0 milligrams per milliliter) (USFWS 1996). Constituent elements of critical habitat for this species include clear, unpolluted thermal spring waters ranging in temperatures from 840 to 970 degrees Fahrenheit in pools, flowing channels, and marshy areas with aquatic plants, insects, and mollusks. Discharges in occupied springs ranged from <1 to 23 cubic meters/minute (USFWS 1996). Most of the discharges were 1 to 5 cubic meters/minute. Current is negligible in the spring pools. The degradation of riparian habitats mainly caused by water diversion, overgrazing, and introduction of exotic fish has contributed to the listing status of the species (NDOW 2003).

Hiko White River Springfish. This species occupies pools in Hiko and Crystal Springs in the Pahranagat Valley, Lincoln County, and has been introduced into Blue Link Spring in Mineral County, Nevada (USFWS 1998). This species was extirpated from Hiko Spring in 1967 but reintroduced in 1984. These springs and their associated open outflows were designated as critical habitat for this species in 1985.

Pahranagat Roundtail Chub. Historically, Pahranagat roundtail chub occurred in Crystal Spring, Hiko Spring, Ash Spring, and the Pahranagat River in Lincoln County Nevada (Stein et al. 2001). The present distribution of this species is limited to approximately 2.2 miles in Pahranagat Creek and 1.6 miles in an irrigation ditch near Ash Springs. No critical habitat has been designated for this species, although this

species was included in a recovery plan for aquatic and riparian species in the Pahranagat Valley (USFWS 1998).

Adult and juvenile fish typically inhabit pools below riffle areas, but adults also utilize deeper water with flow. Chub larvae occur in quiet water near the water's surface and near stream banks. Adult fish exhibit seasonal changes in habitat use, with summer habitat consisting of deeper and slower water in comparison to the spring and winter (USFWS 1998).

Pahrump Poolfish. This species was originally called the Pahrump killifish, but it was assigned the common name "poolfish" in 1991. Historically, separate populations occurred in three springs in Pahrump Valley in Nye County. Two of these populations are extinct (Pahrump Ranch and Raycraft Ranch). The Manse Ranch Spring population also disappeared in 1975, but it was transplanted to other sites to provide refugia populations. Presently, introduced populations exist in Corn Creek Springs (Clark County), an irrigation reservoir fed by Sandstone Spring (Clark County), and Shoshone Springs (White Pine County). The Shoshone Ponds Native Fish Refugium in Spring Valley, White Pine County, was established in the 1970s as a cooperative effort between NDOW and the BLM to assist in the conservation and recovery of native fishes (NDOW 2003). It consists of three small spring-fed ponds within a fenced exclosure, and a larger earthen pond (referred to as Stock Pond) located outside of the exclosure. Pahrump poolfish are present in three of the four ponds (North Shoshone, Middle Shoshone, and Stock Ponds). No critical habitat has been designated for Pahrump poolfish, but a recovery plan was prepared in 1980 (USFWS 1980).

Habitat for this species consists of shallow thermal springs and their outflow areas. In native springs inhabited by this species, larger individuals also utilized deeper waters in open water areas (USFWS 1980). Young fish tend to utilize shallow areas with vegetation. During the breeding period, females seek seclusion in more remote areas of the spring. Fry usually remain near the bottom or adjacent to substrates for protection from predators (USFWS 1980).

White River Spinedace. Historically, the White River spinedace occurred in the White River near the confluence with Ellison Creek in White Pine County and below Adams-McGill Reservoir in Nye County (USFWS 1994a). Historic distribution also included springs in White County (Preston Big, Cold, Nicholas, and Arnoldson) and Nye County (Flag). The present distribution for this species is limited to Flag Springs and the upper portion of Sunnyside Creek, which includes a series of three springs and stream segment located in the Kirch Wildlife Management Area (USFWS 1994a). Critical habitat was designated for three springs and their outflows plus the surrounding land areas at a distance of 15 meters (Preston Big Spring and Lund Spring in White Pine County and Flag Springs in Nye County).

Historically, White River spinedace occupied stream and spring habitats in northern portion of the White River. The species now persists only in spring habitat. Observations in spring habitat occupied by this species included clear, cool water temperatures; open pools with aquatic vegetation; and bottom substrates consisting of gravel, sand, and mud (USFWS 1994a). No information is available concerning habitat used by White River spinedace in riverine areas of the White River.

White River Springfish. Historic and the present distribution of White River springfish are restricted to Ash Springs and its outflow in Pahranagat Valley, Lincoln County, Nevada. The majority of the population is found in the pool, however, fish occasionally occur in the outflow stream (Tuttle et al. 1990). Critical habitat includes Ash Springs (Lincoln County, Nevada), its outflow, and the surrounding land for a distance of 50 feet (USFWS 1998b).

Constituent elements of the critical habitat consist of warm water springs and their outflows and the adjacent riparian area, which provides cover and invertebrate food sources. Specific habitat characteristics in Ash Springs include a relatively large pool (0.2 mile in length) with depths ranging from approximately 1.6 to 6.6 feet. The pool contains dense submergent vegetation and sand and silt bottom substrates. Water temperatures range from approximately 880 to 970 degrees Fahrenheit and the mean discharge is 0.56 cubic feet/second. Adult White River springfish occur at depths ranging from approximately 1.3 to 5.6 feet, but they prefer depths of 3.6 feet or greater. Juvenile fish tend to use shallower water (average o0f 2.1 feet).

Virgin River Chub. Historically, this species occurred in the Moapa River in Nevada and the mainstem portion of the Virgin River from Pah Tempe Springs, Utah downstream to the confluence with the Colorado River in Nevada. The present distribution extends from Pah Tempe Springs downstream to the Mesquite Diversion near the Arizona/Nevada state line (USFWS 1994b). Few individuals have been collected below the Mesquite Diversion since the late 1970s. A population still exists within the Moapa River in Nevada. A captive population also is maintained at the Dexter National Fish Hatchery and Technology Center as a refugium population and for propagation studies. Critical habitat was designated for the species in 87.5 miles of the mainstem portion of the Virgin River in 1999 (USFWS 1999).

Habitat usually consists of deep runs or pools with slow to moderate velocities and instream cover such as boulders or root snags. Both adult and juvenile life stages seem to prefer these habitat characteristics in association with sand substrates. Larger adults are usually associated with the deepest pool habitats (USFWS 1999).

Woundfin. This species currently occupies less than 15 percent of its historical habitat (USFWS 1999). The historical range for this species extends from the confluence of the Salt and Verde Rivers near Tempe, Arizona, to the mouth of the Gila River at Yuma, Arizona. Woundfin also inhabited the Colorado River from Yuma, Arizona, upstream to the Virgin River in Nevada. Its distribution also included the Virgin River in Arizona and Utah. The present distribution of the woundfin is restricted to the mainstem Virgin River from La Verkin Springs, and the lower portion of La Verkin Creek in Utah, downstream to Lake Mead in Nevada. Critical habitat was designated for the species in 87.5 miles of the mainstem portion of the Virgin River in 1999 (USFWS 1999).

Habitat usually consists of runs and pool areas adjacent to riffles for adults and juveniles (USFWS 1999). Larval woundfin occur in backwater areas or slow-velocity habitat along stream margins. Fish greater than 1.6 inches in total length utilize depths between approximately 0.4 and 1.4 feet and velocities between 0.8 and 1.6 feet/second over sand and sand/gravel substrates.

Federal Candidate Species

Columbia Spotted Frog. This species is known to occur from one location within the Ely District, which occurred in the Spring Creek Flat area of White Pine County (approximately 1.5 miles northeast of the Town of Eightmile, Nevada, on West Deep Creek (Nevada Natural Heritage Database 2004). This species utilizes wetland habitats in low elevation shrublands and grasslands within the study area. During breeding season, they are found near permanent water bodies such as ponds, pools in streams, and springs (BLM 1993). The water bodies also usually contain emergent vegetation. After the breeding season is completed, frogs can move considerable distances to habitats such as mixed conifer forests, subalpine forests, grasslands, and brushlands that contain sage and rabbitbrush. This species hibernates during the winter in holes near springs or other areas where water is unfrozen and constantly renewed (U.S. Forest Service 1991).

In total, 17 additional BLM-sensitive fish species occur within the planning area (Appendix P). The state-protected and BLM-sensitive fish species lists are the same except for the addition of two BLM-sensitive species (Bonneville cutthroat trout and Meadow Valley Wash speckled dace). All of these fish species are native to Nevada. Bonneville cutthroat trout and the sucker and some of the dace species (e.g., White River speckled dace and Meadow Valley Wash speckled dace) are found in stream habitats. The other fish species are mainly associated with springs.

In addition, 13 BLM sensitive aquatic invertebrates (i.e., proposed species of concern) and 2 amphibian (northern leopard frog and southwestern toad) are present in the Ely District. The invertebrate species include the Pahranagat nauconid bug and 12 springsnails or snails (see Appendix F). All of these species are found in spring habitats.

Habitat conditions in Condor Canyon were adversely affected by a major rangeland fire in 1999. Effects of the fire included loss of riparian vegetation, increased sedimentation from surrounding upland areas, and encroachment of emergent vegetation (mostly cattails) into the channel. Salt cedar is invading the riparian area but it is not considered severe and could likely be controlled with short-term measures (Hobbs et al. 2003). A Habitat Restoration Plan is being implemented to improve habitat conditions.

Trends

Standardized sampling for federally listed fish species in Nevada has been conducted by the Nevada Department of Wildlife to monitor population trends and distribution (Hobbs et al. 2003; Stein et al. 2001; Stein et al. 2000). Based on available sampling results, population trends are noted in **Table 3.7-1**. Sampling has continued in 2003 and 2004 for most of these species, however, results are not yet available.

Threats to federally listed fish species were identified in the recovery plans (USFWS 1980, 1993, 1994a,b, 1996, 1998). Factors that have affected these populations include habitat alterations, water depletions, hybridization, disease, predation, and competition. Habitat alterations have resulted from stream channel changes, cattle grazing, crop production in adjacent land, and water withdrawals for irrigation and domestic purposes. Introduced non-native fish species have adversely affected populations of listed fish species due

to competition for food and available habitat, transfer of parasites and diseases, and predation. Threats to state-listed and BLM sensitive species are considered to be similar to factors identified for federally listed species.

Table 3.7-1
Summary of Population Sampling for Federally Listed Fish Species

Species	Years	Sampling Results
Big Spring spinedace	1999-2002	Species is present in the upper portion of Condor Canyon, with the highest densities occurring above Condor Canyon near Delmue Bridge.
		Population estimates have fluctuated (7,652 in 1999, 4,294 in 2000, 8,721 in 2001, and 8,984 in 2002).
Pahrump poolfish	1989, 1997-2002	Species is present in four ponds in the Shoshone Ponds Native Fish Refugium.
		Population estimates (without variance statistics) have decreased in North Shoshone Pond from approximately 450 in 1989 to 230 in 2001.
		Population estimates (without variance statistics) have fluctuated in South Shoshone Pond compared to 1989 (ranging between approximately 250 and 600 fish).
		Population estimates (without variance statistics) have decreased since 1997 in Middle Shoshone Pond (1,700 in 1997 to 1,300 in 2002).
		Population estimates (without variance statistics) have increased in Shoshone Stock Pond from approximately 1,700 in 1997 to 1,300 in 2002. Low of 480 fish in 2000.
White River springfish	2001	Snorkel survey indicated 600 fish present in 2001. No sampling was conducted in 2002.
Hiko White River springfish	1985-2002	Population numbers (without variance statistics) have ranged from approximately 1,000 in 1985 to 6,000 fish in 2000 and then decreased to 1,200 fish in 2002.
White River spinedace	1991-2002	Population estimates increased from a low of 40 fish in 1991 to 1,573 fish in 1999. Recent estimates in 2002 were 914 (March) and 1,264 fish (September).
Pahranagat roundtail chub	1997-2001	Trend in population numbers has declined from 568 fish in 1997 to 25 fish in 2001. No sampling was done in 2002 because of access restriction.
Railroad Valley springfish	1996-1998	Population estimates in Big Warm Spring in 1997 and 1998 were approximately 500 to 1,000 fish.
		Population numbers in Little Warm Spring have decreased from 3,524 in 1996 to 2,418 fish in 1998. No sampling was conducted in 1999 through 2002.

Distribution and occurrence information is available for BLM-sensitive springsnails within the planning area (Appendix F). However, no systematic or frequent sampling has been conducted for invertebrate species to provide information on trends (Sjöberg 2004). As part of the Nevada Department of Wildlife*'s* management for native species, protection of springs and their associated stream segments are important.

Current Management

Management of sensitive aquatic species depends on their listing status. Federally listed species are regulated by the U.S. Fish and Wildlife Service under the Endangered Species Act and managed by the Nevada Department of Wildlife. The BLM must follow the requirements of the Endangered Species Act to protect the listed species and their habitat. The BLM also manages their lands to protect Nevada BLM sensitive and State of Nevada listed species as described in BLM Manual 6840. Management guidance for the sensitive fish species is provided in recovery plans and habitat management plans (**Table 3.7-2**).

Table 3.7-2
Management Guidance for Sensitive Fish Species

Species	Plan/Citation
Big Spring spinedace	Big Spring Spinedace Recovery Plan (USFWS 1993); Big Spring Spinedace Monitoring and Nonnative Species Control Plan (NDOW 1999a); Big Spring Spinedace Recovery Implementation Plan (Draft) (NDOW 1999b); Condor Canyon Habitat Management Plan (Guerrero et al. 1989)
Hiko White River springfish, White River springfish, Pahranagat roundtail chub, White River speckled dace, White River desert sucker	Recovery Plan for the Aquatic and Riparian Species of Pahranagat Valley (USFWS 1998); White River Valley Native Fishes Management Plan (NDOW 2000a), Pahranagat Valley Native Fishes Management Plan (NDOW 1999c)
Pahrump poolfish	Recovery Plan Pahrump Killifish (USFWS 1980)
Railroad Valley springfish	Railroad Valley Springfish Recovery Plan (USFWS 1996); Railroad Valley Springfish Species Monitoring Plan (NDOW 2000b)
White River springfish and Woundfin	White River Spinedace Recovery Plan (USFWS 1994a)
Bonneville cutthroat trout	A Conservation Strategy and Conservation Agreement (Draft)

3.7.3 Wildlife

Existing Conditions

A total of 60 special status terrestrial species (18 mammals, 31 birds, 5 reptiles, and 6 invertebrates) potentially could occur within the Ely District. These species and their associated habitats are summarized in Appendix F.

Federally Listed Species.

Southwestern Willow Flycatcher. The southwestern willow flycatcher (*Empidonax traillii extimus*) was listed as federally endangered in 1995 (60 Federal Register 10694). The range of this subspecies in Nevada is confined primarily to the southern portion of the state. No designated critical habitat for this subspecies occurs within or near the boundary of the Ely District (62 Federal Register 39129). The final recovery plan for the southwestern willow flycatcher was published in 2002 (USFWS 2002).

Data obtained from the Nevada Department of Wildlife indicate that the southwestern willow flycatcher has been documented at five known locations on the Ely District in Lincoln County. One location occurs at the Pahranagat National Wildlife Refuge where this subspecies was recorded in 1976, 1979, 1986, 1989, 1990, 1991, and 1994. This subspecies also was recorded at Key Pittman Wildlife Management Area where breeding pairs were detected in 1999, 2000, 2001, 2002, and 2003. Breeding pairs also were detected at Crystal Springs in 2002 and near the town of Ash Springs in 1999, 2000, and 2001. Southwestern willow flycatchers were recorded in 1998 at three sites including a site just southwest of the Delamar Mountains in southern Lincoln County, a site south of the East Mormon Mountains in southern Lincoln County, and a site east of the Fortification Range in northern Lincoln County. A southwestern willow flycatcher also was detected at Lower Meadow Valley Wash in southern Lincoln County in 2002 (NDOW 2001, 2002, 2003g).

Relative to the Ely District, potentially suitable breeding habitat for the willow flycatcher would be limited to riparian shrub and wetland habitat in Lincoln County.

Yuma Clapper Rail. The Yuma clapper rail (*Rallus longirostris yumanensis*) was listed as federally endangered in 1967. A recovery plan for this subspecies was prepared in 1983 (USFWS 1983); however, critical habitat has not been designated.

No evidence of the Yuma clapper rail has been documented within the Ely District; however, this subspecies is known to occur along the Virgin River south and west of Lincoln County.

Bald Eagle. The bald eagle (*Haliaeetus leucocephalus*) was downlisted to federally threatened on July 12, 1995, and the U.S. Fish and Wildlife Service has proposed to delist the bald eagle in the lower 48 states (64 Federal Register 36453). Bald eagles also are protected under the Bald Eagle Protection Act of June 8, 1940, as amended, and the Migratory Bird Treaty Act of July 3, 1918, as amended June 20, 1936, in all states, including Alaska. A recovery plan for this species was prepared in 1982 (USFWS 1983); however, critical habitat has not been designated.

No bald eagle nest sites are known to occur within or near the Ely District. As a result, potential occurrence by this species would be limited to migrating and wintering individuals. The robust branches of cottonwoods are preferred

The restoration and maintenance of healthy ecological systems within watersheds is a primary focus for the future management of the Ely District. Healthy ecological systems are geographically diverse and change over time. They are compatible with soil potential and are resilient to disturbance.

Resources and resource uses would be managed to restore or maintain ecological health. Certain resource management changes and active treatments may need to be implemented, in portions of watersheds, to accomplish this objective. Adaptive management would be pursued to avoid deteriorating conditions favoring invasive plants and catastrophic fires. Any projects would be implemented so as to result in a mosaic of vegetation within a watershed.

In the long term, natural disturbance (such as drought or fire) would occur and fewer treatments would be needed to maintain ecological health. The result would be a variety of vegetation phases within a watershed, which would provide diverse, healthy conditions for future generations.

habitat for winter roosts. Therefore, potentially suitable roosting habitat for the bald eagle would be limited to approximately 22,000 acres of riparian habitat present on public and private land in the District. Cedar Mountain in Newark Valley has been utilized as winter roosting habitat for the eagle in the past; however, there has been no eagle activity at the site for approximately 3 years. Eagles also were observed in 1982 roosting in a stand of large cottonwoods at Bull Creek Ranch in northern Nye County. However, no birds have been observed at these sites within the last few years.

Desert Tortoise. The desert tortoise (*Gopherus agassizii*) was listed as federally threatened in 1990 (55 Federal Register 12178). A recovery plan for this species was prepared in 1994 (USFWS 1994). Critical habitat for the Mojave population of the desert tortoise was designated in 1994 (59 Federal Register 5820). Two designated critical habitat units (Mormon Mesa Unit and Beaver Dam Slope Unit) occur within the study area in southern Lincoln County.

The Nevada Department of Wildlife and the Nevada Natural Heritage Program have documented numerous desert tortoise sightings within the District. There have been several reports of desert tortoise burrows in the lowlands near the mountains from Ash Springs southward along Pahranagat Wash to the Lincoln County line. Sites occupied by desert tortoise are scattered throughout southeastern Lincoln County, with areas of concentration occurring along Kane Springs Wash, Meadow Valley Wash, and the region just south of the Tule Springs Hills.

There are approximately 726,000 acres of potentially suitable desert tortoise habitat in the Ely District, of which approximately 256,000 acres have been designated as critical habitat for this species in southern Lincoln County. Subsequently, three ACECs (Kane Springs, Mormon Mesa, and Beaver Dam Slope) were designated by the BLM to assist in the recovery of the desert tortoise within the Ely District. These ACECs encompass 212,500 acres or approximately 83 percent of the critical habitat for the desert tortoise in the District (BLM 2000) (see **Map 3.7-2**).

Federal Candidate Species.

Yellow-billed Cuckoo. The yellow-billed cuckoo (*Coccyzus americanus*) is a federal candidate species that formally ranged throughout much of North America from southern Canada to northern Mexico (66 Federal Register 38611). However, the yellow-billed cuckoo has suffered population declines primarily due to the loss of streamside habitat and is declining west of the continental divide (BISON-M 2002).

There have been six locations where the yellow-billed cuckoo has been reported in the Ely District in Lincoln County. Observations of yellow-billed cuckoo were reported at two sites along Meadow Valley Wash; a breeding pair at one site in 2001 and a single bird at another site in 2002. At Crystal Springs, two breeding pairs were reported in 2001. South of Crystal Springs, individual birds were observed at a fourth site in 2000 and 2002. At another site at Ash Springs, four breeding pairs and additional single birds were reported in both 2000 and 2001 (NDOW 2003). In 1979, a single cuckoo was reported by the Nevada Department of Wildlife just south of Beaver Dam State Park in extreme eastern Lincoln County.

Potentially suitable habitat for the yellow-billed cuckoo on the District would be limited to approximately 3,100 acres of riparian and wetland.

Federally Petitioned Species.

Greater Sage-grouse. The greater sage-grouse (*Centrocercus urophasianus*) has been petitioned to be federally listed under the Endangered Species Act as a result of the downward trend of local populations and a reduction of habitat (CPT 2001; Kritz 2004). Sage grouse typically occupy sagebrush communities, breeding in relatively open lek sites (or strutting grounds). Leks are established in open areas, 0.2 to 12 acres in size (CPT 2001). Nesting habitat is characterized primarily by Wyoming big sagebrush communities with a 15 to 38 percent canopy cover and a grass-forb understory (CPT 2001). On average, most nests occur within 4 miles of a lek site, however, nesting habitat may occur at greater distances from a lek site for migratory populations (Connelly et al. 2000). Early brood rearing generally occurs close to nest sites. Optimum brood rearing habitat consists of sagebrush stands that are 16 to 32 inches tall with a canopy cover of 10 to 25 percent and a herbaceous understory consisting of grass and forb species (BLM 2000).

Summer habitat consists of sagebrush mixed with areas of wet meadows, riparian habitat, or irrigated agriculture fields. As habitat begins to dry up, sage grouse broods move to more mesic habitat such as wet meadows where succulent grasses and insects are still available. In Nevada, sage grouse greatly rely on wet areas for their survival since Nevada normally receives less precipitation than other states (CPT 2001). Fall habitat in northeastern Nevada consists of a mosaic of low-growing sagebrush and Wyoming big sagebrush (see **Map 3.5-3**). It is crucial that sagebrush be exposed at least 10 to 12 inches above snow level for wintering sage grouse (CPT 2001). Sagebrush is the primary food source of adult sage grouse; however, forb species are an important food source in spring and early summer and improve successful reproduction in females. Numerous forb species also enhance nest concealment and relative nest success (PACWPL 2002).

BLM Sensitive Species. The remaining special status species include 54 BLM sensitive species (18 mammals, 26 birds, 4 reptiles, and 6 invertebrates) (see Appendix F).

Trends

In general, special status species are those species for which population viability is of concern, based on current or predicted downward trends in population numbers or density, or habitat capability that would limit a species' distribution. As such, special status species are afforded an additional level of protection by law, regulation, or policy from state and federal agencies.

Specific threats to federally listed wildlife species were identified in the recovery plans (USFWS 1982, 1983, 1994, 2002). Factors that have affected these species and their habitat include habitat loss or modification, water diversion or depletions, livestock grazing, establishment of invasive nonnative plants, and human disturbance. Threats to state protected species, BLM sensitive species, and U.S. Fish and Wildlife Service species of concern are considered to be similar to those identified for federally listed species.

A reduction of overall habitat quality in the sagebrush communities on the District as discussed under Habitat Trends in Section 3.6, Fish and Wildlife. Sage grouse populations in Nevada and throughout their range have displayed a substantial downward trend in both numbers and distribution and the sage grouse habitat losses have paralleled the trends in populations (NDOW 2003). Due to population declines throughout their range in the western U.S., including Nevada, the 2001 Nevada Sage Grouse Conservation Strategy was developed to achieve two major goals: 1) create healthy, self sustaining sage grouse populations that are well distributed throughout the species' historic range by maintaining and restoring ecologically diverse, sustainable, and contiguous sagebrush ecological systems and by implementing scientifically sound management practices; and 2) have locally functional, well-informed groups to actively contribute to sage grouse conservation while balancing habitat, bird, and economic considerations (CPT 2001).

Relative to the Ely District, sage grouse currently occur north of Pioche in Lincoln, Nye, and White Pine counties. In White Pine County, short-term data from 22 leks indicate an overall downward trend of 8 percent in 2003 following decreases of 26 percent in 2002 and 8 percent in 2001 (NDOW 2003). Survey data from 12 leks counted in 2002 and 2003 in Lincoln County reflect a 5 percent increase in overall attendance over the short term. Although long-term data still are being analyzed, short-term data indicate that breeding populations of sage grouse in the Lincoln County area are stable (NDOW 2003), but are of very low densities. Many of the historic leks within the Lincoln County area are no longer active, as a result of population declines from reductions in overall habitat quality and fragmented seasonal habitats (see **Map 3.5-3**).

Current Management

Management of special status species depends on their listing status. Federally listed species are regulated by the U.S. Fish and Wildlife Service and managed by BLM under the Endangered Species Act. The BLM must follow the requirements of the Endangered Species Act to protect the listed species and their habitat. The BLM also manages their lands to protect U.S. Fish and Wildlife Service candidate species, Nevada BLM sensitive species, state listed species, and U.S. Fish and Wildlife Service species of concern as described in BLM Manual 6840. Other management guidance for special status species includes the implementation of recovery plans, biological opinions, plan amendments, and interagency recovery implementation teams.

All special status species are being managed to prevent future listing under the Endangered Species Act. Several ACEC nominations for special status species were not carried forward because existing management was deemed adequate to protect the species.

As part of Nevada's conservation strategy, two conservation plans (one for White Pine County and one for Lincoln County) were developed by the local sage-grouse planning teams. The goal of these county conservation plans is to develop and implement local monitoring strategies to promote sage-grouse conservation.

3.8 Wild Horses

3.8.1 Existing Conditions

Current wild horse herds originated from animals released into native habitats since the early white exploration and settlement in the region in the 1800s (see Section 3.9, Cultural Resources). The current populations incorporate genetic material and traits from a wide variety of breeds used historically within the region. Some of the wild horses in the District have descended from mining stock and tend to have a draft appearance; others are derived from ranch stock or cavalry remount ancestry. Size and conformation usually are correlated with that ancestry. The most predominant colors are sorrels and bays, but other colors and patterns also are represented.


Wild Horses
Photo by Jake Rajala

Herd structure consists of a lead mare, a dominant stallion, and other mares and foals. From a distance, the lead mare frequently can be recognized by her agitation and vigilance. When a perceived threat materializes, she will take the herd away to a safer location. The stud, or stallion, spends much of his time segregating the herd from bachelor studs, which form small bands on the periphery of the main band. Occasionally, one of these studs will challenge the lead stallion for dominance. Although some predation (primarily by mountain lions) is known to occur, mortality due to predation is relatively limited in most herds because of the preponderance of open spaces and expanses in the District. Large predators require cover for stealth and stalking efficiency.

Wild horses compete with livestock and wildlife for available forage. There are both differences and similarities in dietary overlaps and food preferences (Hubbard and Hansen 1976). Managers, biologists, and interested public traditionally have perceived that free-roaming horses are ecologically equivalent to domestic cattle. Both species are regarded as equivalent in calculating animal unit months and having the same influence on structure, function, and composition of semi-arid ecological systems. Beever (2003) stated that it may be inappropriate to assume that influences of horses mirror influences of cattle or other ungulates. The author states that free-roaming horses have an evolutionary history that has given rise to a unique suite of behavioral, morphological, and physiological traits. Horses have a larger body size than cattle and physiologically are less efficient digesters of grass and other forage, therefore, requiring greater quantities of forage. Horses are one of the least selective grazers in western North America. Fewer plant species may remain ungrazed in areas occupied by wild horses compared to areas occupied by cattle and other ungulates. Because of this non-selectivity and use of a lower quality diet, horses must consume 20 to

65 percent more forage than cattle per unit of body weight. In addition, horses physically are able to remove vegetation closer to the ground, sometimes with adverse effects.

3.8.2 Trends

After passage of the Wild Free-Roaming Horse and Burro Act (Public Law 92-195) in 1971, a comprehensive inventory was conducted on the Ely District. Approximately 700 wild horses were found on 29 areas; these were designated as herd areas. The wild horse population on the Ely District presently exceeds 3,000 horses. Most herds currently exceed the level that can be supported on a long-term basis by the available forage and water. Herd recruitment numbers greatly exceed the numbers being adopted or being placed into the process for eventual adoption.

Since 1973, when the horse and burro adoption program began, the two legal means of disposing of surplus, harvested animals has been through public adoptions and euthanasia. Some animals, especially older studs, lack the physical appeal and disposition that attract adopters. Ultimately, when these animals are perceived as unadoptable, they are returned to holding facilities or released back onto public lands. Euthanasia is no longer used for population control and is not likely to be resumed. Population trends continue to move upward because annual reproduction and recruitment considerably outnumbers adoptions. Population reductions are limited by the fact that herd recruitment exceeds the legal methods and mechanisms for disposal. With present high numbers on the range, the potential for negative impacts is extremely high.

In the fall of 2004, Congress amended the 1971 Act to facilitate the sale of animals over 10 years of age and those that had been offered unsuccessfully for adoption at least three times. It is too soon to judge the effectiveness of the amendment relative to control of herd populations.

In response to herd population problems, the BLM has attempted in some areas to slow natural reproduction by inoculating mares with an immunocontraceptive called porcine zona pellucida. Research continues for the development and testing of an effective multi-year vaccine that potentially could lower herd recruitment rates to a more desirable level.

3.8.3 Current Management

Perhaps no other federal program receives a higher level of public interest and scrutiny than the wild horse program. The health, nutrition, and general well being of wild horse herds are closely monitored by multiple public organizations for a variety of purposes and reasons. These groups present unique opportunities for cooperative and collaborative partnerships as well as for controversy. Such groups in Nevada have provided monitoring assistance, publicity for the program via training demonstrations and wild horse and burro shows, development and maintenance of wild horse projects, orphan foal adoptions, volunteers to assist in compliance checks, and the offer of pasture for surplus or unadoptable animals.

Following passage of the Wild Free-Roaming Horse and Burro Act of 1971 (Pubic Law 92-195), 29 herd areas within what is now the Ely District were identified as having wild horse populations. Some of these

were combined for management purposes, resulting in 25 herd management areas, one of which was later dropped under provisions of the Desert Tortoise Amendment. The remaining 24 herd management areas encompass approximately 5.36 million acres of BLM-administered lands in the Ely District, or approximately 45 percent of the entire District (**Table 3.8-1**). The smallest of the herd management areas is 19,500 acres; the largest is nearly 800,000 acres. There are no wild horse ranges designated within the Ely District. The current established appropriate management level District-wide is 2,141 animals.

Table 3.8-1
Herd Management Areas Under the Jurisdiction of the Ely Field Office

Herd Management Areas	Size (acres)	Appropriate Management Level Range
Antelope	389,900	324
Applewhite	30,300	1
Blue Nose Peak	84,600	1
Buck and Bald	799,500	423
Butte	427,800	95
Cherry Creek	35,000	0-0
Clover Creek	33,100	1-14
Clover Mountains	168,000	1-16
Deer Lodge Canyon	105,300	30-50
Delamar Mountains	183,600	51-85
Diamond Hills South	19,500	22
Dry Lake	487,800	94
Highland Peak	136,100	20-33
Jakes Wash	153,700	1-21
Little Mountain	53,000	9-15
Meadow Valley Mountains	94,500	0
Miller Flat	89,400	9-15
Monte Christo	369,800	236
Moriah	53,300	1-29
Rattlesnake	71,400	1
Sand Springs East	476,100	257
Seaman	358,800	159
White River	116,300	90
Wilson Creek	624,500	160
Totals	**5,361,300**	**1,986-2,141**

The BLM State Director (Nevada) has approved standards and guidelines for wild horses and burros developed by both the Mojave/Southern Great Basin Resource Advisory Council and the Northeastern Great Basin Resource Advisory Council (see Appendix A). The advisory groups intend that these standards and guidelines will result in a balance of multiple use and sustainable development. Standards for rangeland health only can be reached and maintained by managing animal numbers so that appropriate management levels are not exceeded in each herd management area. Controlling wild horse numbers by gathers and other controls is essential. The Resource Advisory Councils realize that achieving proper functioning rangelands may be a long-term process on degraded rangelands.

The Ely Field Office has established appropriate management levels for these herd management areas through a series of actions over the past 15 years. In the most recent of these actions, the Ely Field Office issued an Environmental Assessment (NV-04-03-036) and Finding of No Significant Impact in November 2003 for Establishment of Appropriate Management Levels for Twelve Wild Horse Herd Management Areas. **Table 3.8-2** summarizes the evaluation of habitat suitability for each of the herd management areas in the District and the recommendations for future management. In several cases, management changes are proposed to better allow for management of wild horse populations. These changes are discussed in greater detail in Section 2.5.8.

Maintenance of wild horse numbers is completed through gather operations. Typically the timing of gather operations tends to be sporadic. Some herd management areas are gathered every other year due to drought, while others are gathered every 5 or 6 years due to funding. The determination of an excess population of wild horses occurs primarily based on visual counts or helicopter census (inventory). Coupled with vegetation monitoring, the establishment of the appropriate management level and inventory data will trigger the request for a gather. Due to the majority of foals being born during the spring, gather operations don't occur from March-June.

The maintenance of wild horses within appropriate management levels strives to achieve a thriving natural ecological balance while maintaining a multiple use relationship, as well as achieving rangeland health standards. During wild horse maintenance or gathers, data are collected regarding herd health and characteristics. These data include genetic blood tests, collection of phenotypic characteristics, body condition, age, recruitment rates, and other herd-specific information. During field monitoring, public notification, or gather operations, sick and lame horses are euthanized for humane purposes.

Table 3.8-2
Current Conditions of Herd Management Areas in the Ely District

Herd Management Area	Evaluation of Habitat Suitability					
	Forage	Water	Space	Cover	Genetic Viability	Comments/ Recommendation
Antelope	Adequate	Adequate	Adequate	Adequate	Adequate	Retain
Applewhite	Inadequate with excessive damage to riparian vegetation.	Adequate	Adequate	1	Allotment fencing prevents interaction with other herds and limits genetic viability of the herd.	Remove herd; drop HMA status.
Blue Nose Peak	Forage unsuitable for yearlong grazing.	Inadequate	1	1	No established herd present; HMA receives incidental use.	Drop HMA status
Buck and Bald	Adequate	Adequate	Adequate	Adequate	Adequate	Combine with Butte and Cherry Creek.
Butte	Adequate	Adequate	Adequate	Adequate	Adequate	Combine with Buck and Bald and Cherry Creek.
Cherry Creek	Adequate	Adequate	Adequate	Adequate	No established herd present.	Combine with Buck and Bald and Butte
Clover Creek	Marginal	Adequate	1	1	Inadequate habitat resources to sustain a genetically viable population of 50 breeding animals.	Remove herd; drop HMA status.
Clover Mountains	Inadequate	Adequate	Marginal	1	Inadequate habitat resources to sustain a genetically viable population of 50 breeding animals.	Remove herd; drop HMA status.
Deer Lodge Canyon	1	1	1	Poor winter habitat; horses move to Wilson Creek HMA and other areas to winter.	1	Combine with Wilson Creek.

Table 3.8-2 (Continued)

Herd Management Area	Evaluation of Habitat Suitability					
	Forage	Water	Space	Cover	Genetic Viability	Comments/ Recommendation
Delamar Mountains	Adequate; heavy to severe use is occurring near water sources and riparian areas.	Adequate	Adequate	Adequate	[1]	Remove herd; drop HMA status.
Diamond Hills South	Adequate	Adequate	Adequate	Adequate	Adequate	Retain; this is part of a metapopulation with Elko and Battle Mountain districts.
Dry Lake	Adequate	Adequate	Adequate	Adequate	Adequate	Combine with Rattlesnake and Highland Peak.
Highland Peak)	[1]	Water available, primarily in northern part of HMA.	[1]	Inadequate winter habitat; horses in the northern portion of HMA winter in the Dry Lake HMA.	[1]	Combine with Dry Lake and Rattlesnake.
Jakes Wash	Inadequate	Inadequate	Inadequate summer range	Inadequate winter cover		Remove herd; drop HMA status.
Little Mountain	[1]	Inadequate	Inadequate	Inadequate summer habitat; horses move between this HMA and Miller Flat	[1]	Remove herd; drop HMA status.
Meadow Valley Mountains	[1]	Inadequate	Inadequate	Marginal	[1]	Wild horse use conflicts with desert tortoise habitat, remove herd; drop HMA status.
Miller Flat	Inadequate	Inadequate	Inadequate	Inadequate; poor winter habitat; horses move to Little	[1]	Remove herd; drop HMA status.

Table 3.8-2 (Continued)

Herd Management Area	Evaluation of Habitat Suitability					
	Forage	Water	Space	Cover	Genetic Viability	Comments/ Recommendation
				Mountain HMA in winter.		
Monte Cristo	Adequate	Adequate	Adequate	Adequate	Adequate	Combine with Sand Springs East.
Moriah	Adequate	Inadequate	Inadequate	Lacks suitable yearlong habitat; horses move outside the HMA.	[1]	Remove herd; drop HMA status.
Rattlesnake	[1]	[1]	[1]	Inadequate summer habitat; horses move to Dry Lake HMA for summer habitat.	[1]	Combine with Dry Lake and Highland Peak.
Sand Springs East	Adequate	Adequate	Adequate	Adequate	Adequate	Combine with Monte Cristo.
Seaman	[1]	Marginal, very little water on public lands.	Adequate	No summer habitat; cover inadequate.	[1]	Remove herd; drop HMA status.
White River	[1]	Marginal; very little water on public lands.	Adequate	Adequate	[1]	Remove herd; drop HMA status.
Wilson Creek	Adequate	Adequate	Adequate	Adequate	Adequate	Combine with Deer Lodge Canyon.

[1]An "Inadequate" rating in one or more of the five essential habitat suitability components was considered to render the Herd Management Area unsuitable. In several such cases, full evaluation of other components was either not conducted or not considered essential to the management decision.

Data sources: Herd Management Area Descriptions and Appropriate Management Level Evaluation; Appendix B of Twelve HMA Appropriate Management Level EA, EA NV-040-03-036, November 2003; Notice of Wild Horse Management Decision and Finding of No Significant Impact (FONSI) for the Establishment of Appropriate Management Levels for Twelve Wild Horse Herd Management Areas, EA NV-040-03-036, November 2003; unpublished BLM data.

3.9 Cultural Resources

3.9.1 Existing Conditions

The Ely District encompasses a diverse array of climatic, geological, geomorphological, biological, and hydrological settings. The dynamic nature of these settings undoubtedly influenced past land uses and patterns as evidenced by the varied locations of cultural resources found in the District. Landscapes and their associated landforms also influenced past cultural land use in the District. Near-flat and gently sloping surfaces such as alluvial fans, fan piedmonts, fan skirts, alluvial flats, and playas, as well as ridge tops, passes, and stream terraces, contain most cultural resources. These types of landforms convey potential ease of travel, possible water sources, likely prehistoric camping locations, and historic ranch, field, and mining locations (Peterson 1981). Mountain slopes contain the fewest cultural resources, with isolates, quarries, and mining-related endeavors being the primary resource types in these locations.

Approximately 12,114 cultural resource sites have been identified within the Ely District covering a timespan of over 10,000 years. The sites range from small temporary campsites, hunting stations, rock art sites, artifact scatters, quarries, rockshelters, and food collecting sites, to historic mining camps, staging stations, trails, and structures. These prehistoric and historic sites represent continuous use of the area and include several substantial finds. **Table 3.9-1** shows the relative frequency of sites by watershed, or hydrologic unit, and gross time period. **Map 3.9-1** shows the distribution of recorded prehistoric and historic sites in the District.

Approximately 3.8 percent of the District has been surveyed at the Class III inventory level. For the District as a whole, the ratio of prehistoric to historic sites is approximately 7:1 (approximately 43.4 percent of the sites are prehistoric and 8.5 percent are historic sites). Watershed-specific ratios of prehistoric to historic sites range from a high of approximately 16:1 (Long-Ruby Valleys) to a low of approximately 2:1 (Hamblin-Snake Valleys), indicating that prehistoric sites are more common than historic sites throughout the District. More detailed information on methodology, site density, and site distribution are documented in the Gnomon, Inc. Technical Report (Drews and Ingbar 2004).

Chronologically, occupational periods within the Great Basin are defined by a series of adaptive strategies that express regional trends over the larger area. These strategies are further refined within the context of regional phases, each of which are represented by different assemblages and settlement patterns within the archaeological record. Adaptive strategies are broadly framed within a Pre-archaic (11000 Before Present to 8000 Before Present) to Late Archaic (1500 Before Present to Historic contact) continuum.

Prehistoric Overview

Pre-archaic sites usually are associated with pluvial lake, shoreline features, riparian areas, marshes, or along old river terraces. Sites usually lack buried components, middens, house features, plant processing equipment, storage facilities, or other indications of intensive occupation. Diagnostic tools include a variety of stemmed projectile points (Great Basin Stemmed series) as well as fluted Clovis and unfluted lanceloate

Table 3.9-1
Cultural Resource Sites by Hydrologic Subbasin in the Ely District

Hydrologic Subbasin Name[1]	Prehistoric	Historic	Multi-component	Isolated Artifact	Isolated Historic	Isolated Prehistoric	No Record[2]	Unknown	No Geographic Information System Link to Database[3]	Total All Sites	Percent All Sites
Lower Virgin	157	19	9	1	0	43	3	3	7	242	2.0
White	674	141	63	0	47	160	194	200	130	1,609	13.3
Muddy	180	3	8	0	2	50	3	3	4	253	2.1
Meadow Valley Wash	710	99	27	0	9	106	16	167	11	1,145	9.5
Hamblin-Snake Valleys	140	69	7	1	11	39	48	368	23	706	5.8
Southern Great Salt Lake Desert	11	1	0	0	0	0	3	3	1	19	0.2
Escalante Desert	92	9	9	0	0	14	1	10	0	135	1.1
South Fork Humboldt	84	16	6	0	4	3	13	78	9	213	1.8
Diamond-Monitor Valleys	0	0	1	0	0	0	0	0	3	4	0.0
Little Smoky-Newark Valleys	446	169	87	0	17	105	165	383	25	1,397	11.5
Long-Ruby Valleys	1,135	69	79	0	18	161	173	441	80	2,156	17.8
Spring-Steptoe Valleys	760	326	141	0	76	338	163	208	76	2,088	17.2
Dry Lake Valley	330	43	14	0	33	250	4	0	8	682	5.6
Hot Creek-Railroad Valleys	359	32	8	0	21	289	33	117	130	989	8.2
Sand Spring-Tikaboo Valleys	184	34	20	0	8	116	10	98	6	476	3.9
Total All Sites by Type	5,262	1,030	479	2	246	1,674	829	2,077	513		
Total All Sites										**12,114**	

[1]Based on 4th level hydrologic unit subdivisions.
[2]No Record" indicates that no record for that site number exists at the archives.
[3]No Geographic Information System link to Database" indicates that the site is present on a map, but has not been entered into the site database.

Source: BLM Site Data; Harry Reid Center; Southern Nevada Archive; Nevada State Museum; Northern Nevada Archive.

types (Beck and Jones 1988). The Early Archaic period (7000 to 4000 Before Present) is marked by Large Side-notched projectile points in the north, large concave-based Triple-T and Humboldt Series at Gatecliff, and by Pinto Series points in the South Fork shelters (Thomas 1981, 1983). Due to the generally warmer and drier conditions during the Early Archaic period, populations in the Great Basin seem to shift from lakeshore environments to a wider variety of locales including those near perennial streams, springs, caves, and rock shelters. The Middle Archaic (4000 Before Present to 1500 Before Present) is marked by an increase in the diversity of habitats in which sites are found (Grayson 1993). Hallmarks of this period include Gatecliff Series projectile points at Gatecliff Shelter, although in the north central and northeastern Great Basin, the Humboldt, Pinto, and even Elko Series projectile points are present. Groundstone tools also become a noticeable part of the tool assemblage. During the Late Archaic period the bow and arrow replaced the spear and atlatl, with accompanying smaller and lighter Rose Spring and Eastgate projectile points during the first part of the Late Archaic, while pottery appeared around 1000 Before Present. Late Archaic populations began to use much more elaborate plant processing equipment, a possible reflection of new subsistence strategies that involved exploiting a more diverse resource base and different ecological zones (Frison 1991).

Between 1500 Before Present and 800 Before Present, much of the eastern Great Basin and northern Colorado Plateau supported people whose lifeways differed from those of the people who were there before and after. The “Fremont” people manufactured well-made, thin-walled black-on-grey carbon painted pottery and frequently lived in sizable villages (Grayson 1993). Although the Fremont were a diverse group, they are defined by their similarities. Artifacts found throughout the Fremont region include sandals made with deer leg hides using the dew claws as heels, basketry with a “one rod and bundle” weaving technique, and pottery with unique patterns and tempers. Though a distinct culture, they share the development of corn agriculture and expansion of organized sedentary villages with contemporary farming cultures, such as the Ancestral Puebloan, who lived throughout the southwest in the 11th and 14th centuries. No artifacts dating after 650 Before Present have been determined to be Fremont; the culture seems to disappear from the archaeological record.

Little is known of the actual connections between prehistoric cultures and the languages and cultures of historic peoples. There is some evidence to indicate that the Numic-speaking people (Shoshone, Paiute, Ute) did not spread into the region (Great Basin) until after about 1000 Before Present and that they absorbed or replaced earlier occupants. The record of Great Basin prehistory is known to extend back 10,000 years or more involving variants of a lifeway termed the Western Archaic, which in its earliest stages was characteristic of the entire West from the Columbia Plateau to the Southwest and from the western Plains to California. Within this common ancient tradition somewhat different yet related regional traditions developed over thousands of years in response to environmental and demographic conditions. In the Great Basin the ancient way of life was maintained with relatively fewer changes into historic times. Though there was considerable local variation of settlement and subsistence patterns and many influences from surrounding regions, the prehistoric Great Basin has presented a basic cultural unity through time (Spencer and Jennings 1977:188-190, Aikens 1978a:131-133, D’Azevedo 1986:8).

Historic Overview

The vast interior of the Great Basin remained unknown until the early 1820s when the first parties of trappers, explorers, and immigrants attempted to traverse the region in search of furs and a direct overland route to the Pacific Coast. Early explorers included; Jedediah Smith, Peter Skene Ogden, Kit Carson, and John C. Fremont. After 1845, an increasing number of immigrants began to follow the Humboldt or Overland Trail, across the central Great Basin to California rather than taking either the Oregon or Old Spanish Trails. The first non-Indian settlement was located at Mormon Station (Genoa) in 1849. Most of Nevada became part of the Utah Territory in 1850, became its own territory in 1861, and finally gained statehood in 1863. The discovery of gold at the Comstock Lode in 1859 brought thousands of people to the area, each dreaming of the riches that gold and silver could bring them. The Comstock Lode began to decline in the 1880s and the state population decreased. Discoveries of silver at Tonopah, gold at Goldfield and copper at Ely led to new mining booms which lasted through World War I. In 1931, gambling was legalized and Nevada experienced a new boom which grows with each new decade.

Ethnographic Overview

The Ely District was occupied by the Western Shoshone, Goshute, and Southern Paiute during the aboriginal period. The Shoshone were the main occupants of the District, and occupied all three counties. They interacted extensively with the Goshute, or Goshute Shoshone, along their eastern territorial boundary, and with the Southern Paiute along their southern territorial boundary. Traditional lands of the Goshute extend from Utah to eastern Nevada in White Pine County and the northern part of Lincoln County, although Goshute settlements and subsistence activities extended westerly to at least Egan Canyon in White Pine County. In southern Nevada, Paiute territorial boundaries met those of the Western Shoshone in southern Lincoln County.

The Ely District was occupied by the Western Shoshone, of which the Goshute Shoshone were a subgroup, and the Southern Paiute during the aboriginal period. The Western Shoshone were the main occupants of the District (see map), and occupied all three counties. The Western Shoshone traditional lands “extended from the arid reaches of Death Valley inhabited by the Panimint Shoshone, through the mountainous highlands of central Nevada into northwestern Utah, where it encompassed the area of the Gosuite [or Goshute] of Tooele and Skull valleys and Deep Creek and the “Weber Ute”” (D’Azevedo 1986:262). The Western Shoshone interacted extensively with the Southern Paiute along the southern Western Shoshone territorial boundary. The traditional lands of the Goshute Shoshone extended from Utah to eastern Nevada in White Pine County. Goshute Shoshone settlements and subsistence activities extended westerly to at least Egan Canyon in White Pine County. In southern Nevada, Southern Paiute territorial boundaries met those of the Western Shoshone in southern Lincoln County.

Aboriginal groups in the Great Basin, including the Western Shoshone, were also designated according to the dominant food resources or salient environmental features of their respective areas. In the Ely District, the Kusiutta (Goshute Shoshone), meaning “desert people or dust something” lived from the Deep Creek area east into Utah; the Pasiatekkaneen, meaning “redtop grass eaters,” occupied the Diamond and Pine valley areas; the Yuainankuhteen, meaning “south or warm side” lived west of Duckwater in Little Smoky

Valley; the Pa'anaihteen, or "people from up above," occupied Steptoe Valley; the Taintenkateen, meaning "hole" or "cave", was applied to the people in Cave Valley; and the Mahakuhaduka, named after the "eaters of Mentzelia seeds" also lived west of Duckwater in Reese River Valley (Janetski 1981:199-200 and Figure 16, citing ITCN 1976a and Steward 1938) (Woods 2003:17).

Pre-contact Western Shoshone, including subgroup Goshute Shoshone, and Southern Paiute are described as uniform cultures with only minor local variations, based entirely on hunting and gathering. The Western Shoshone hunted and gathered in family areas based on yearly cyclical migration patterns. The bands lived in widely scattered winter villages consisting of a few families, coming together for communal activities (Steward 1936). Beginning around 1827, contact with trappers and explorers resulted in the transformation of these bands from hunter/gatherers to sedentary groups living on government reserves or the outskirts of towns established within their ancestral lands (Woods 2003). With the expansion of mining and ranching interest in the 1880s and continuing displacement of the Indians from their traditional subsistence pursuits, many of the Indians formed small settlements on the outskirts of mining camps, railroad towns, and farming communities. Several reservations were established in the early 1900s. While some Indians moved to reservations located some distance from their traditional lands, most remained where they were until reservations (Indian trust lands) were created around their native settlements (Clemmer 1972, 1978). Small groups of Shoshone attached themselves to ranches and towns, subsisting on a meager standard of living, and maintaining a kind of symbiotic relationship with whites. This pattern remains to some extent to the present day, where most Shoshone have wage jobs or raise cattle in or around their traditional lands.

3.9.2 Trends

In Nevada, on the lands administered by the Ely District, vandalism, theft, visitor impacts, and natural deterioration are diminishing the cultural and scientific values of cultural resources. This degradation is occurring at an increasingly rapid rate as the population increases. Despite numerous federal laws, destruction of prehistoric and historic cultural resources continue, in part, due to a lack of understanding by the public of the true value of the resources and a lack of regular monitoring of many significant locations (http://www.nv.blm.gov/ely/prehistoric.htm). There is such a vast area of public land administered by the Ely District, that patrols by law enforcement are not effective in protecting these sites. Educating and informing the public as well as enlisting their help is one way to preserve cultural resources. Helping people to understand that cultural resource values are far greater than their material worth is the first step. Learning the importance of leaving these artifacts, no matter how small, in their original setting for both study and the future enjoyment of others is another major goal.

3.9.3 Current Management

Cultural Resources

The protection of and consideration of impacts on cultural resources is governed by numerous federal and state mandates, which include, but are not limited to, Section 106 of the National Historic Preservation Act of 1966, as amended, the Archaeological and Historic Preservation Act of 1974, Federal Land Policy and Management Act, and the Nevada State Protocol Agreement (Protocol). In accordance with these

mandates, impacts to cultural resources are mitigated by first identifying sites that may be affected by land management decisions through field inventory and then by project redesign (i.e., avoidance) or various data recovery techniques. Data recovery may include surface collection, partial or complete excavation, surface mapping, artifact and feature analysis, architectural documentation, archival research, or some combination thereof.

The BLM's cultural resources management program is a comprehensive system for identifying, protecting, planning the appropriate use of, and managing cultural resources on public lands. The program is composed of two important components: protection and utilization. The protection component is concerned with safeguarding and maintaining cultural resources for the public. Included are proactive management activities such as inventory, physical protection, stabilization, preservation, and interpretation of cultural resources along with public education. An example of a proactive activity is the "Site Steward Program," which allows the public, through volunteer efforts, the opportunity to learn more about the value of preserving cultural resources and assist the BLM in protecting, monitoring, and documenting the resources. The chief objective of the Site Steward Program is to report to the land managers the destruction, vandalism, or other degradation of cultural resources through a regularly scheduled routine of site visits. The protection component also is concerned with support of other activities so that the management and development of public lands can proceed in accordance with legal and other mandatory requirements. The utilization component is concerned with scientific research and collection management.

The following are a few of the significant cultural resource sites currently being managed under the BLM cultural resources management program:

- The White River Narrows Petroglyph Site. The White Rivers Narrows Petroglyph Site is composed of approximately 4,000 acres and contains at least 15 petroglyph sites, which offer opportunities for display, and scientific and public understanding of local aboriginal lifestyle through graphic images. A Cultural Resources Management Plan was developed for this site to provide long-term management direction for the protection, enhancement, and utilization of cultural resources within the White River Narrows Petroglyph Site location.

Pony Express Reenactment
Photo by Jake Rajala

- The Sunshine Locality National Register District. The Sunshine Locality National Register District is a preserve of more than 90 archaeological sites located within a 35,000-acre area representing an 11,000-year-old Early Archaic lake-and-marsh adapted culture known as the Western Pluvial Lakes Tradition. A long-term Cultural Resources Management Plan was developed for this site in 1987.

- Pony Express Trail. The Pony Express started on April 3, 1860, and the last trip arrived in San Francisco on November 20, 1861. Thus, the Pony Express lasted 19 months, 2 weeks, and 3 days or 19.5 months. During the month of April 1860, the Pony Express carried important communications in 10 days. The actual averages of the Pony Express for the 19.5 months were April to October, 12 to 13 days, and November to March, 14 to 16 days.

- Baker Archaeological Site. The Baker Archaeological Site has been identified as a "Puebloid" or "Fremont" site and contains at least one Fremont pithouse and possible adobe-walled storage structures, as well as chipped stone, ceramics, and other portable artifact associations. A long-term Cultural Resources Management Plan was developed for this site in 1991.

Traditional Cultural Properties

A Traditional Cultural Property can be defined generally as a place associated with cultural practices or beliefs of a living community that: 1) are rooted in that community's history and 2) are important in maintaining the continuing cultural identity of the community. Places that may be of traditional cultural importance include, but are not limited to, locations associated with the traditional beliefs of an American Indian group about its origins, cultural history, or the nature of the world; a rural community whose organization, buildings and structures, or patterns of land use reflect the cultural traditions valued by its long-term residents; or locations where American Indian religious practitioners go, either in the past or the present, to perform ceremonial activities based on traditional cultural rules or practice (Parker and King 1989).

Properties that have achieved significance only within the 50 years preceding their evaluation are not eligible for inclusion in the National Register unless "sufficient historical perspective exists to determine that the property is exceptionally important and will continue to retain that distinction in the future." This is an extremely important criteria consideration with respect to traditional cultural values. Significance ascribed to a property only in the past 50 years cannot be considered traditional. The fact that a property may have gone unused for a lengthy period of time, with use beginning again only recently, does not make the property ineligible for the National Register.

A Traditional Cultural Property is eligible for the National Register only if it meets one or more of the National Register criteria (criteria a through d). However, traditional cultural properties are almost always listed under Criterion (a) and occasionally Criterion (b) for their association with historical events or broad patterns of events. Recognizing a place as eligible for the National Register, as a Traditional Cultural Property or as anything else, does not change its significance, it merely requires that the significance and value of a property be systematically considered in planning and in consultation with those who value it.

Within the Ely District, several places of cultural value have been identified through consultation with tribal governments; however, none of the places of cultural value meet National Register eligibility criteria for traditional cultural properties. These places of cultural value may meet other criteria as significant ethnohistoric sites or they may deserve consideration under the American Indian Religious Freedom Act,

Native American Graves Protection and Repatriation Act, or Executive Order 13007. No Traditional Cultural Properties have been identified within the District after several recent and extensive efforts made to do so.

No extensive search was made to identify traditional communities other than American Indian; however, no Traditional Cultural Properties have been identified from other communities.

Identification of the places of cultural value in the District was accomplished through the application of several research components, including American Indian contacts, archival research, field reconnaissance, and oral history interviews. Western Shoshone, Goshute Shoshone, and Southern Paiute reservations, colonies, organizations, and individuals were contacted by mail and telephone. Meetings and interviews were held with representatives of the Ely Shoshone, Duckwater Shoshone, Yomba Shoshone, and Battle Mountain Shoshone; the Ibapah Goshute in Utah, the Paiute Tribe of Utah, Moapa Paiute, and American Indian individuals residing in Eagle Valley and Caliente. A total of 164 places of cultural value were identified, 119 for the Western Shoshone and Goshute Shoshone, and 45 for the Southern Paiute. Of these, 91 were from archival sources and 73 from interviews with American Indians. Of the 164 properties identified, 11 are situated outside of the District boundaries, but were included for context (Woods 2003).

3.10 Paleontology

3.10.1 Existing Conditions

Paleontological resources on public lands are recognized as constituting a fragile and nonrenewable scientific record of the history of life on earth, and so represent an important and critical component of America's natural heritage. Once damaged, destroyed, or improperly collected, their scientific and educational value may be greatly reduced or lost forever. In addition to their scientific, educational, and recreational values, paleontological resources can be used to inform land managers about interrelationships between the biological and geological components of ecological systems over long periods of time.

A variety of paleontological resources exist in the District, including plant and animal fossils occurring in Cambrian, Mississippian, Devonian, Permian, Triassic, Eocence, Miocene, and Pliocene rocks. There are several areas that have been identified as paleontologically sensitive:

Ruin Wash and Klondyke Gap. Ruin Wash is one of the few places in the world where soft-bodied animal Lower Cambrian fossils are preserved. In addition, specimens from both Ruin Wash and Klondyke Gap are scientifically important because of their completeness and excellent preservation.

Andie's Mine Trilobites. Andie's Mine contains scientifically important paleontological value. The trilobites at this location are part of the Pioche Shale Formation. This shale formation contains several different orders of trilobites.

Snake Creek Indian Burial Cave. Snake Creek is a unique paleontological deposit. The cave is the first natural trap excavated in the Great Basin and one of the few localities describing a valley-bottom community. The recovery of extinct camel and horse, in addition to radiometric dates, indicates at least some of the deposits to be of late Pleistocene age.

The Elderberry Canyon Local Fauna. The Elderberry Canyon Local Fauna is the first Eocene mammalian fauna reported from the Great Basin and occurs in carbonate rocks occurring in the Sheep Pass Formation near Ely. The Elderberry Canyon Local Fauna includes over 40 taxa of vertebrates, more than 30 of which are mammals.

3.10.2 Trends

Vertebrate fossils such as dinosaurs, mammals, fishes, and reptiles, and uncommon invertebrate fossils are collected by trained researchers under BLM permit. Collected vertebrate fossils and uncommon invertebrate fossils remain the property of all citizens of the U.S. and are placed in museums or other public institutions after they are studied.

Common invertebrate fossils such as plants, mollusks, and trilobites are collected for personal use in reasonable quantities, but may not be bartered or sold. There is no permit system established for invertebrate fossil collecting. This has led to illegal commercial collecting of trilobites and people collecting

far more than is considered “reasonable quantities” of trilobites for personal use, both of which impact paleontological resources (see Section 2.5.10).

The demand for use of both vertebrate and invertebrate fossils has increased over the years and is expected to increase in the future. Casual use and collection of invertebrate fossils by “rockhounds” and fossil collectors has contributed to the loss of the resource and its research potential and interpretation.

3.10.3 Current Management

Paleontological resources are managed on public lands because they are nonrenewable resources of value to scientists, educators, hobbyists, commercial collectors, and other members of the public. Without protection, the resources may be intentionally or unintentionally damaged or destroyed, causing valuable information to be lost. Currently, trained researchers collect and study vertebrate fossils and uncommon invertebrate fossils under BLM permit. These fossils are then placed in a museum or other public institution. No permit is necessary for the collecting of common invertebrate fossils.

The BLM paleontological resource protection program includes: identifying and evaluating paleontological resources so they may be adequately addressed in planning and environmental analysis documents; maintaining and conducting an effective and continuing protection program; increasing the awareness of federal land managers and the public regarding the significance of paleontological resources and management requirements; encouraging public participation in resource management; avoiding or mitigating impacts to valuable paleontological resources; avoiding publicizing the exact locations of scientifically significant paleontological resources; and, managing and issuing collection permits when appropriate (BLM 1998).

3.11 Visual Resources

3.11.1 Existing Conditions

Important visual resources are visually sensitive use areas where the maintenance of the surrounding visual environment affects the people's enjoyment of using an area, or are unique or unusual landscapes having natural scenic value. Landscapes in which viewers may travel, recreate, or reside, or where existing views may potentially be affected by the actions defined in the alternatives are included in the definition of visually sensitive areas.

The planning area currently varies from a predominantly undisturbed natural setting with occasional dirt and asphalt roads to the visually dominant, disturbed area of the existing Robinson Mine.

Clear skies with broad, open landscapes characterize the regional landscape setting of the Ely District. The area is characteristic of the mid- to high-elevation areas of the western U.S., with rolling hills and broad valleys. The vegetation has a contrasting pattern of pinyon-juniper forests intermixed with sagebrush and grasses. This type of landscape allows for long viewing distances. Consequently, maintenance of visual resources is a concern from nearby and distant viewing locations, including views from federal lands with high visual resource values, federally designated wilderness areas, recreation areas, major transportation routes, and population centers.

3.11.2 Trends

Sensitivity of the public to visual resources within the District has increased over time. An increase in population growth within and adjacent to the District has lead to concerns over preserving the viewsheds around communities. A desire to preserve viewsheds along historic trails also has been expressed. Additionally, scenery is a draw to tourism and backcountry recreation, which has led to increased concerns over preserving visual resources (see Section 2.5.11).

3.11.3 Current Management

Visual resources currently are managed following existing visual resource management manuals and guidance. Areas within the District without existing Visual Resource Management classes are managed using interim Visual Resource Management objectives where a project is proposed. BLM managers could use discretion in applying standards to various land use proposals and grant exceptions where warranted by the public interest or valid development rights.

The BLM is responsible for ensuring that the scenic values of public lands on the District are considered before allowing surface-disturbing uses that may have negative visual impacts. Visual design considerations are being incorporated into the permit requirements, as applicable, for all surface-disturbing projects. This is accomplished through the use of the Visual Resource Management system, which involves inventorying scenic values and establishing management objectives for those values. Once management objectives are established, proposed surface-disturbing activities are evaluated to determine if they conform with the

management objectives. Different levels of scenic values require different levels of management. Management of an area with high scenic values may focus on preserving the existing character of the landscape, while management of an area with little scenic value may allow major modifications to the landscape.

Visual Resource Management classes were developed for BLM-administered lands in the Schell and Caliente districts through an inventory process (**Map 2.4-4**). The inventory process consists of a scenic quality evaluation, sensitivity level analysis, and a delineation of distance zones. The area's visual resources then were assigned to management classes with established objectives. Visual resource management in the Egan District is performed on a case-by-case basis.

The Visual Resource Management system provides a way to identify and evaluate scenic values to determine the appropriate levels of management during land use planning. The Visual Resource Management system recognizes the classes identified below. Each management class portrays the relative value of the visual resources and serves as a tool that describes the visual management objectives.

Class I Objective: To preserve the existing character of the landscape. The level of change to the characteristic landscape should be very low and must not attract attention. Class I is assigned to those areas where a management decision has been made previously to maintain a natural landscape such as designated scenic areas.

Class II Objective: To retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer.

Class III Objective: To partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract the attention but should not dominate the view of the casual observer.

Class IV Objective: 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 and may dominate the view and be the major focus of viewer attention.

Another key component of establishing Visual Resource Management classes is evaluating visual sensitivity. Visual sensitivity evaluates the amount of use an area receives and the viewers' expressed attitudes toward what is seen. This data is used to delineate areas as having high, moderate, or low concerns for changes in scenic quality and for prevention of visible change in the landscape. Areas identified as sensitive include known travel routes, areas of human habitation, areas of traditional use, and special areas.

Once visual resource classes and objectives are established, the analysis stage is used to determine whether the potential visual impacts from proposed surface-disturbing activities will meet the management objectives established for the area. A visual contrast rating process is used for this analysis, which involves

comparing the project features with the major existing landscape features using the basic design elements of form, line, color, and texture.

3.12 Lands and Realty

3.12.1 Existing Conditions

Approximately 82 percent of the District is under federal ownership and is administered by the BLM. The BLM administers approximately 4.44 million acres of public land within White Pine County, 1.34 million acres of public land in Nye County, and approximately 5.62 million acres of public land in Lincoln County. Additional land within the District is administered by other agencies including the U.S. Forest Service, Department of Defense, U.S. Fish and Wildlife Service, Bureau of Indian Affairs, National Park Service, and various state agencies. Blocks of private land tend to be concentrated within the valleys and around communities within the District. Land ownership within the District is presented on **Map 3.12-1**.

Airport Leases

There are currently three existing airport leases within the Ely District. The details of these airport leases and the associated acreage is provided on **Table 3.12-1**.

Recreation and Public Purposes

Table 3.12-2 provides the public lands leased or disposed of on the District under the Recreation and Public Purpose Act.

Disposals

The Egan RMP (BLM 1986), the Schell Management Framework Plan (MFP) (BLM 1981), the Caliente MFP, and the Desert Tortoise Amendment to Caliente MFP (BLM 2000) identified a total of 88,354 acres of public land remaining for disposal (37,297 acres from the Egan RMP; 35,558 acres from the Schell MFP; 12,073 acres from the Caliente MFP; and 3,426 acres from the Desert Tortoise Amendment to the Caliente MFP. **Table 3.12-3** provides the locations of the remaining lands available for disposal.

Acquisitions

Acquisitions of non-federal lands within the District have been limited to three easements for a cattleguard, a fence, and a spring development with enclosure.

Withdrawals

The District contains five existing withdrawals and two pending withdrawals subsequent to the existing land use plans. These withdrawals are presented in **Table 3.12-4** and include the administering agency, acreage, and purpose.

Table 3.12-1
Existing Airport Leases

Purpose	Acreage
White Pine County Airport located north of Ely	598
Alamo Airport located west of Alamo	633
The Long Now Foundation landing strip located in Spring Valley east of Ely	120
Total Acreage	**1,351**

Table 3.12-2
Summary of Existing Recreation and Public Purpose Act Patents and Leases from 1981 to Present

Purpose	Acreage
Existing Leases	
Charcoal Ovens State Park	520
Pleasant Valley School Lease	40
Lund School Lease	40
Total Acreage	**600**
Existing Patents	
Pioche School	10
White Pine County School District	40
Lincoln County Fairgrounds	60
White Pine County Shooting Range	580
Nevada Division of State Land, Horse and Cattle Honor Camp	15
Nevada Division of State Land, Nevada State Prison	1,059
White Pine County Commissioners, Baker Cemetery	3
Nevada Department of Wildlife, Key Pittman Wildlife Management Area Expansion	5
University of Nevada, Reno, Great Basin College	60
Lincoln County Solid Waste Disposal Site	80
Nevada Department of Transportation, Panaca Maintenance Station	17
Total Acreage	**1,929**

Table 3.2.1-2
Remaining Lands Identified for Disposal in Previous Land Use Plans
Subject to the Federal Lands Transaction Facilitation Act (Baca Bill)

Legal Description		Acres
T.16 N., R.63 E., Section	1, Lots 5-20, S½SE¼, S½NE¼	240
	9, Lots 9, 10, 15,	108.34
	12, E½,	320
	13, E½SE¼, NW¼SW¼, SW¼NW¼,	160
	16, Lots 1-5,	175.60
	23, SE¼, E½SW¼,	240
	24, W½SW¼, E½NE¼,	160
	25, W½,	320
	26, All	640
	27, E½SE¼NE¼, E½SE¼	100
	34, E½,	320
	35, S½NW¼, NW¼NW¼, NE¼,	280
	36, W½SE¼, SW¼, NW¼, SW¼NE¼,	440
T.17 N., R.63 E., Section	15, SE¼SE¼, NE¼NW¼, NW¼NE¼,	120
	16, SE¼NE¼,	40
	21, SE¼,	160
	22, E½E½,	160
	34, Lots 1-4, W½E½SW¼NW¼, W½SW¼NW¼, N½NW¼NW¼, E½NW¼, NE¼NW¼,	245.28
T.15N., R.64 E., Section	6 E½W½,	152.74
T.17N., R.64 E., Section	5 SE¼,	160
	7 E½SW¼.	80
	8 Lots 1-8, NW¼SW¼, SE¼SW¼.	416.26
T.20N., R.64E., Section	28 All,	640
	29 All,	640
	32 SE¼, E½NE¼,	240
	33 All,	640
T.21N., R.64E., Section	5 All,	641.2
	6 All,	635.79
T.22N., R.64E., Section	29 All,	640
	30 All,	632.9
	31 All,	634.4
	32 All,	640
T.1N., R. 67E., Section	9 W½SW¼SW¼,	20
T.14N., R.71E, Section	30 Lots 3, 5, 6, SE¼NW¼SE¼NW¼, N½NW¼SE¼NW¼,	24.58
T.4N., R.69E., Section	3 SW¼, (within)	14.9
	10 S½NE¼, (within)	9.5
T.2S., R.67E. Section	14 NW¼SE¼, NE¼NE¼SW¼,	70
	23 NE¼NE¼,	40
	24 N½NW¼SW¼,	20
	TOTAL ACRES	**11,141.49**

Table 3.12-4
Existing, Pending, and Proposed Withdrawals Within the District

Administering Agency	Description	Purpose	Acreage
Existing Withdrawals			
BLM	Sacramento Pass Recreation Area	Withdrawn from surface entry and mining, but not from leasing under the mineral leasing laws.	465
BLM	Pony Springs Fire Station	Withdrawn from all forms of appropriation under the public land laws, including the mining laws, but not from leasing under the mineral leasing laws.	10
BLM	Gap Mountain Recreation Site	Withdrawn from settlement, sale, location, or entry under the general land laws including the mining laws, but not from leasing under the mineral leasing laws.	105
U.S. Fish and Wildlife Service	Desert National Wildlife Refuge	Withdrawn from all forms of appropriation under the public land laws, including the mining laws, but not from leasing under the mineral leasing laws.	3,270
National Park Service	Baker Administration Site	Withdrawn from all forms of appropriation under the public land laws, including the mining laws, but not from leasing under the mineral leasing laws.	80
Total			**3,930**
Pending Withdrawals			
BLM	Ash Springs Recreation Area	Withdraw from all forms of appropriation under the public land laws, including the mining laws, but not from leasing under the mineral leasing laws.	73
U.S. Fish and Wildlife Service	Ruby Marshes inholding acquisition	Withdraw from all forms of appropriation under the public land laws, including the mining laws, but not from leasing under the mineral leasing laws.	640
Total			**713**
Proposed Withdrawals			
BLM	Entrance area from Baker to Great Basin National Park		4,541
BLM	Murry Springs Watershed Protection		2,450
BLM	BLM (Caliente) Administrative Site		3
Total			**6,994**

Rights-of-Way

There are 13,141 rights-of-way on the District. The majority of these rights-of-way grants have been issued for powerlines and roads. Other rights-of-way on the District include fiber optic lines, state highway material sites, U.S. highways, interstate highways, water pipelines, irrigation ditches, etc.

There are four major right-of-way corridors on the District: the Moapa corridor, the Falcon to Gonder corridor, and the Southwest Intertie Project corridor, and an additional corridor designated as part of the Calente MFP and Desert Tortoise Amendment (see **Map 3.12-2**). The Moapa Corridor is a 0.5-mile-wide

corridor connecting a designated corridor on the Moapa Reservation and running northeast to the Nevada-Utah state line. The Falcon to Gonder corridor is a 165- to 185-mile-long 345-kilovolt electric transmission line connecting the Falcon substation north of Dunphy, Nevada, with the Gonder substation north of Ely, Nevada. Although no specific width had been established in previous land use planning efforts, the existing right-of-way is currently 160 feet wide. Approximately 38.9 miles of this corridor are within the Ely District. The Southwest Intertie Project corridor is a 0.5-mile-wide corridor. It begins in the Ely District at the White Pine and Elko County line on U.S. Highway 93 and follows U.S. Highway 93 south to the Lincoln-Clark County line. The Ely to Delta portion of the Southwest Intertie Project corridor begins at the Robinson Summit substation and continues east in an existing corridor to a new substation near Delta, Utah.

Additionally, a corridor designated as part of the Caliente MFP and Desert Tortoise Amendment is present on the District. This corridor is 1,000 feet wide, 500 feet on centerline of an existing fiber optic line beginning in Township 11 South, Range 71 East, Section 30, running easterly to the Arizona stateline. This corridor crosses portions of the Beaver Dam Slope ACEC.

Communication Sites

The BLM is responsible for permitting communication sites located on BLM-administered public lands on the District. Communication sites typically consist of systems used for transmission or reception of radio, television, telephone, telegraph, and other electronic signals, as well as other means of communication. Facilities found on communication sites usually include a building, a tower, and other related authorized incidental improvements. Communication sites permitted on the District consist of two-way mobile radio sites, microwave towers, television translators, cellular telephone towers, wireless internet sites, and military aircraft tracking systems.


Communication Site
Photo by Doris Metcalf

There are 36 communication sites on the District. These sites are listed in **Table 3.12-5** and shown on **Map 3.12-3**.

Unauthorized Occupancy, Use, and Development

Unauthorized occupancy, use, and development has not been a high-priority issue on the District. Unauthorized occupancy typically consists of encroachments of buildings, yards, or fencelines, which have been in place for a number of years. These encroachments generally are discovered during survey projects.

The majority of trespasses have been agricultural. Additional unauthorized uses include residential/occupancy, and developments including fencelines, buildings, roads, and water wells. Resolution of unauthorized use is on a case-by-case basis and usually includes the issuance of temporary land use permits, lease or right-of-way issuance, disposal of the encroached land through sale, or the removal of the unauthorized use.

Table 3.12-5
Communication Sites on the Ely District

Land Use Plan	Site Name
Schell MFP	Worthington Peak
	Seaman Range
	Golden Gate
	Mount Irish
	Connors Pass
	Domingo
	Kern Mountain
	Spring Valley
	Sacramento Pass
	Stateline
	Mount Wilson33
Egan RMP	Cherry Creek
	Duck Creek
	Squaw Peak
	Kimberly Peak
	Saxton Peak
	Currant
	Duckwater
	Big Bald Mountain (Pending)
	Cherry Creek (Fortymile Knoll) (Pending)
Caliente MFP	Highland Peak
	Caliente
	Chokecherry
	Ella Mountain
	Black Mountain
	Delamar Mountain
	Leith Peak
	Mormon Mesa
	Kane Springs
	Alamo East
	Red Flag West #1
	Pahranagat Valley Television District East
	Gap Peak
	Alamo West
	Pahranagat Valley Television District West
	East Remote
	West Remote
	Burnt Springs (Pending)
	Tempaiute (Pending)

Land Use Authorizations

Land use permits are used to authorize uses of public lands that do not exceed 3 years and involve little or no land improvement, construction, or investment. This land use authorization does not convey ownership of the land and may be renewed or revoked at the discretion of the BLM. Land use authorizations include film permits, advertising displays, commercial or non-commercial croplands, apiaries, livestock holding or feeding areas not related to grazing permits and leases, harvesting of native or introduced species, temporary or permanent facilities for commercial purposes (does not include mining claims), residential occupancy, ski resorts, construction equipment storage sites, assembly yards, oil rig stacking sites, mining claim occupancy if the residential structures are not incidental to the mining operation, and water pipelines and well pumps related to irrigation and non-irrigation facilities. Land use authorizations may be either permits, which are less than 3 years or leases, which can be for longer than 3 years and can involve a substantial investment in the land. Currently, there is one land use lease for occupancy and one land use lease for agricultural.

3.12.2 Trends

Changes in ownership and administration of BLM public lands are largely dictated by external public and agency demands in the form of applications for rights-of-way for a variety of infrastructure uses by private interests, land disposals for public uses, and congressional and executive branch acts that authorize federal land sales and withdrawals. In turn, these external demands are driven by regional and national economic development initiatives. While not comprehensive, the following are three major influences on existing and future administration of public lands in the Ely District:

- Expansion of Las Vegas and Mesquite. The increases in the population of Las Vegas and Mesquite have resulted in increased demand for water and energy supplies, as well as increased use of public lands within driving distance of these urban and residential centers. To meet future water requirements, it is anticipated that Las Vegas utilities will seek underground water supplies on public lands. New water pipelines and electrical transmission lines, requiring new rights-of-way, will be needed to pump and convey water to the city. There will likely be an expanded demand for developed and dispersed recreation opportunities to meet the demands of a larger population. These demands may be met through additional land disposals, and improvements in campgrounds and other public faculties.

- Energy, telecommunications, and transportation infrastructure expansions. The Ely District is crossed by large interstate natural gas pipelines, electrical transmission lines, and fiber optic telecommunication lines (see discussion of utility corridors). As demand for energy increases on the west coast of the U.S., it is likely that more pipeline and electrical generation transmission projects will be proposed to meet future demands. These facilities will likely require rights-of-way for generation sites, and new rights of way for linear project components. It also is likely that state highway and county road improvements will be made to improve access between rural communities and the Las Vegas metropolitan area. An example is a proposed new highway segment between Caliente in Lincoln County and Mesquite in Clark County.

- Minerals and oil and gas development. As discussed in Section 3.18, Geology and Mineral Resources, the Ely District has historically been an important source of minerals and energy resources. While the current levels of mineral and oil and gas activity are relatively low, constraints on world supplies of minerals and energy may make the known and potential new reserves economically viable for development in the near future. New or renewed mineral development would create new needs for roads, and electrical power.

- Renewable Energy. See Section 3.13.2.

3.12.3 Current Management

While the overall direction for management of public lands is contained in existing land use plans and the statutory requirements of the Federal Land Policy and Management Act of 1976, there are several federal legislative acts and executive orders that may be implemented to change land ownership and status within the Ely District. The different types of land transfers and federal administrative actions are discussed below:

- Airport Patents. As part of the Airport and Airway Improvement Act of 1982, the BLM can convey lands under their jurisdiction to public agencies for use as airports and airways.

- Recreation and Public Purposes Act. The Recreation and Public Purposes Act (43 Code of Federal Regulations 2912 and 2740) provides for the lease or conveyance, respectively, of public land to states or their political subdivisions, and to nonprofit corporations and associations, for recreational and public purposes. Public purpose is defined as providing facilities or services for the benefit of the public in connection with, but not limited to, public health, safety, or welfare.

  The use of public lands or facilities under the Recreation and Public Purpose Act for habitation, cultivation, trade, or manufacturing is permissible only when necessary, integral, and an essential part of the public purpose.

- Disposals. Public land on the District may be disposed of under a variety of authorities. Disposals administered by the BLM include Recreation and Public Purpose Act disposals, Desert Land Entry disposals, disposals under the Carey Act, Airport Conveyance disposals, Indian Allotment disposals, and sales under the Federal Land Policy and Management Act.

- Withdrawals. Withdrawals are formal actions that accomplish one or more of the following actions:

  - Transfers total or partial jurisdiction of federal land between federal agencies.
  - Segregates federal land to some or all of the public land laws and mineral laws.
  - Dedicates land for a specific public purpose.

- Airport Leases. Airport leases are authorized as part of the Act of May 24, 1928. There are currently three existing airport leases within the Ely District. The details of these leases and the associated acreage are provided in **Table 3.12-1**.

Withdrawals consist of three major categories: 1) Congressional Withdrawals, 2) Administrative Withdrawals, and 3) Federal Energy Regulation Commission Withdrawals.

1. Congressional Withdrawals. These are legislative withdrawals designated by Congress in the form of public laws.

2. Administrative Withdrawals. These are withdrawals made by the President, Secretary of the Interior, or other authorized officers of the executive branch of the Federal Government.

3. Federal Energy Regulation Commission Withdrawals. These are withdrawals for power projects established under the authority of Section 24 of the Federal Power Act of 1920. These withdrawals are automatically created upon filing an application for power development until otherwise directed by the Federal Energy Regulation Commission or by Congress.

- Rights-of-way. A right-of-way grant is an authorization to use a specific piece of public land for specific facilities for a defined period of time. The majority of rights-of-way granted by the BLM are authorized under one of the following: 1) Title V of the Federal Land Policy and Management Act (43 U.S. Code 1761-1771); 2) the Mineral Leasing Act (Section 28 of the Mineral Leasing Act of 1920, as amended, 43 U.S. Code 185); and 3) other laws/authorities not repealed by the Federal Land Policy and Management Act. Under the Federal Land Policy and Management Act, the BLM can issue rights-of-way grants for electrical power generation, transmission and distribution systems, communication systems, highways, railroads, pipelines (other than oil and gas pipelines), and other facilities or systems, which are in the public interest. Additionally, rights-of-way grants can be issued for renewable energy projects such as wind energy developments, biomass utilization, and solar energy projects. Detailed discussions on renewable energy on the District are presented in Section 3.13. Under the Mineral Leasing Act, the BLM can issue rights-of-way grants for oil and natural gas gathering, distribution pipelines and related facilities, and oil and natural gas transmission pipelines and related facilities.

- Acquisitions. In managing the 264 million acres of public lands under its jurisdiction, the BLM provides for acquisition, use, disposal, and adjustment of land resources; determines the boundaries of federal land; and, maintains historic records for these ownership transactions.

  Acquisition, through exchange, purchase, and donation is an important component of the BLM's land management strategy. The BLM acquires land and easements in land, when it is in the public interest and consistent with approved land use plans. The BLM's land acquisition program is designed to:

  - Improve management of natural resources through consolidation of federal, state, and private lands.
  - Increase recreational opportunities and preserve open space.
  - Secure key property necessary to protect endangered species and promote biological diversity.
  - Preserve archaeological and historical resources.
  - Implement specific acquisitions authorized by Acts of Congress.

- Exchange

  Public lands may be exchanged by the BLM for lands owned by corporations, individuals, states or local governments. Exchanges are only pursued with willing landowners. The lands to be exchanged must be of equal value and located within the same state. Through exchanges, non-federal parties can acquire lands with commercial, industrial, residential, or agricultural development or economic potential. In turn, the federal government acquires lands offering public recreation, open space, wildlife, and resource values.

- Purchase

  The purchase of lands or interests in lands, such as easements and water rights, can be accomplished within a few months if funding is available, and if there are no title defects, hazardous materials, or other mitigating local issues.

- Easements for Conservation, Access Roads, Trails, and Improvements

  Easements allow the government to control certain rights on private property that usually involve access or development. The lands remain in private ownership with limited rights owned by the government.

- Donation

  These lands are generally accepted as a gift to the U.S. if the lands are contiguous to and “block-up” existing public lands and the need for public ownership is identified in land use plans.

3.13 Renewable Energy

3.13.1 Existing Conditions

As a directive under the National Energy Policy report (May 2001), the BLM is required to assess the potential for renewable energy on public lands and to identify any limitations to access these resources. By incorporating this information during the land use planning process, an accelerated process for future renewable energy applications would be provided and the amount of environmental review needed for individual applications would potentially be reduced by addressing environmental issues in the land use plans. Additionally, the Nevada State renewable portfolio law (Nevada Senate Bill 372) requires utilities to buy no less than 15 percent of their power from renewable energy sources by 2013.

The BLM and the Department of Energy National Renewable Energy Laboratory have established a partnership to assess renewable energy resources on public lands in the western U.S. Through this assessment, BLM planning units were evaluated for renewable resource development potential and reported in assessing the potential for renewable energy on public lands (BLM 2003). The renewable resources evaluated in the Ely District include biomass utilization, solar, and wind energy.

Biomass Utilization

Biomass utilization is the use of woody by-products from activities such as ecological restoration and fuels reduction. These by-products can be utilized through harvest, sale, trade, wood product production, and bio-energy (BLM 2003). Bio-energy utilization is the use of the woody material generated through restoration or treatment activities to generate power in specialized power plants. As restoration and fuels reduction projects continue, the biomass material generated represents a long-term source of renewable energy.

Biomass technology is currently being used in the Ely District for heating one of the White Pine County schools. Retrofitting other schools in White Pine County is being considered.

The restoration and maintenance of healthy ecological systems within watersheds is a primary focus for the future management of the Ely District. Healthy ecological systems are geographically diverse and change over time. They are compatible with soil potential and are resilient to disturbance.

Resources and resource uses would be managed to restore or maintain ecological health. Certain resource management changes and active treatments may need to be implemented, in portions of watersheds, to accomplish this objective. Adaptive management would be pursued to avoid deteriorating conditions favoring invasive plants and catastrophic fires. Any projects would be implemented so as to result in a mosaic of vegetation within a watershed.

In the long term, natural disturbance (such as drought or fire) would occur and fewer treatments would be needed to maintain ecological health. The result would be a variety of vegetation phases within a watershed, which would provide diverse, healthy conditions for future generations.

Solar Energy

Solar energy is the conversion of sunlight into electrical power through the use of specialized solar panels. This technology uses solar light to provide heat, light, hot water, and electricity for homes, businesses, and industry. There are a variety of solar energy technologies including photovoltaic (solar cell) systems, concentrating solar systems, passive solar heating and daylighting, solar hot water, and solar process heat and space cooling.

Currently, solar energy power is being used for project-specific locations such as communication sites and spring boxes in the Ely District. There have not been applications submitted for proposed projects in the District.

Wind Energy

Wind energy is the conversion of wind currents into electrical or mechanical power through the use of turbines. Wind energy is considered the world's fastest growing energy source (BLM 2003b). A major benefit of wind energy is that wind is a free, renewable resource.

Currently, wind energy developments are not present in the District. However, development of wind energy projects would be conducted in accordance with the BLM Interim Wind Energy Development Policy Instruction Memorandum 2003-020 (BLM 2003).

3.13.2 Trends

From 2000 to the end of 2002, wind energy capacity in the U.S. has risen from 53 megawatts to 4,660 megawatts. No existing wind energy developments are present in the Ely District. However, since 2000, four anemometer permits have been authorized and eight permits for anemometer testing are currently pending. There are seven project sites identified with anemometers in the District. As the BLM reduces limitations to renewable resource development and utility companies strive to be in compliance with the Nevada renewable portfolio law, it is anticipated that applications for renewable energy projects would increase.

Concentrating solar power technologies currently offer the lowest-cost solar electricity for large-scale power generation (10-megawatt-electric and above). Current technologies cost around $3 per watt or 12¢ per kilowatt-hour of solar power. New innovative hybrid systems that combine large concentrating solar power plants with conventional natural gas combined cycle or coal plants can reduce costs to $1.5 per watt and drive the cost of solar power to below 8¢ per kilowatt-hour. Advancements in the technology and the use of low-cost thermal storage will allow future concentrating solar power plants to operate for more hours during the day and shift solar power generation to evening hours. Future advances are expected to allow solar power to be generated for 4¢ to 5¢ per kilowatt-hour in the next few decades.

Researchers are developing lower cost solar concentrators, high-efficiency engine/generators, and high-performance receivers. The goal is to further develop the technology to increase acceptance of the systems and help the systems penetrate growing domestic and international energy markets.

The southwestern U.S. can benefit from the use of these systems. Because the Southwest gets up to twice as much sunlight as the rest of the country, many southwestern states (California, Nevada, Arizona, and New Mexico) are exploring the use of concentrating solar power, especially for use in public utilities.

The Department of Energy analysts predict the opening of specialized niche markets in this country for the solar power industry between 2005 and 2010. The Department of Energy estimates that by 2005, there will be as much as 500 megawatts of concentrating solar power capacity installed worldwide. By 2020, more than 20 gigawatts of concentrating solar power systems could be installed throughout the world.

3.13.3 Current Management

Currently, applications for renewable energy testing, specifically anemometer sites, are handled on a case-by-case basis by the BLM-administered lands and realty program. Although no proposals for development of renewable resources have been received to date, management of these projects would be performed on a case-by-case basis using an interdisciplinary approach. Additionally, in anticipation of increasing renewable energy development in the western U.S., the BLM is in the process of preparing a Programmatic EIS to evaluate issues associated with wind energy development on western public lands, excluding Alaska (BLM 2003b).

3.14 Travel Management and Off-highway Vehicle Use

3.14.1 Roads

Existing Conditions

The majority of access on the District is accomplished informally. However, reasonable access is made for permitted uses such as mining claims, mining uses, mineral leases, grazing, recreation, rights-of-way, and other specific uses.

The BLM maintains 2,264 miles of roads on the District per year. Within the District, the counties maintain a total of 2,313 miles of roads per year. The BLM and counties cooperatively maintain an additional 77 miles of roads.

Trends

One of the most important trends observed for travel management in the District has been an increase in informal travel route proliferation. This increase mainly is due to recreation use, and can be correlated to increases in population and off-highway vehicle use. In Nevada, there has been a 184 percent increase in off-highway vehicle use between 1998 and 2003.

Current Management

Road system management by the BLM on the District is variable. Priorities for road maintenance are determined on a case-by-case basis and are dependent on a variety of factors including budget, emergency situations, access, weather, and whether or not the road leads to facilities. Roads on the District are maintained according to the following maintenance levels described in the BLM Facility Inventory Maintenance Management System:

- Level 1 – Roads where minimal maintenance is required. These roads are no longer needed and therefore closed to traffic. The objective is to remove these roads from the transportation system. Maintenance consists of maintaining drainage and runoff patterns only. Grading, brushing, or slide removal is not performed unless drainage is affected, causing erosion.

- Level 2 – Roads that are open for limited administrative traffic only. These roads are typically passable by high-clearance vehicles. Maintenance consists of maintaining drainage structures. Grading is only conducted to correct drainage issues and brushing is conducted to allow administrative access. Slides may be left in place if they do not adversely affect drainage.

- Level 3 – Roads where management objectives require the road to be opened seasonally or year-round for commercial, recreation, or high-volume administrative access. These roads are natural or aggregate-surfaced and have a defined cross-section with drainage structures. Maintenance consists of

maintaining drainage structures, performing grading, and brushing. Slides affecting drainage have a high priority for removal.

- Level 4 – Roads where management objectives required the road to be open year-round and to connect major features, such as recreation sites, local road systems, or administrative sites, to county, state, or federal roads. The entire roadway is maintained, and a preventative maintenance program may be established as needed. Problems are repaired as discovered. These roads may be closed or have limited access due to snow conditions.

- Level 5 – Roads where management objectives require the road to be open all year. These roads are the highest traffic volume roads in the transportation system. The entire roadway is maintained and a preventative maintenance program is established. Problems are repaired as discovered. These roads may be closed or have limited access due to snow conditions.

New roads may be constructed by the BLM or by a permittee in connection with a project occurring on public land such as a mineral lease or right-of-way. Over the past 20 years, approximately 520 authorized roads, totaling 650 miles, have been constructed in the District.

3.14.2 Off-highway Vehicles

Existing Conditions

Off-highway vehicle use on the District typically is associated with recreation, hunting and fishing, and livestock and range management. Off-highway vehicle access to public land varies across the District. Public land on the District is currently designated as open for vehicle use, limited to designated roads, or closed to use. In an open area, all types of vehicle use are permitted and are not restricted. In a limited area, vehicle use is restricted to certain times, to certain areas, to designated routes, to existing routes, or to specified vehicle uses. In a closed area, motorized vehicle use is restricted at all times.

Trends

Off-highway vehicle use has rapidly increased on the District. Off-highway vehicle use is not only limited to recreational use, but also has become a preferred mode of transportation for other activities such as hunting, fishing, camping, ranching, mining, and wood cutting. Based on this trend, off-highway vehicle use is increasing across the entire District. A large amount of critical desert tortoise habitat and dust abatement regulations in Clark County have limited opportunities for off-highway vehicle use in the Las Vegas District, which has displaced off-highway vehicle users to the Ely District. Another off-highway vehicle trend on the Ely District has been an increase of intensive off-highway vehicle use around communities.

Off-highway vehicle race events occur on the District as well. These events currently are limited to courses for which a NEPA analysis has been completed. Recreation locations with high off-highway vehicle use on the District include Duck Creek Basin, Chief Mountain, and other destination locations with developed facilities.

Current Management

Off-highway vehicle activities in the Ely District are managed under the National Management Strategy for Motorized Off-highway Vehicle Use on Public Lands (BLM 2001). This guidance is an effort to manage off-highway vehicle activities in compliance with applicable executive orders (11644 [1972] and 11989 [1978]) and regulations (43 Code of Federal Regulations 8340). Off-highway vehicle race events on the District are managed under Special Recreation Permits. Special Recreation Permits are discussed in Section 3.15, Recreation.

3.15 Recreation

3.15.1 Existing Conditions

During 2004, there were an estimated 271,000 visitor days to public land on the District. Recreational activities on the District typically consist of casual and dispersed uses including off-highway vehicle use, hunting, fishing, camping, cross-country skiing, horseback riding, caving, geocaching, rock climbing, mountain biking, and cultural tourism (BLM 2003). Currently, there are no fee-use areas on the District. There are currently 24 outfitter and guide permits issued within the District.

Cross County Skiing
Photo by Jake Rajala

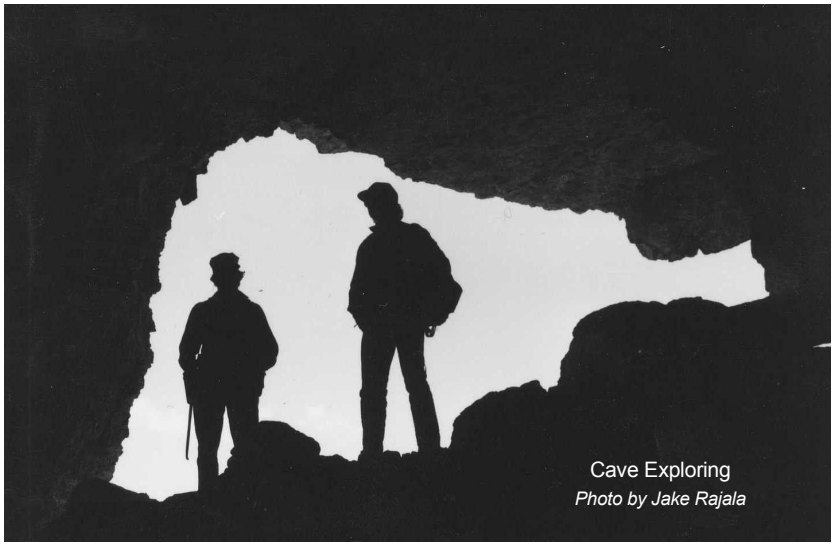
3.15.2 Trends

The number of recreation visits to the Ely District has been increasing. These increases in recreation can be attributed to population growth within the District and a reduction in the availability of primitive recreational experiences similar to those found on the Ely District. Another trend that has been observed is an increase of extreme activities. Activities such as rock climbing, bouldering, mountain biking, and caving have increased in popularity throughout the western U.S, and are increasing on the Ely District as well. Off-highway vehicle use, which also is a major recreational activity, is discussed in Section 3.14, Travel Management and Off-highway Vehicle Use.

3.15.3 Current Management

Recreation on the District is managed through the designation of Special Recreation Management Areas and Extensive Recreation Management Areas. A Special Recreation Management Area is an area where more intensive recreation management is needed, where a commitment has been made by the BLM to provide specific recreation activity and experience opportunities, and where recreation is a principal management objective. An Extensive Recreation Management Area includes all BLM-administered lands outside the Special Recreation Management Areas, and may include developed and primitive recreation sites with minimal facilities. The Loneliest Highway Special Recreation Management Area is located along U.S. Highway 50 on the District. This Special Recreation Management Area contains some of the most popular destinations on the District including Illipah Reservoir, Cold Creek Reservoir, Garnet Hill Rockhounding Area, and the Pony Express Trail. The management objectives of the Special Recreation Management Area are to provide recreational opportunities to the public that would otherwise not be available, reduce conflict among users, minimize damage to resources, and reduce visitor health and safety issues. The remainder of the District is broken into three Extensive Recreation Management Areas: the Schell Extensive Recreation Management Area (4.24 million acres), Egan Extensive Recreation Management Area (3.82 million acres), and Caliente Extensive Recreation Management Area (3.5 million

acres). Recreational use within these Extensive Recreation Management Areas typically include hunting, fishing, camping, sightseeing, wildlife viewing, as well as numerous other recreational opportunities. Management actions within Extensive Recreation Management Areas primarily are limited to providing basic information and access to the public. Visitors to Extensive Recreation Management Areas are expected to rely on their own skill, knowledge, and equipment when participating in recreational activities.



Cave Exploring
Photo by Jake Rajala

The role of the BLM is to provide a wide spectrum of recreational opportunities, while maintaining the character of the land through minimizing development. The majority of recreation sites on the District are used as both specific destinations and as staging areas for dispersed recreation. Recreation sites on the District are classified as developed, primitive, or dispersed. Developed recreation sites are sites that provide facilities such as picnic tables, pit toilets, and informational signs and are easily accessible. Primitive recreation sites are indicated on maps but do not have developed facilities. Dispersed recreation sites usually have informal fire rings, and camp areas. Dispersed recreation sites do not have any developed facilities. These sites are not indicated on maps and usually are used as an access point for other forms of recreation such as hunting or fishing. Access to dispersed recreation sites can vary from easy to difficult. There are eleven developed and five primitive recreation sites on the District. The eleven developed recreation sites are presented in **Table 3.15-1**. The locations of existing recreation sites on the District are shown on **Map 3.15-1**.

Table 3.15-1
Developed Recreation Sites on the Ely District

Recreation Site Name
Meadow Valley
Baker Site
Sacramento Pass
Illipah Reservoir
Cleve Creek
Garnet Hill
Goshute Creek
Ash Springs
Egan Crest Trail
Ward North Trailhead
Ely Elk Viewing Area

The BLM manages competitive recreational events, recreation-related commercial enterprises, and other organized events on the District through the use of Special Recreation Permits. Special Recreation Permits provide a framework to analyze proposed recreation-related activities, control the number of users and limit resource conflict, and provide a tool to monitor and mitigate impacts to resources from organized event activities. Special Recreation Permits are required for five types of uses: commercial use, competitive use, vending, special area use, and organized group activity and event use. In issuing Special Use Permits to recreational users of public lands, the BLM authorizes permittees use of the lands and related waters for permitted purposes. Special Use Permits are managed in a manner consistent with management objectives determined for the area. The majority of Special Use Permits issued on the District are typically for outfitting and guiding activities and for off-highway vehicle events.

3.16 Livestock Grazing

Prior to 1934, grazing of public lands outside forest perimeters was managed by the General Land Office. Comprehensive management of these lands was initiated in 1934 when Congress passed the Taylor Grazing Act. The Grazing Service was established and charged with implementation of the Act. Specific tasks included establishment of a permit system, organization of grazing districts, fee assessment, and consultation with local advisory boards. The Ely Grazing District (No. 4) was established November 3, 1936. In 1946, the Grazing Service was combined with the General Land Office to create the BLM.

In the late 1960s and early 1970s, a shift in public attitude regarding the use of public land emerged. Congress passed the NEPA in 1969, directing land managers to address the environmental consequences of activities on federal lands. As a result of the NEPA and the Natural Resources Defense Council v. BLM decision in 1973, EISs were prepared for every resource area administered by the BLM. The purpose of these EISs was to address the status of grazing and to develop a solution to meet long term goals of grazing on public land.

In 1976, Congress passed the Federal Land Policy Management Act. This act requires that public domain lands be managed for multiple use. It also reaffirmed BLM's authority to reduce livestock numbers if necessary. Perhaps most importantly, it provided for the preparation of Allotment Management Plans in consultation, coordination, and cooperation with permittees for each grazing permit. The Public Rangeland Improvement Act, passed by Congress in 1978, established a grazing fee formula that sets and adjusts annual fees for grazing on public domain land.

In 1986, a national management approach was initiated with the goal of monitoring the long term and short term effects of grazing. The objective of monitoring was to provide a long term database that would allow for the identification of specific problem areas, and the definition of management actions necessary to correct those problems. The method implemented was an "allotment evaluation" process with a 3- to 5-year data compilation interval. In 1984, a Nevada Range Studies Task Group developed and released the Nevada Rangeland Monitoring Handbook to serve as a technical guide in the monitoring process.

In August of 1995, new regulations were enacted that changed methods and administrative procedures used by the BLM in its management of public lands. Commonly referred to as Range Reform '94, these regulations directed the establishment of standards and guidelines to "achieve properly functioning ecological systems for both upland and riparian areas." In addition, these regulations changed how the BLM manages and permits grazing allotments. Grazing standards and guidelines for the Mojave-Southern Great Basin and Northeastern Great Basin regions were adopted and approved by the Secretary of the Interior on February 12, 1997.

The Adjudication Period (Early to Mid 1960s)

The "adjudication" of BLM grazing permits occurred over a period of approximately 15 years, from the mid 1950s through the late 1960s. The Ely District had largely completed this process by the mid 1960s.

Adjudication consisted of establishing the extent of historical grazing on allotments and included a review of the following factors:

1. Priority Use. The Ely District had a "priority period" of 1929-1934, the 5-year period immediately preceding enactment of the Taylor Grazing Act. All priority period use claims were subject to validation and constituted a primary permit preference limitation.

2. Base Property Production. All BLM Districts imposed a minimum base property requirement, predicated either on land or water. Assets such as privately owned base property, hay fields, hay stacks, pastures, water rights, and water flows were measured, and production was calculated. If the existing grazing allocation exceeded the maximum allowable base property production ratio, the grazing permit was subject to reduction.

3. Public Land Carrying Capacity. During the adjudication period, a one-point-in-time carrying capacity survey was conducted of all grazing allotments. After meeting the first two tests, if the existing grazing allocations exceeded the surveyed carrying capacity, the grazing permit was subject to reduction.

The collective effect of applying these three limiting factors determined the amount of "adjudicated grazing privileges." Adjudicated permits also were referred to as "Base Property Qualifications" that were subject to change and refinement as further site specific information became available.

The Post Adjudication Period (Mid-1960s to 1980)

There is no clear point in time when the "Adjudication Period" ended, but for the purposes of this RMP, the period between 1965 and 1979 is defined as the "Post Adjudication Period." This coincides with the completion of adjudication in the Ely District in 1965 and the beginning of the "Evaluation Period" in 1980 (Duane Wilson, personal communication).

The post-adjudication period saw the formal implementation of "grazing management" by the BLM. Grazing management systems were developed and incorporated into allotment management plans. As allotment management plans were implemented, a second round of grazing permit adjustments generally occurred. This management phase was well underway by the mid-1960s in the Ely District. It progressed at an accelerated rate until the mid-1970s when the Natural Resources Defense Council lawsuit required a shift in management toward the development of EISs.

Most animal unit month reductions during this period were based on results of BLM Soil-Vegetation Inventory Method surveys reported in the earliest grazing EISs. Protests from professional range management specialists caused the Soil-Vegetation Inventory Method process to be reevaluated (RCI 1981), and it was demonstrated that one-point-in-time surveys could not be used to calculate rangeland carrying capacity in an accurate and consistent manner. BLM issued a decision discontinuing these surveys and began a program based on utilization and vegetation trend monitoring. Resultant data are used to evaluate whether or not grazing practices have been successful at meeting objectives established in resource management plans, rangeland program summaries, and allotment management plans.

The Evaluation Period (1980 to Present)

In 1986, the BLM Washington office issued Instructional Memorandum 706 (WO IM 86-706). This memorandum instructed that monitoring evaluations be conducted of all "I" and "M" management category allotments[1]. Allotment evaluations have been completed on 102 allotments since 1990. Each allotment evaluation has resulted in either grazing agreements, issuance of grazing decisions, or documentation to the allotment file concerning grazing management. In 1989, the Nevada State BLM Office issued Instructional Memorandum 268 (IM NV-89-268). This memorandum focused on compliance with Washington Office Instructional Memorandum 86-706 and other existing laws and regulations pertinent to this change in policy. Instructional Memorandum NV 89-268 (Revised) specifies how each district shall conduct the evaluation process. Since these directives were issued, there has been a new prioritization of goals. Priorities changed to include allotments containing wild horse herd management areas. This allows for the resolution of resource conflicts between wild horses and livestock, and to the establishment of appropriate management levels for wild horses. Currently assessments and evaluations are conducted at the watershed and allotment scale to determine if the standards and fundamentals for rangeland health are being achieved.

As monitoring results became available, allotment evaluations were completed. This process is the process used to determine if existing multiple uses for allotments are meeting or making progress towards meeting land use plan objectives, allotment specific objectives, Rangeland Program Summary objectives, and land use plan decisions, in addition to the standards and guidelines for grazing administration. Each allotment evaluation concluded with specific management recommendations. Management changes were implemented in the following years, either through agreement or decision. The most frequent management actions occurring as a result of these evaluations include reduction in preference and other changes in grazing management such as implementation of a grazing system, or change in season of use.

3.16.1 Existing Conditions

All livestock grazing allotments within the Ely District are classified as perennial allotments. Term permits authorize grazing use based on perennial vegetation. Livestock grazing allotments within the northern portion of the District are within the Great Basin ecological system. Livestock grazing allotments within the southern portion of the District, primarily the southern portion of Lincoln County, are within the Mojave ecological system.

The Mojave Desert is made up of ecological systems of limited distribution and size that support unique sensitive/endemic species or communities, and of ecological systems that have low resilience to environmental stress or disturbance. The area represents the majority of creosote vegetation within the Mojave ecological system.

[1]BLM initiated a selective management process to prioritize expenditures of limited range management funds. Allotments were grouped into categories according to their resource potential, current management status, and complexity of resource issues. Allotments classified as "I" were to be managed to Improve current condition; allotments classified as "M" were to be managed to Maintain satisfactory conditions; allotments classified as "C" were to be managed Custodially while protecting existing resource values.

Grazing preference is attached to base property owned or controlled by a permittee or lessee. Base property within the Ely District includes both land and water. The majority of base properties within the Ely District are land base properties. Land base or water base were designated as per the Special Rule affecting the Ely District. The Special Rule for classification of base properties, in Nevada Grazing District No. 4, was approved February 21, 1945. This Special Rule states in pertinent part: "A proper factual showing of its necessity having been made by the regional grazier and it having been found that local conditions in Nevada Grazing District No. 4 make necessary the application of a special rule for the classification of base properties in order to better achieve an administration consistent with the purposes of the act, either land or water only, or a combination of land and water, may be classified as base property for a single livestock operation in that district. In instances in which a combination of land and water is so recognized, the following further classification will be made: Class 1. Land dependent by use and full-time prior water. Class 2. Land dependent by location and full-time water." Land base properties within the Ely District range from less than one hundred to several thousand acres. Water base property is privately owned water that is suitable and available for consumption by livestock.

There are 242 grazing allotments within the Ely District. The Ely District administers livestock grazing on 226 allotments. Livestock grazing is administered on 143 allotments by the Ely Field Office and on 83 allotments by the Caliente Field Station. Of the 226 allotments, there are 87 allotments designated as Custodial, 61 designated as Improve, and 78 designated as Maintain1. Eleven allotments are administered by other districts within Nevada while one allotment is administered by the St. George Field Office (see Appendix Q). Three allotments are completely closed as a result of the 2000 Caliente MFP Amendment for Management of Desert Tortoise Habitat. They are the Beacon, Sand Hollow, and Rox-Tule Allotments. Portions of six allotments were partially closed as a result of the 2000 Caliente MFP Amendment for Management of Desert Tortoise Habitat. They are the Breedlove, Delamar, Gourd Springs, Mormon Peak, Grapevine and Lower Lake East Allotments. Grazing use was relinquished on the Rocky Hills Allotment. Six allotments adjudicated as trail allotments are included in the 226 allotments administered by the Ely District.

There are currently 139 livestock permittees that hold term permits authorizing livestock grazing on the public lands within the Ely District (69 permittees with the Ely Field Office and 70 permittees with the Caliente Field Station). There are currently 129 cattle operators and 10 sheep operators in the Ely District. All livestock grazing is authorized under Section 3 permits of the "Taylor Grazing Act."

Total animal unit months for the District are 726,165. Total active use is 535,487 animal unit months and total suspended use is 190,678 animal unit months. The majority of the livestock grazing authorized is for cattle grazing of which the total number of active animal unit months is 398,055. Total active use is 137,005 animal unit months for sheep and 427 animal unit months for domestic horses. Authorized grazing use including both cattle and sheep for the period 1998 to 2002 ranged from 206,707 animal unit months to 271,354 animal unit months. Essential grazing allotment information is maintained in the BLM Rangeland Administration System Database. Relevant information for the allotments on the Ely District is presented on **Table R-1** in Appendix R. Over recent years, particularly since 1996, stocking levels have been reduced due to the impacts of drought. Actual use also fluctuates based on economic conditions. On most allotments in recent years, BLM has approved permittee applications, or has required permittees, to use less forage than the active use authorized by their term permits. In limited situations in those years when forage for livestock remains following use of the forage authorized by the term grazing permit, BLM has authorized use on a

temporary and nonrenewable basis. Temporary nonrenewable is authorized provided it is consistent with multiple use objectives and multiple uses of the allotment.

The majority of the public land cattle operations within the Ely District run between 100 to 500 head of livestock. Some of the larger operations run up to 1,000 head. The typical sheep operation ranges in size up to approximately 4,000 sheep.

Grazing allotments within the Ely District range in size from approximately 300 acres to 1,000,000 acres with the average of approximately 269,723 acres in size. The larger cattle and sheep operators graze on several allotments while many of the smaller operations include only one allotment. Some of the larger livestock grazing operations include 10 to 15 allotments. Actual animal unit months for the larger operators ranges from approximately 14,000 to 30,000 animal unit months annually. Currently there are 9 operators that graze a total of 87 allotments with a total cumulative active use of 204,225 (38 percent) of the total active animal unit months (535,487) for the Ely District.

Allotment grazing periods of use within the Ely District vary and include both seasonal or yearlong. Seasons include fall/winter/spring period and spring/summer/fall period. Grazing systems may include rest-rotation, deferred rotation, and deferred rest-rotation. A few allotments also graze under the principles of Holistic Resource Management (see Appendix Q for grazing system descriptions). Allotments that are grazed seasonally include herding of cattle and sheep between public land allotments, base property, other leased or private pasture and U.S. Forest Service-administered lands.

Most of the allotment categorized as yearlong grazing are associated with the larger year-round operators that graze on several allotments. In these cases, industrial allotments typically are grazed seasonally and livestock are moved between pastures, allotments, base property or other pasture based on the season or period of use developed for the grazing system. Allotments have specific periods of use and livestock are moved from one allotment to another based on the periods of use. The majority of the sheep operations include grazing use on several allotments.

Yearlong grazing use does occur on single allotments. Allotments are divided into separate use pastures. Livestock are moved between use areas, base property, or other private pasture based on seasonal use. Livestock are moved or rotated from one use area or pasture of the allotment to another. Areas of grazing use may also be deferred or rested from one year to the next depending on the grazing schedule for the allotment. Livestock distribution is controlled by various methods including water locations, herding, and fencing.

Some allotments are grazed in common by two or more livestock permittees. Livestock are either mixed together in the same use area or graze in separate use areas of the allotment. Authorized grazing use is in accordance with established use periods or seasons of use for the allotment.

Most cattle grazing operations maintain a base herd yearlong. Livestock are moved from base property to the allotment(s) during the year depending on the authorized period of use for the allotment. Grazing use on public lands is rotated with base property or other pasture which provides forage during certain seasons.

This allows for flexibility in movement of livestock to and from public lands during the year. For some operations, grazing use is rotated with grazing use on the U.S. Forest Service administered lands and includes seasonal and yearlong operations with single or multiple allotments. Grazing on U.S. Forest Service-administered lands occurs during the summer months. Cattle are moved to U.S. Forest Service administered lands in early summer and return to public lands during the fall. Seasonal grazing use also includes grazing use on BLM-administered grazing allotments. Livestock are moved from other grazing allotments or pasture lands. Cattle are moved to and from spring, summer, fall and winter pastures. If livestock are not moved to other allotments they are moved to base property or other private pasture. During the period March through May cattle and sheep are moved from winter use areas or base property to the spring use areas or allotments. Most calving occurs during this period on either base property or the allotment. During the early summer period (May and June) cattle are moved to the higher elevation summer pastures. For some operations this includes authorized use on U.S. Forest Service-administered lands or BLM-administered lands. During the fall period, typically September to mid November, cattle are moved to the lower elevation allotments and graze for the fall/winter period. Where operations include several pastures or allotments, livestock movement is based on the established grazing system; (i.e., rest-rotation, deferred rotation and deferred rest-rotation).

Most of the cattle ranches within the Ely District are cow/calf operations. That is, the rancher has a base herd of cattle, the majority of which are cows (bulls are also included in the herd). The primary purpose of the range cow is to produce a calf. Calving usually occurs during the period March through May. Calves are usually weaned during the fall months. Cattle are either trailed or trucked when moving to or from public land allotments.

The majority of the sheep ranches within the Ely District operate almost entirely on BLM-administered lands. Some operations include BLM- and U.S. Forest Service-administered lands. Private lands are used mostly for shipping and handling animals. In the typical public land sheep operation, sheep are trailed to and from seasonal ranges.

Spring is often the most critical and busy time of year for the sheep rancher. In early April the sheep are trailed or trucked to low elevation sagebrush/grasslands which provide early spring forage and topographically protected areas for the ewes to give birth. Although some operations have privately owned spring range, usually they are on public lands. Sheep are sheared prior to lambing, providing the wool product portion of income. Because lambs are fragile, death loss due to weather and/or predators is a major concern and herds are watched closely.

Sheep operators will usually move their sheep to spring ranges in early May. Both types of operations will move their sheep to summer ranges at higher elevations in late June or early July. The sheep are usually divided into groups or herds of roughly 1,000 ewes and their lambs for easier control and management at this time of year.

The sheep are moved to lower elevation ranges in late September to escape early frost and snow, and the lambs and ewes are selected from the herd for marketing. Lambs and ewes are sold directly off the private or, more typically, the public range at this time of year. It is during this late fall time period that the condition of the herd is evaluated, replacement ewes are selected, and the basic breeding herd is established for

another year. The breeding ewes, the replacement lambs, and the few lambs to be sold later are then moved onto lower elevation fall ranges on public lands or to open fields on private land. The herd will remain there until they are moved onto public winter ranges around the first of November. The operating herd now contains the ewes and replacement lambs from two and sometimes three summer bands, comprising an efficient winter band of around 2,500 head.

The breeding season begins in late November or early December and lasts about 2 months. Except during this period, the rams are kept separately from the ewes on private ranges. During winter months, sheep graze on federal land desert shrub ranges (winter ranges). Activities during the winter months center around trucking or trailing sheep to winter ranges, and herding and trailing the sheep herds while on the winter range.

3.16.2 Trends

Range Condition

Over recent years particularly since 1996, stocking levels have been reduced due primarily to the impacts of drought. Active use also has fluctuated based on economic conditions. Authorized grazing use including both cattle and sheep for the period 1998 to 2004 ranged from 271,354 animal unit months to 160,025 animal unit months. Total active use is 535,487 animal unit months. Total licensed grazing use for the 10-year period from 1992 to 2004 is shown in **Table 3.16-1**.

Table 3.16-1
Licensed Grazing Use in the Ely District from 1992 to 2004

Year	Licensed Animal Unit Months
1992	194,823
1993	168,620
1994	165,649
1995	153,513
1996	122,204[1]
1997	173,152
1998	271,354[2]
1999	256,895
2000	258,496
2001	262,332
2002	206,707[1]
2003	173,662
2004	160,025

[1]Severe drought in 1996 and similar conditions since 2002 caused a decline in licensed use.
[2]In 1998, the Caliente Field Office was transferred from the jurisdiction of the Las Vegas Field Office to the Ely Field Office accounting for the additional 98,000 animal unit months.

3.16.3 Current Management

Allotment evaluations associated primarily with grazing term permit renewal and the watershed assessment process are being completed. Allotment evaluations and watershed assessments are being conducted to determine if the standards and fundamentals for rangeland health are being achieved. A determination is also made to determine if livestock grazing is maintaining or progressing toward the achievement of standards for rangeland health and if livestock grazing is a significant factor in failing to achieve the standards.

All grazing permits will be fully processed by the end of FY 2009 using the information from the land health standards evaluations. Standards and guidelines developed for the Ely District include the Northeastern Great Basin Area and the Mojave-Southern Great Basin Area. Standards and guidelines will be implemented through terms and conditions of grazing permits, leases, and annual authorizations.

The implementation process for standards and guidelines will occur under two separate processes as described below:

1. Rangeland Health Standards assessments will continue at the watershed and allotment scale to determine if the standards and fundamentals for rangeland health are being achieved. Implementation of the standards for grazing administration will be in accordance with the BLM Manual Section 4180, its accompanying Rangeland Health Standards Handbook H-4180-1 and Title 43 Code of Federal Regulations Subpart 4180. Allotment specific objectives may have to be developed, amended or quantified and terms and conditions of permits changed or revised to reflect the standards and guidelines. Watershed assessments and the allotment evaluations associated with these will continue to be completed based on district priorities.

2. During the supervision and/or monitoring of an allotment, if it is determined that the existing terms and conditions of a grazing permit are not in conformance with the approved standards and guidelines and that livestock grazing is determined to be a significant factor in the nonattainment of a standard, grazing management practices or the levels of the grazing use will be changed or terms and conditions of the permit/lease will be modified. These changes or modifications will be in accordance with established procedures to ensure that the grazing management practices or the levels of the grazing use is in conformance with the standards and guidelines.

The allotment evaluation will consist of or involve:

1. The evaluation of current grazing use by all users (livestock, wild horses, wildlife) based on monitoring data analysis and interpretation;

2. Recommendations to change or adjust grazing systems;

3. Recommendations to change or adjust stocking levels;

4. Any recommendations for wildlife populations or habitat management actions required if it is determined that these actions are necessary; and

5. Construction of rangeland projects such as fences, pipelines and water developments.

Management activities on the District also include construction and maintenance of various improvement projects in cooperation with grazing permitees and other agencies. Rangeland projects generally fall into one of two categories: 1) structural projects, such as fences, gates, cattleguards, pipelines, and water developments; and 2) rangeland seedings following fire, brush control, insect infestations, or other disturbances. The former are used to expedite rangeland management by:

- Separating discrete grazing units or allotments;
- Dividing allotments into pastures that facilitate grazing systems;
- Ensuring proper grazing distribution and utilization;
- Accommodating populations of wildlife;
- Providing potable water to all units that livestock have access to; and
- Allowing ready access to all operators and legitimate users.

Range projects or improvements conducted for livestock grazing management and related purposes are shown in **Table 3.16-2**. While only a portion of these improvements have been completed with the specific objective of benefiting livestock, most of them contribute to the effective management of livestock on the allotments involved.

Table 3.16-2
Summary of Range Improvement Projects on the Ely District
from 1958 to 2004

Range Improvement (Units)	Benefiting Livestock	Benefiting Watersheds	Benefiting Wildlife	Benefiting Other	Total
Seeding (acres)	16,564	17,765	1,170	206,598	242,097
Chainings (acres)	4,981	3,300	8,452	10,694	27,427
Burned or sprayed (acres)	960	0	0	3,560	4,520
Furrow or trench (acres)	0	627	0	0	627
Plowed (acres)	0	1,000	0	0	1,000
Fire rehabilitation (acres)	0	1,360	0	35,730	37,090
Fences (miles)	1,532	259	41	1,640	3,438
Corrals (number)	85	0	0	37	122
Cattleguards (number)	245	50	1	163	448
Wells (number)	91	5	1	195	292
Spring development (number)	80	8	1	65	154
Reservoirs (number)	91	4	0	106	201
Pipelines (miles)	320	60	0	163	541
Water hauls, troughs (number)	106	0	6	0	100
Guzzlers (number)	0	0	80	0	80

3.17 Woodland and Native Plant Products

3.17.1 Existing Conditions

Vegetation resources on the Ely District provide for a diversity of social, cultural, and economic uses. The utilization of vegetation as livestock forage is discussed in Section 3.16, Livestock Grazing. In addition, these resources are used as forest and woodland products (e.g., fuelwood, Christmas trees), traditional harvesting (e.g., food, basket material, medicinal and ceremonial purposes), and plant collecting (e.g., landscaping, cultivation). These uses predominantly involve plants characteristic of the Great Basin woodland (e.g., pinyon pine) and the Mojave Desert (e.g., Joshua tree, cactus), both of which are extensive on the District. The vast majority of these activities occur close to communities and along roads.

Woodland volumes vary considerably depending on species composition and density. The determination of successional stages in and production from woodlands was based on the descriptions for the Forestland Ecological Site Descriptions 28BY060NV and 029XY083NV, which are the most prevalent woodland sites in the District. The major successional stages and associated ranges of percent canopy cover within this ecological site include:

- Sapling – 5 to 10 percent canopy cover;
- Immature – 10 to 20 percent canopy cover;
- Mature – 20 to 40 percent canopy cover; and
- Over mature – over 40 percent canopy cover.

The pinyon and juniper woodlands cover approximately 3.6 million acres on the Ely District (see **Map 3.5-7** Pinyon Juniper Vegetation on BLM Administered Land in the Ely District), and consist of the following categories and estimated acreages:

- Immature woodlands – 36,000 acres (approximately 1 percent of total acreage);
- Mature woodlands – 324,000 acres (approximately 9 percent of total acreage);
- Over mature woodlands – 2.9 million acres (approximately 80 percent of total acreage); and
- Pinyon-juniper woodland with invasive and noxious weeds dominant in the understory – 362,000 acres (approximately 10 percent of total acreage).

The woodland community is prevalent on side slopes with shallow, rocky soils. Pinyon pine and junipers historically have been used to make charcoal for mineral processing and provide for fuel and construction of early pit houses (Ronco 2003). Current uses include both personal and commercial harvest of fuelwood, poles and posts (primarily for fence building), Christmas trees, cuttings or sprigs, and pinyon pine nuts.

Utah juniper and singleleaf pinyon contribute 50 to 70 percent and 30 to 50 percent of tree canopy composition, respectively. Pinyon-juniper fuelwood sales in the District for 2003 included 710 cords. Assuming a rough average of 3 to 6 cords per acre, there are approximately 11 to 22 million cords of fuelwood in standing trees on the Ely District. Road access and slope limit the availability of these trees for fuelwood.

Woodland product sales in the District for 2003 also included 3,091 post and poles and 1,026 Christmas trees (predominantly pinyon pine trees) for individual and commercial use. Assuming an average of 15 to 30 posts and poles per acre, there are approximately 54 to 108 million posts and poles in standing trees in the District. Assuming an average of 15 Christmas trees per acre (based on pinyon pine trees comprising 30 percent of the woodlands), there are approximately 15 million Christmas trees in the District.

Various parts of the pinyon pine have been used for food and medicine and continue to have spiritual significance to some groups. Pinyon pine nut crops are variable by year and geographic location. Harvesting occurs in the fall, and plentiful crops occur every 3 to 7 years. Pinyon pine nut harvest was and still is the center of many tribal ceremonies, and tribal elders still participate in the collecting activities.

Sales in the District for 2003 included 41,500 pounds of pinyon pine nuts for commercial use.

The Mojave Desert vegetation, located in the southern portion of the District, is used in horticulture for xeric landscaping (e.g., cacti and yuccas, beargrass, and creosotebush), and some species may be collected to place into cultivation (e.g., ephedra).

Various riparian species (e.g., willows) also are used by American Indians for basketry and other purposes.

The restoration and maintenance of healthy ecological systems within watersheds is a primary focus for the future management of the Ely District. Healthy ecological systems are geographically diverse and change over time. They are compatible with soil potential and are resilient to disturbance.

Resources and resource uses would be managed to restore or maintain ecological health. Certain resource management changes and active treatments may need to be implemented, in portions of watersheds, to accomplish this objective. Adaptive management would be pursued to avoid deteriorating conditions favoring invasive plants and catastrophic fires. Any projects would be implemented so as to result in a mosaic of vegetation within a watershed.

In the long term, natural disturbance (such as drought or fire) would occur and fewer treatments would be needed to maintain ecological health. The result would be a variety of vegetation phases within a watershed, which would provide diverse, healthy conditions for future generations.

3.17.2 Trends

As described in the Great Basin Restoration Initiative and Section 3.5, Vegetation, the pinyon-juniper woodland on the Ely District and elsewhere in the Great Basin is increasing in density of trees and extent of coverage. Tree species, especially singleleaf pinyon and juniper, are spreading and becoming established in areas today that are below their historic elevational limits and have encroached on approximately 1.4 million acres of sagebrush habitat (Rowland 2003). Therefore, the availability of pinyon and juniper trees for fuelwood and other products currently is increasing. However, the trend toward more frequent and severe wildfires, as well as winter temperature inversions in the region may counter some of this increase.

The trends in usage of woodland products and other native plant material remain static. Public demand for vegetation products includes interest in natural ingredients for products ranging from cosmetics to medicines. Demand for fuelwood is not considered to be high, and the demand by commercial fuelwood cutters is low.

3.17.3 Current Management

Current uses are managed as described in **Table 3.17-1**. Personal use is distinguished from commercial uses due to the greater demand on resources typically imposed by commercial enterprises. Permits for commercial pinyon pine nut harvesting are sold by auction to the highest bidder. All desert vegetation collections are available, but limited, on the Ely District to areas designated for salvage due to planned ground disturbances.

Table 3.17-1
Summary of Current Management of Woodland and Native Plant Products

Product Type	Type of Use	Species	Live	Dead	Availability	Comments
Fuelwood	Personal use	Pinyon, juniper	X	X	District-wide except in Wilderness Study Areas and other restricted areas.	2 cord minimum
		Mountain mahogany	X		Only in designated areas.	
		Mountain mahogany		X	District-wide except in Wilderness Study Areas and other restricted areas.	
	Commercial use	Pinyon, juniper	X	X	District-wide except in Wilderness Study Areas and other restricted areas.	6 cord minimum
		Mountain mahogany		X	District-wide except in Wilderness Study Areas and other restricted areas.	
Posts and Poles	Personal and commercial use	Pinyon, juniper	X	X	District-wide except in Wilderness Study Areas and other restricted areas.	
Christmas Trees	Personal use	Pinyon, juniper	X	NA	District-wide except in Wilderness Study Areas and other restricted areas.	
	Commercial use	Pinyon, juniper	X	NA	District-wide except in Wilderness Study Areas and other restricted areas.	
Pinyon Pine Nuts	Personal use	Pinyon	NA	NA	District-wide.	No permit needed, 25 pound maximum
	Commercial use	Pinyon	NA	NA	Only in designated areas.	Sold by auction
Collection of Desert Plants	Personal use	Joshua tree, cactus, and succulents	X	X	Only in designated areas.	Salvage only
Collection of Native Plants	Personal use	All non-succulent plants, seeds, or parts and willows	X	X	District-wide except in Wilderness Study Areas and other restricted areas.	

NA = not applicable.

3.18 Geology and Mineral Extraction

3.18.1 Existing Conditions

Physiography and Topography

The Ely District is located in the Basin and Range physiographic province and is within a sub-province called the Great Basin (Eaton 1979). The Basin and Range province is characterized by generally north-south trending mountain ranges and valleys and encompasses portions of a number of states including Arizona, California, Idaho, Nevada, New Mexico, Oregon, Utah, and Texas. In the Ely District, the mountains and valleys follow the Basin and Range north-south pattern with ranges being about 5 to 15 miles wide and 20 to 100 miles long.

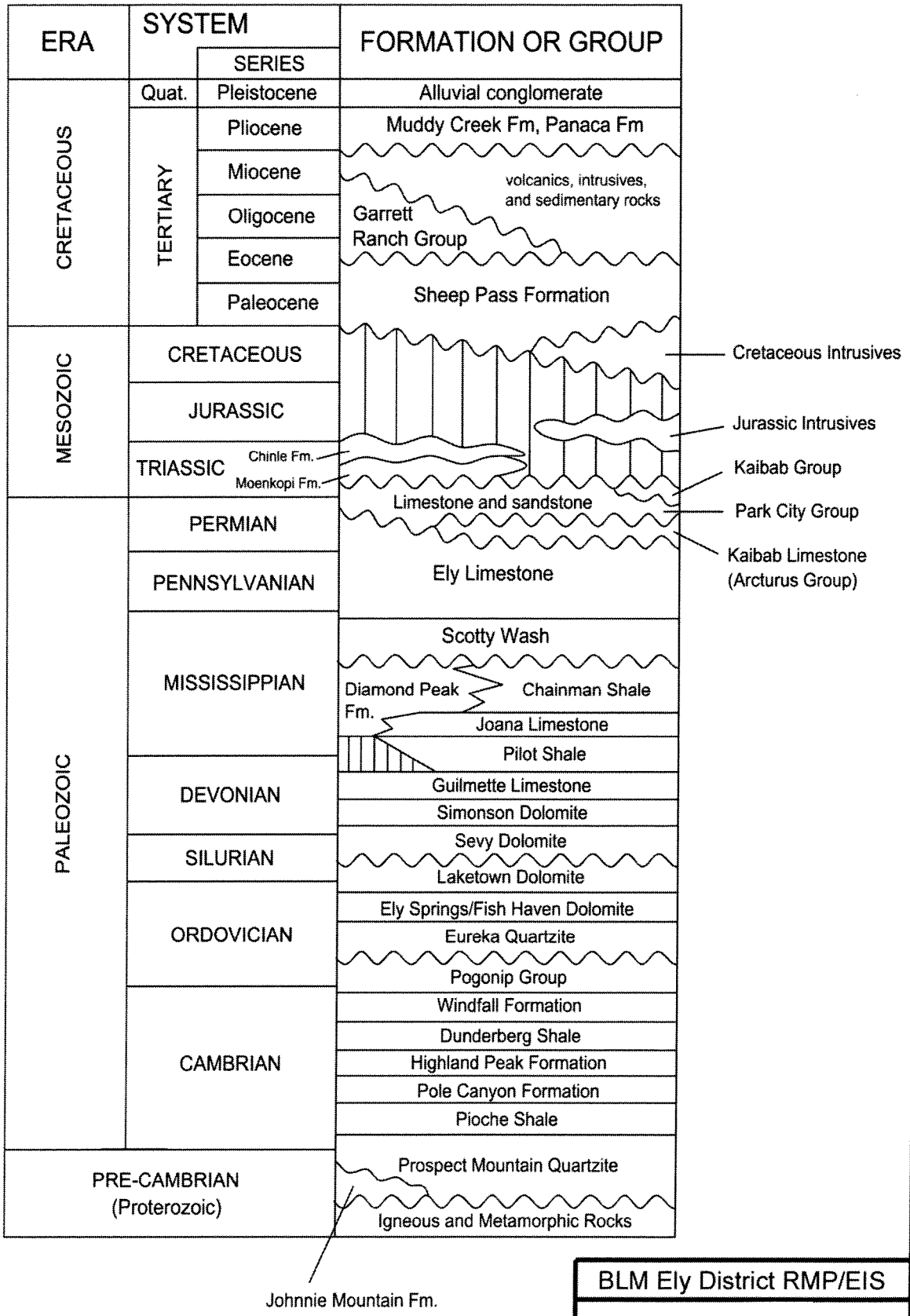
In the Ely District, elevations range from less than 2,000 feet in the valleys of southern Lincoln County to 13,063 feet at Wheeler Peak, the second highest point in Nevada. Generally, the valley floors in the northern part of the District are higher than in the southern areas with elevations ranging from 6,000 to 7,000 feet. Elevations in the mountain ranges are generally from 7,500 to 10,000 feet with the higher peaks often above 11,000 feet. The highest mountain ranges are in the northern part of the District, with the Snake Range (location of Wheeler Peak) being the highest and the Schell Creek Range containing several peaks above 11,000 feet.

The mountain ranges in the Ely District generally consist of volcanic and sedimentary rocks (Stewart and Carlson 1978). Erosion has created rugged terrain in the mountains and some areas show evidence of glaciation in the past (Price et al. 1999). The valleys contain material (valley fill) eroded from the mountains. The valley fill can be thousands of feet thick and the deposits consist of poorly sorted alluvial fan deposits adjacent to the mountain ranges to fine-grained playa (dry lake) deposits and sand dunes in the valley floors.

Most of the area is internally drained and surface runoff is confined to the basins. A few drainages in the southern part of the District in Lincoln County drain into the Virgin River. Those drainages are, from west to east, Coyote Spring Valley, Meadow Valley Wash, and Toquop Wash. The White River Valley, which is located on the eastern edge of Nye County and extends into White Pine County, drains into the Coyote Spring drainage. The Virgin River drains into the Colorado River at Lake Mead, south of the Ely District southern boundary.

Stratigraphy and Geologic History

The geologic units in the Ely District range from Precambrian in age (more than 570 million years old) to Recent. **Figure 3.18-1** is a generalized stratigraphic nomenclature chart of the Ely District. **Table 3.18-1** provides a summary of the associated regional geologic history. The chart and the map have been compiled from several sources and the geology was simplified to show the general geology of



BLM Ely District RMP/EIS

Figure 3.18-1

Stratigraphic Nomenclature Chart

Sources: Modified from Peterson and Grow (1995).

Table 3.18-1
Summary of the Geologic History of the Ely District

Geologic Era	Geologic Period	Millions of Years Before Present	Major Geologic Events
Cenozoic	Quaternary	1.6-present	Crustal extension continues resulting in Basin and Range earthquakes, mountain building, volcanism, and geothermal activity. Glaciers formed in the higher mountains more than 10,000 years before present. Glacial action results in the rugged topography of the higher mountains.
	Tertiary	65-1.6	Crustal extension begins 20 million years before present. The extension results in Basin and Range normal faulting, mass gravity sliding, and igneous activity. Many ore deposits emplaced during this period.
Mesozoic	Cretaceous	144-65	Cretaceous period ending with extinction of the dinosaurs and many other species. Granitic igneous intrusions were widespread causing the formation of metallic ores such as the copper-gold-silver-lead-zinc ores of the Robinson Mining District. Thrusting from Sevier Orogeny causes folding and faulting and movement of large sheets of rock from west to east.
	Jurassic	208-144	Intrusion of igneous rock in the vicinity of the present-day Snake Range. Sedimentary rocks not deposited or were later eroded.
	Triassic	245-208	Moenkopi and Chinle formations deposited in continental and shallow marine conditions.
Paleozoic	Permian	286-245	During most of Paleozoic time, shallow marine conditions persisted resulting in the deposition of thousands of feet of limestone, shale, and lesser amounts of quartzite. Organic-rich Mississippian Chainman Shale is a possible source rock for petroleum generation. Antler Orogeny occurs from Devonian to Mississippian, influencing deposition of sediments in east-central Nevada.
	Pennsylvanian	320-286	
	Mississippian	360-320	
	Devonian	408-360	
	Silurian	438-408	
	Ordovician	505-438	
	Cambrian	570-505	
Precambrian		1,450-570	Igneous and metamorphic rocks formed in ancient crust. Eventually, a stable continental margin is formed resulting in deposition of the Johnnie Mountain Formation and younger Precambrian portion of the Prospect Mountain Quartzite. The stable continental margin persisted throughout most of Paleozoic time.

Sources: Hose et al. 1976; Peterson and Grow 1995; Price et al. 1999; Rowley and Dixon 2001; Tschanz and Pampayan 1970.

the area. The Precambrian rocks consist of intrusive igneous rocks, metamorphic rocks, quartzites, and phyllites.

The entire section of sedimentary rock from Cambrian through Permian (Paleozoic Age) is over 35,000 feet thick and consists primarily of limestone, dolomite, shale, and sandstone. The Paleozoic section also includes metamorphic rocks derived from tectonic events or altered by emplacement of igneous rocks (Tschanz and Pampayen 1970). The Paleozoic-aged shales may be source rocks for the oil fields in the Railroad Valley that are just outside of the Ely District and also are the possible source of the numerous shows of oil and gas found in wells drilled in the District (Peterson and Grow 1995).

Sedimentary rocks of the Mesozoic-age consist primarily of sandstone and shale, are about 10,000 feet thick, and belong to the Moenkopi and Chinle formations. The Mesozoic rocks are found primarily in southeast Lincoln County. There also are intrusive igneous rocks from the Jurassic and Cretaceous consisting of granite-like rocks including monzonite, quartz monzonite, and granodiorite. Important Cretaceous-age intrusive rocks include quartz monzonite that is associated with the mineralization at the Robinson, Bald Mountain, and Mount Hamilton Mining Districts. Jurassic-age intrusive igneous rocks are found in the Snake Range (Tschanz and Pampayen 1970; Hose et al. 1976).

Tertiary-age strata consists of sedimentary and volcanic rocks. The sedimentary formations, as described below, are not continuous over the area but are defined in local areas. Equivalents may be present from basin to basin, but are not identified as distinct formations. The Tertiary-age sedimentary deposits are part of the valley fill sediments that range in age from lower Tertiary to Recent. The thickness of the valley fill varies from basin to basin, but can be thousands of feet thick. The oldest sedimentary unit is the Sheep Pass Formation that is slightly more than 3,000 feet thick and is composed of lake-derived limestone, sandstone, and siltstone (Hose et al. 1976). The type section for the Sheep Pass Formation is located on the crest of the Egan Range. The lower part of the formation is a conglomerate that is composed of fragments from older Paleozoic formations. Invertebrate and vertebrate fossils in the formation indicate that it is Eocene in age, but Peterson and Grow (1995) also indicate that it may be Paleocene. Other later Tertiary-age sedimentary deposits include the Pliocene-age Muddy Creek and Panaca formations that are found in the southern part of the District. These units were deposited in lakes and consist of sand, silt, clay, and limestones (Tschanz and Pampayen 1970). Other younger Tertiary sedimentary deposits present in the District were dated on the basis of the presence of vertebrate fossils, but they have no specific formation names (Hose et al. 1976).

Many of the Tertiary rocks are composed of volcanic-derived materials called ignimbrites that are formed from ash flow-type volcanic eruptions. The Tertiary volcanic rocks range in age from late Eocene to Pliocene, but the thickness is undetermined. Some measured sections are over 2,000 feet thick (Cook 1965). However, there is a general trend that the Tertiary volcanic rocks are thicker in the south (possibly from 5,000 to 10,000 feet thick) and thinner to the north (Tschanz and Pampayen 1970; Hose et al. 1976). In some areas, the Tertiary sediments and volcanics are interbedded, and some of the sedimentary deposits are primarily composed of volcanic materials. Tertiary intrusive rocks also are present, but are not well exposed on the surface and the outcrops are scattered on various mountain ranges throughout the District. The intrusives include granite, granodiorite, monzonites, quartz monzonites, and

diorites. Rhyolite, dacite, quartz latite, and other shallow intrusive rocks may have been the source for volcanic ash flows.

Late Tertiary, Quaternary, and Recent sedimentary deposits consist of unconsolidated materials and include lake deposits, playas, dunes, alluvium, and alluvial fans. These deposits may be thousands of feet thick in the valleys, but much of the originally deposited material may have already been eroded (Tschanz and Pampayen 1970). The lake deposits, playas, and dunes generally are composed of fine-grained materials, and the alluvium and alluvial fans contain coarse-grained materials.

Structural Geology

The geologic structure of the Great Basin was created by interactions between the North American and Pacific tectonic plates (Rowley and Dixon 2001). The geologic structure of the Ely District is complex, because successive episodes of faulting have obscured earlier faulting. There are four major types of fault styles in the District: low angle reverse, ecoulement, strike-slip, and normal faults (Tschanz and Pampayen 1970; Hose et al. 1976). The low angle reverse (or thrust) faults are associated with an episode of mountain building (the Sevier Orogeny) that occurred in the mid to late Mesozoic and possibly into the early Cenozoic (Price et al. 1999). The Sevier Orogeny was characterized by compressional movement that caused strata to be uplifted and moved laterally over other strata, often for tens of miles. The resultant thrust faults caused older rocks to be moved over younger rocks. Major thrust faults have been defined by oil and gas exploration in northeastern Nevada (Moulton 1984).

The second type of fault or dislocation, the ecoulement, is caused by the sliding of large blocks due to uplift and tilting. It is believed that large ecoulements (gravity slides or detachments) occurred during the mid to late Tertiary in response to uplift caused by the upward movement of magmas coupled with extension of the crust (Francis and Walker 2001). Possible examples of gravity sliding have been found in the Mormon Mountains, the Bristol Range, the Pintwater Range, and the southern Egan Range (Tschanz and Pampayen 1970). The western side of the Grant Range also may be bounded by a large detachment fault (Montgomery 1997; Francis and Walker 2001).

The third type of faulting, strike-slip faults, are caused when pieces of the crust move past each other laterally. There are two major strike-slip faults in southwestern Lincoln County, cutting across the grain of the mountain ranges in a generally southwest to northeast direction (Tschanz and Pampayen 1970). These faults are thought to have occurred in the late Tertiary and are believed to be analogous to major active strike-slip faults like the San Andreas in California where movement is in response to major plates of the earth sliding past one another. The Ely-Black Rock Fault, a major northwest-southeast strike-slip fault, cuts across White Pine County along a line from Baker to Ely and to the western edge of the county (Thorman and Kentner 1979). The Ely-Black Rock Fault is thought to be related to crustal adjustments caused by the Sevier Orogeny.

The fourth type of fault style, the one that caused the present-day physiography (basin and range) is normal faulting. Most of the mountain ranges are bounded on at least one side by a major high-angle normal fault. The mountains represent the uplifted blocks and the valleys are downthrown blocks. The amount of

displacement on the faults can range from 1,000 to 15,000 feet or more (Bortz and Murray 1979; Hose et al. 1976). The present-day structure began to evolve about 20 million years ago as movement of the Pacific plate began to cause crustal extension that resulted in the dominant normal faulting (Rowley and Dixon 2001). Most of the normal faulting in eastern Nevada is believed to have occurred in the late Tertiary, but many faults were active into the Quaternary (Howard et al. 1978). It is believed that many of these high-angle faults flatten at depth and intersect a zone of detachment that may be related to earlier thrust faulting (Eaton 1979). Erosion of the mountain blocks resulted in the deposition of thousands of feet of valley fill on the downthrown blocks.

Geologic Hazards

The two major types of geologic hazards that have the potential to affect the Ely District are earthquakes and landslides. Because of the nature of the geology in the area, the potential for each of the above-named hazards to affect the area is low. Each of the hazards is discussed below.

Earthquakes. Earthquakes occur when movement occurs on faults and energy is released into the surrounding rocks. The severity of an earthquake is dependent on a variety of factors including the amount of movement that has occurred on the fault, the composition of the surrounding rock, and distance from the source of the earthquake. In order to assess the potential severity of earthquakes in any given area of the country, the U. S. Geological Survey has developed seismic hazard maps that try to predict the amount of ground motion that could occur from a severe earthquake (USGS 2002a). Based on the ground motion map, the Ely District is not expected to experience strong ground motions that would cause substantial damage to buildings or other structures. However, in the south-central portion of Lincoln County is area that might expect stronger ground motions than the rest of the District. Data compiled by the Nevada Bureau of Mines and Geology (1999) shows a large number of small seismic events in that portion of Lincoln County.

Landslides. Landslides are relatively rare in the Basin and Range province (Radbruch-Hall et al. 1980). The most common large-scale movement of earth material occurs as debris flows that occur as a result of torrential rains. Landslides in the area commonly occur where volcanic sediments are capped by more resistant rocks and erosion of underlying softer material creates unstable situations. Landslides also can occur where fractured carbonate and crystalline rocks form steep slopes and the fracture planes coupled with erosion cause instability. In addition, slope instability can result from anthropogenic causes such as construction and mining.

3.18.2 Mineral Resources

The Ely District manages the mineral resources on 11.4 million acres of federal land. Most of this acreage includes surface and mineral ownership. Within legal constraints, all publicly owned minerals are available for exploration, development, and production, while subject to existing regulations, standard terms and conditions, and stipulations. Federally owned minerals in the public domain are classified into three categories: leasable minerals, locatable minerals, and saleable minerals as discussed below. The classifications are based on acts passed by the U.S. Congress.

Leasable minerals are those minerals that are leased to individuals for their exploration and development. The leasable minerals have been subdivided into two classes, fluid and solid. Fluid minerals include oil and gas; geothermal resources and associated by-products; and oil shale, native asphalt, oil impregnated sands and any other material in which oil is recoverable only by special treatment after the deposit is mined or quarried. Solid leasable minerals are specific minerals such as coal and phosphates. All minerals on acquired lands are considered to be leasable minerals. Leasable minerals are associated with the following laws: Mineral Leasing Act of 1920, as amended and supplemented, Mineral Leasing Act for Acquired Lands of 1947, as amended, and the Geothermal Steam Act of 1970, as amended.

Locatable minerals are those that have been described as "valuable mineral deposits." These include precious and base metal ores such as gold, silver, copper, or lead, and certain industrial minerals such as pozzolan, gypsum, chemical grade limestone, chemical grade silica sand, and decorative stone. Uncommon varieties of mineral materials such as pumice, rock, and cinders also are regulated as locatable minerals. These minerals are regulated under the General Mining Law of 1872, as amended, and Surface Use and Occupancy Act of July 23, 1955.

Saleable minerals are common mineral materials that include sand, gravel, and common clay. Saleable minerals are sold through contract and are regulated under the Mineral Material Act of July 23, 1947, as amended, and the Surface Use and Occupancy Act of July 23, 1955.

The Mining and Mineral Policy Act of 1970 declares that it is the continuing policy of the federal government to foster and encourage private enterprise in the development of domestic mineral resources. Section 102 of the Federal Land Policy and Management Act directs that the public land be managed in a manner which recognizes the nation's need for domestic sources of minerals and other commodities from the public lands, while managing these lands in a manner that would protect scientific, scenic, historic, archaeological, ecological, environmental, and atmospheric and hydrological values. The BLM's mineral policy (1984) states that, "Public lands shall remain open and available for mineral exploration and development unless withdrawal from other administrative actions is clearly justified in the National interest."

Leasable Minerals

Oil and Natural Gas. Although commercial hydrocarbons have not been discovered in the Ely District, oil is produced from fields just outside of the District in the Railroad Valley in northeast Nye County and also in areas north and northwest of the District in Eureka and Elko counties. Although the northern part of Railroad Valley extends into the Ely District, no commercial oil production has been established in the Ely District portion of the valley. The fields in Eureka County are located in the Pine Valley (Nevada Division of Minerals 2001), and another field is located in central Elko County. These fields are not as prolific as the Railroad Valley fields.

Oil was discovered in Railroad Valley in 1954 at Eagle Springs. Almost 41 million barrels of oil have been produced from oil fields in the Railroad Valley from 1954 through 2001, with Grant Canyon being the largest producer (Nevada Division of Minerals 2001). The fields are characterized by complex traps, and crude oil is the primary hydrocarbon commodity. A total of nine producing fields have been discovered in the Railroad

Valley, some of which have had prolific production wells such as at Grant Canyon. Most of the 21 million barrels of oil produced at Grant Canyon came from just 2 wells (Montgomery 1997). For a period of time, the wells at Grant Canyon had some of the highest daily producing rates for onshore oil wells in the contiguous U.S. Hydrocarbon reservoirs in Railroad Valley include the Garrett Ranch, Sheep Pass, and Guilmette formations as well as an unspecified Devonian-aged zone at Ghost Ranch. The Garrett Ranch Formation is an uncommon type of petroleum reservoir composed of ignimbrites (volcanic rock) (Bortz and Murray 1979). The carbonate rocks of the Sheep Pass Formation also produce at two fields in the Railroad Valley, but the Sheep Pass Formation may be of lesser importance as a reservoir than as a possible hydrocarbon source rock. All the named hydrocarbon reservoirs and potential source rocks are present in the Ely District.

Exploration for oil and gas has been conducted in the Ely District since 1920 when the Illipah Syndicate drilled a well in the Barrel Springs area of the White Pine Range in White Pine County. The well was drilled in Section 11, Township 17 North, Range 58 East and reached a total depth of 929 feet with gas and oil shows (evidence of oil and gas) (Garside et al. 1988). The Illipah Syndicate drilled three more wells in the 1920s in the Barrel Springs area with numerous oil and gas shows, but with no commercial results.

About 181 wells have been drilled in the Ely District since the 1920s (Snow 2003). Since 1950, slightly more than 170 wells have been drilled in the District, and 90 percent of them were abandoned with no production. Many of wells had abundant evidence of the presence of hydrocarbons, but not in commercially producible quantities. About 9 percent were indicated to be productive, but no fields were established, and it is likely the wells proved uneconomic over a short period of time (Garside et al. 1988). A small percentage of wells were converted to disposal wells or water wells. Drilling activity in the 1950s was sparse with only one well drilled in some years and in other years no drilling occurred. Since 1964, an average of about 4 wells per year have been drilled in the District, with most of the wells being drilled in White Pine County (Hess 2001). However, 50 wells have been drilled in the Nye County portion of the Ely District, and most of those are in the Railroad Valley. Most of the drilling occurred on federal leases, and the overwhelming amount of leased minerals are owned by the federal government. There are approximately 1,179,725 acres of leased federal minerals.

More than one-third of the wells in the Ely District were drilled to depths of between 2,500 and 5,000 feet. A little more than 5 percent of the wells were drilled to more than 10,000 feet deep. The deepest well in the District, drilled in 1983, was the Commodore Resources Outlaw Federal #1 drilled to a total depth of 13,000 feet in White Pine County (Section 1, Township 10 North, Range 70 East). The well was drilled east of the Snake Range and had reported hydrocarbon shows, but tests on the oil were not conclusive of naturally occurring hydrocarbons (Poole and Claypoole 1984).

The U.S. Geological Survey (Peterson and Grow 1995) estimated the potential undiscovered technically recoverable hydrocarbon resources for the Eastern Basin and Range area, of which the Ely District is part. Their estimates, when extrapolated to the Ely District, indicate that the potential hydrocarbon resource in the District is nearly 98 million barrels of oil and almost 16 billion cubic feet of natural gas. These estimates are the mean values presented by Peterson and Grow (1995). Low-grade coal (lignite) is present in the Ely District, but thick, extensive, mineable deposits have not been found. Therefore, there is very low or no potential for coalbed natural gas resources in the district. Therefore, coal bed methane gas is not included in the natural gas resource estimate.

Based on the foregoing, much of the Ely District has a high potential for hydrocarbons based on the following geologic characteristics (BLM 1990):

- Presence of hydrocarbon source rocks
- Evidence of thermal maturation
- Presence of reservoir rocks with adequate porosity and permeability
- Potential for hydrocarbon traps to exist

There are places in the District where Precambrian-age metamorphic and volcanic rocks are the dominant surface rock types, but the presence of these rocks does not preclude the potential for the occurrence of deeper hydrocarbons in these areas. It is possible that hydrocarbon resources may have been buried by thrust faults or extrusive igneous rocks and that current exploration techniques, exclusive of random drilling, cannot define the location or depth of these hidden potential resources.

Geothermal Energy. Geothermal resources are an important source of energy in Nevada. In the western and central part of the state there are a number of geothermal power plants (Shevenell et al. 2000). In the year 2000, there were a reported 15 geothermal power plants with a total capacity of nearly 229 megawatts. Essentially, hot groundwater is tapped by drilling wells and is used to power turbines to generate electricity. Other applications of geothermal energy in Nevada involve using geothermal heat for uses from industrial to recreational activities ranging from vegetable dehydration to spas and pools.

The northwest part of Nevada has the highest occurrence of water temperatures greater than 75 degrees Centigrade (Garside 1994). The high temperatures are believed to be related to circulation of groundwater along faults in an area of higher heat flow. In the eastern and southern parts of the state, there are generally low to moderate temperature geothermal resources. The source of the heat is believed to originate from the circulation of groundwater in fractured carbonate aquifers. The area of low to moderate temperature geothermal resources includes the Ely District. Although the Ely District is within an area dominated by low to moderate geothermal temperatures, there are 6 hot wells (greater than 37 degrees Celsius) in the district; the hottest well is located in the northern Steptoe Valley with a recorded temperature of 151 degrees Celsius (Garside 1994; Shevenell et al. 2000). In addition, there are several hot springs, mainly located in White Pine and eastern Nye counties. There are numerous warm springs and wells (less than 37 degrees Celsius) scattered throughout the District. In Caliente and Ash Springs, warm springs are used for pools, spas, and space heating.

Areas of established geothermal production are categorized as known geothermal resource areas. There are no known geothermal resource areas in the Ely District. Only one current geothermal lease is active in the Ely District. The lease consists of 1,004 acres and is in the Cherry Creek area.

Solid Leasable Minerals. Solid leasable minerals include coal, oil shale, phosphate, and sodium minerals. There are no known economic deposits of these commodities in the Ely District and there are no active leases for solid leasable minerals.

Locatable Minerals

The Ely District contains numerous types of locatable mineral deposits. The following is a summary of the major locatable mineral deposits in the Ely District.

- Copper has been the most important locatable mineral resource in the Ely District. Since 1906, copper has been mined at the Robinson Mining district, just west of Ely, Nevada. The district has produced over 5 billion pounds of copper (Hose et al. 1976). The remaining reserve is estimated at 200 million tons of copper ore. Operation and production were renewed at the Robinson Mine in late 2004.

- Gold is an important commodity that was produced at the Robinson district, but also is found in many mining districts in the Ely District. Gold presently is being mined at the Bald Mountain district in northwest White Pine County. Small scale placer mining of gold is occurring in the Osceola District. There is an estimated 30 billion tons of disseminated gold in the Bald Mountain-Aligator Ridge area (Ilchik 1996). Important gold deposits also have been mined in the Delamar district in Lincoln County (Tschanz and Pampeyan 1970). Minor amounts of gold were produced from deposits in the Nye County portion of the Ely District (Kleinhampl and Ziony 1985).

- Lead and zinc have been mined extensively in the Ely District. Important mining districts include the Pioche, Jackrabbit, and Bristol in Lincoln County (Tschanz and Pampeyan 1970). Lead and zinc also are present in many mining districts in White Pine County (Hose et al. 1976)

- Silver has been an important commodity in the Ely District as bonanza silver deposits are associated with lead, zinc, and gold deposits. Important silver deposits were mined in the Pioche, Bristol, Jackrabbit, Highland, and Groom districts in Lincoln County (Tschanz and Pampeyan 1970). Silver was produced as a by-product of copper production at the Robinson district. Substantial amounts of silver also were produced in the Hamilton, Cherry Creek, Ward, and Taylor districts in White Pine County as byproducts of gold mines (Hose et al. 1976).

- Tungsten has been mined at the Tempiute district in Lincoln County and in the Cherry Creek district in White Pine County (Tschanz and Pampeyan 1970); (Hose et al. 1976).

- Pozzolana, a commodity derived from volcanic ash, has been mined in Lincoln County. Increased demand for pozzolana (used in making concrete) has resulted in proposals for new mining operations.

- Radioactive mineral deposits occur as uranium mineralization associated with other mineral deposits and as uranium mineralization in sedimentary and volcanic rocks. To date, none of these deposits have been put into production. The following types of uranium mineralization have been identified in the Ely District (Garside 1973):

  - Uranium mineralization associated with volcanic tuffs and tuffaceous sedimentary rocks. This type of mineralization is common in the Panaca Formation of Lincoln County.

- Uranium and anomalous radioactivity associated with quartz veins and quartz fluorite veins.
- Uranium and anomalous radioactivity associated with secondary iron and manganese oxides within and adjacent to sulfide mineral deposits.
- Reports of anomalous radioactivity in mine dumps and mine workings.
- Uranium mineralization associated with the gold deposits of the Atlanta District in Lincoln County.

Saleable Minerals. Sand and gravel are the most common types of mineral materials sold on public lands. These materials are found throughout the District, usually in alluvial fans along the edges of the valleys. Common varieties of limestone, dolomite, and quarzite rocks are quarried for building stone and landscape materials.

3.18.3 Trends

Leasable Minerals

Oil and Natural Gas. As of January 2005 there were 459 federal oil and gas leases covering approximately 1,031,036 acres in the Ely District (see **Map 3.18-1**). As federal oil and gas leases expire, those lands may be nominated for leasing again. The BLM conducts lease sales every quarter. For the 13 lease sales held from 2000 through 2004, a total of approximately 1,207,673 acres were leased in competitive and non-competitive categories. An annual summary of the lease sales is shown in **Table 3.18-2** (ENSR 2003). Total bonus bids received for the period, rental, and fees received were $2,283,121. Half of the bonus money bid for public domain minerals went to the State of Nevada. The remainder of the bonus money stayed with the Federal Treasury, where it was split between the conservation fund and the general fund on a 4:1 ratio, respectively.

Table 3.18-2
Lease Sale Summary 2000-2004
Ely District

Year	Number of Leases[1]	Average Acreage Per Lease	Total Acreage Leased/Year	Average Bonus + Rental + Fees (dollars)	Total Bonus + Rental + Fees (dollars)
2000	33	3,079	101,599	4,688	154,714
2001	172	3,509	603,476	5,888	1,012,766
2002	29	3,766	109,255	6,214	180,199
2003	56	1,392	77,934	3,868	216,583
2004	118	2,673	315,409	6,092	718,859
Total			1,207,673		2,283,121
Average/Year			241,535		456,624

[1]Source: LR2000.

It is anticipated that the amount of federal oil and gas acreage under lease in the Ely District between 2005 and 2025 will range between 1.18 and 1.5 million acres. Based on June 2000 to June 2003 numbers, additional annual federal acreage leased is projected to average 65,000 acres. However, acreage additions would be offset by leases that will expire if commercial hydrocarbons are not discovered. It cannot be predicted at this time how much acreage eventually will be held by production, which is entirely dependent on the discovery of commercial oil and gas fields. Revenues generated from lease rentals alone in the Ely District could generate millions of dollars during the 2005 to 2025 period. If substantial oil and gas discoveries are made, making offered leases more attractive and bidding up of the bonuses, substantially more revenue could be generated.

Based on the reasonably foreseeable development scenario, it is estimated that many as 448 oil and gas exploration and development wells could be drilled over the next 20 years. This number is a hypothetical estimate based upon what could reasonably be expected to occur. There are some major assumptions upon which oil and gas development activity is based. Those assumptions include:

- There would be no substantial change in the laws, regulations, or policies governing management of oil and gas resources during the land use planning period.

- The reasonably foreseeable development scenario is made without respect to any existing or proposed leasing stipulations and conditions of approval according to BLM Instruction Memorandum No. 2004-089 concerning policy for the reasonably foreseeable development scenario for oil and gas dated January 16, 2004 (BLM 2004).

- The actual locations of potential exploration wells and field development are unknown. The impacts associated with these activities are likely to occur anywhere within the resource area that is of high or moderate potential for oil and gas resources.

Based on past exploration drilling and field discovery history, most of the exploration is likely to occur in the valley floors. Historically, oil discoveries in Nevada have been exclusively in the valley floors adjacent to the mountains. For planning purposes, all of the valley areas are considered to have high development potential. It is expected that 90 percent or more of the activity would take place in the valley areas.

Drilling trends may fluctuate greatly, from no drilling occurring over 5 consecutive years to half of the wells being drilled in a 10-year period. Each new discovery would foster an increase in drilling activity that may last for 2 to 3 years. In addition, advances in technology that facilitate the discovery and production of hydrocarbons could affect the amount of exploratory drilling and subsequent developmental drilling that could occur.

Geothermal Energy. In spite of the existence of hot temperatures recorded in geothermal exploration wells, very limited exploration and development is expected to occur during the planning period. Up to 30 geothermal gradient wells may be drilled resulting in one exploration well. If a geothermal resource is discovered that would support a power generation plant, a total of three geothermal wells could result with other infrastructure such as generating facilities, pipelines, power lines, and roads.

Solid Leasable Minerals. There are no known deposits of solid leasable minerals within the Ely District. There are no leases of minerals on acquired lands that would be managed as solid leasables. The Ely District does not expect to see much change in this status in the future.

Locatable Minerals

In addition to the Robinson Mine, other active locatable minerals mining in the Ely District is in the Bald Mountain district, where gold is mined at the Bald Mountain Mine. The highly productive Carlin-Cortez Trend may extend into White Pine County, suggesting the potential for future gold discoveries. Since 1995, the Nevada gold industry has focused on development of new reserves near existing mines in the Carlin Trend to keep total operating costs and startup costs down. Because of the consolidation of mining companies during the period from 1995 to 2000, the Nevada gold industry is poised to continue developing new reserves in the Carlin Trend near existing deposits and within proven gold areas.

The restoration and maintenance of healthy ecological systems within watersheds is a primary focus for the future management of the Ely District. Healthy ecological systems are geographically diverse and change over time. They are compatible with soil potential and are resilient to disturbance.

Resources and resource uses would be managed to restore or maintain ecological health. Certain resource management changes and active treatments may need to be implemented, in portions of watersheds, to accomplish this objective. Adaptive management would be pursued to avoid deteriorating conditions favoring invasive plants and catastrophic fires. Any projects would be implemented so as to result in a mosaic of vegetation within a watershed.

In the long term, natural disturbance (such as drought or fire) would occur and fewer treatments would be needed to maintain ecological health. The result would be a variety of vegetation phases within a watershed, which would provide diverse, healthy conditions for future generations.

For the Nevada gold industry to expand beyond the Carlin Trend and develop new deposits in White Pine and Lincoln counties would require sustained gold prices above $350 per ounce and preferably above $400 per ounce. Prices at those levels are needed because of the increased total operating costs and startup costs that would be incurred developing new mines in areas that do not have the infrastructure to support large-scale mining. Thus, the economics of the U.S. gold industry and the economics of the “new” Nevada gold industry that has resulted from the consolidation of mining companies favors development of new reserves in areas of existing mining, rather than exploration and development in new areas. The Nevada gold industry has proven reserves sufficient for at least another 15 years of mining in the Carlin Trend. There is, therefore, no short-term pressure on the Nevada gold industry to replace reserves through exploration in “unproven” areas. However, recent increases in the price of gold to values above $350 per ounce have resulted in renewed exploration interest in White Pine County, where many smaller gold deposits were discovered and mined between 1985 and 1995. It is expected that gold exploration in White Pine County and in the Ely District will continue to increase over the next 20 years if gold prices stay above $350 per ounce.

Copper is a commodity controlled by world supply and production costs in third-world countries. Currently, copper prices are above $1.00 per pound and may stay there for a few years due to a sharp increase in demand from China and India coupled with low production over the past 5 years.

Other locatable mineral commodities in the Ely District, such as lead, uranium, zinc, and tungsten, are not likely to be produced over the next 20 years unless commodity prices rise and encourage exploration and development of these minerals.

Saleable Minerals. The demand for saleable minerals has increased in the last decade. In Nevada, the main population growth over the past 10 years has been in the Las Vegas area. Sand and gravel are in increasing demand to meet the needs for new construction throughout Southern Nevada. There also is an increased demand for decorative rock and landscape material which has an even wider market throughout the western states. This trend for increased demand of these salable minerals is expected to continue.

3.18.4 Current Management

Leasable Minerals

Mineral operations for leasable minerals are conducted under 43 Code of Federal Regulations 3100 for oil and gas, 43 Code of Federal Regulations 3200 for geothermal resources, and 43 Code of Federal Regulations 3500 for solid leasable minerals. Oil, gas, and geothermal are referred to as fluid leasable minerals. Coal and phosphates are examples of solid leasable minerals. These regulations provide for processing these types of mineral case files. The regulations are further defined for exploration versus development. To ensure that all operations are conducted with adequate consideration to environmental and resource concerns, RMPs develop leasing stipulation which are attached to lease agreements. Once the lease has been established, the operator may conduct exploration under 43 Code of Federal Regulations 3150 for oil and gas, and 43 Code of Federal Regulations 3252 for geothermal resources. The development and production of oil and gas is conducted under 43 Code of Federal Regulations 3160 regulations, and for geothermal resources under 43 Code of Federal Regulations 3261. Solid leasable exploration is conducted under 43 Code of Federal Regulations 3505 and 3506 regulations. Leases for solids are issued under 43 Code of Federal Regulations 3507 and 3508 regulations, while operations are conducted under 43 Code of Federal Regulations 3517 regulations. These regulations provide for an interdisciplinary review of any proposed exploration, drilling, or production operation. These activities have additional resource protection through mitigation measures developed through the environmental reviews.

Management decisions would follow Interim Management Policy and guidelines for mineral leasing in Wilderness Study Areas and Instant Study Areas. Leases that have been grandfathered in Wilderness Study Areas would conduct operations as outlined in the Interim Management Policy and guidelines. All Wilderness Study Areas would be closed to leasing (non-discretionary). Should Congress release all or part of any of the Wilderness Study Areas, the lands would return to multiple-use management and may be generally available for leasing.

Oil and Natural Gas. At present, the Egan Resource Area is the only management unit in the Ely District where oil and gas leases are being issued. The leasing is conducted in accordance with the Egan RMP, Oil

and Gas Leasing Amendment and Record of Decision (BLM 1992). Leasing in the Schell and Caliente Resource Areas has occurred in the past and valid leases are in effect, but issuance of leases was discontinued in those areas because of uncertainties regarding adequacy of the current MFPs to provide for oil and gas leasing. Application for permits to drill can be approved on leases outside of the Egan Resource Area, but no new leases can be issued.

In Nevada, the State of Nevada Division of Minerals has a Memorandum of Understanding with the BLM for the regulation of oil and gas activities. The BLM conducts the inspection of well sites on state and fee lands, and both agencies require operators to file the BLM forms pursuant to conducting oil and gas exploration and production activities. In addition, when drilling on federal lands, drilling permit applications must be submitted to both the BLM and Nevada Division of Minerals.

Geophysical operations both on and off an oil and gas lease are reviewed by the federal surface management agency, which can include the BLM, Bureau of Reclamation, or U.S. Forest Service, as appropriate. Prior to earth disturbing activities, the operator is required to file a notice of intent to conduct oil and gas geophysical exploration operations. Upon completion of operations, including any required reclamation, the operator is required to file a Notice of Completion. If the terms and conditions have been met, the operator is released from further action. Consent to release the bond or termination of liability is not granted until the terms and conditions have been met.

Permitting of oil and gas wells are governed by procedures set forth by the Onshore Oil and Gas Order No. 1, “Approval of Operations on Onshore Federal and Indian Oil and Gas Lease,” issued under 43 Code of Federal Regulations 3164 (BLM 1983). Operations Order No. 1 lists the following as pertinent points to be followed by the lessee or operator: 1) notice of staking; 2) filing of permit application, which includes a multi-point surface use and operations plan; 3) approval of subsequent operations; 4) well abandonment/conversion to water well; 5) responsibilities on privately owned surface; and 6) reports and activities required after well completion. Other resources are protected from oil and gas activities through the use of lease stipulations that are attached to the lease.

Geophysical surveys and well permit applications are subject to varying degrees of NEPA analysis. Geophysical exploration and single exploratory wells may be given a categorical exclusion from formal impact analysis, whereas the impacts of multiple-well developments or intensive seismic surveys can be subjected to higher levels of impact analysis such as environmental assessments or EISs.

Geothermal Energy. For geothermal drilling in Nevada, as in oil and gas drilling, permit applications must be filed with both the BLM and Nevada Division of Minerals. In addition to drilling permits, geothermal operators must obtain a water well permit from the Nevada Division of Water Resources. A permit also must be obtained from the Nevada Division of Environmental Protection for the injection or surface disposal of geothermal fluids.

Geothermal exploration can include geophysical surveys, drilling temperature gradient wells, drilling holes used for explosive charges for seismic exploration, core drilling or any other drilling method (provided the well is not used for geothermal resource production), airborne exploration, off-road vehicular travel, road

and trail construction, and rehabilitation. Exploration operations do not include the direct testing of geothermal resources or the production or utilization of geothermal resources. Production operations include production well drilling; direct testing of the geothermal resources; chemical sampling of the geothermal resource; road construction and improvement; production; maintenance of production facilities; waste disposal, construction camps; construction of electric transmission lines; and plant construction, development, and expansion. All the above-described activities are subject to impact analysis under NEPA. As in oil and gas operations, some activities (e.g., geophysical surveys) may not require a formal impact analysis. However, exploration wells and production developments may require impact assessment through an environmental assessment or EIS. Geothermal leases also can have attached stipulations that are used to protect other resources.

Locatable Minerals

Private individuals and corporations can acquire locatable minerals by staking mining claims. These mining claims are recorded in the local county courthouse and with the BLM. Management of locatable minerals by the BLM consists mainly of managing surface disturbances associated with the mining of the minerals. Surface disturbances can consist of pits, shafts and adits, leach pads, waste rock piles, tailings, and other disturbance of surface soils and vegetation to accommodate the infrastructure needed to support the mining.

Locatable mineral exploration and development are regulated under 43 Code of Federal Regulations 3809 (as amended) for public lands. These regulations provide for mineral activities on public lands while preventing undue and unnecessary degradation. The regulations also provide for reclamation of disturbed areas and coordination with state agencies. The amended 3809 regulations are effective at this time, and include substantial changes to the development of hard rock minerals. Under current regulations, activites under a notice are limited to an exploration operation less than 5 acres. A notice is not a federal action that requires compliance with NEPA, so no environmental documentation is prepared. BLM does review notices to ensure that no unnecessary or undue degradation would occur. A financial guarantee is required to reclaim 100 percent of the disturbance for all notices.

All other mining operations, except casual use, are required to file a plan of operations regardless of the number of acres disturbed. A plan also is required for all exploration activities that disturb over 5 acres, bulk sampling which would remove 1,000 tons or more of presumed ore for testing, or for any surface-disturbing operations greater than casual use in certain Special Management Areas such as ACECs. The approval of plans of operation is a federal action that requires NEPA compliance. Mining claim use and occupancy under 43 Code of Federal Regulations 3715 also requires NEPA compliance. A bond is required for any surface disturbance related to mining to reclaim 100 percent of the disturbance.

Locatable mineral exploration and development for Wilderness Study Areas are regulated under 43 Code of Federal Regulations 3802. Guidelines in the Wilderness Interim Management Plan would be followed for claims and operations within Wilderness Study Areas and Instant Study Areas. The Wilderness Interim Management Plan states that locatable mineral development and exploration activities within Wilderness Study Areas can occur in accordance with the mining laws, but are currently limited to those actions that do not require reclamation. This policy restriction effectively closes Wilderness Study Areas to mineral location.

However, should the Wilderness Interim Management Plan be revised, or if Congress takes action to remove some areas from Wilderness Study Area status, some of these areas eventually could become available for mineral location during the life of this RMP.

Saleable Minerals. Saleable mineral exploration and development is regulated under 43 Code of Federal Regulations 3600. The disposal of saleable minerals is accomplished through competitive and negotiable sales contracts, free use permits, and sales in community pits. Inspections of saleable minerals operations is conducted in accordance with BLM policy contained in BLM Manual Section 3600, and as outlined in BLM Instruction Memorandum No. 99-021. The goals of the saleable mineral inspection program are: 1) an accurate accounting of materials removed; 2) proper compensation to the federal government; 3) protection of the environment, public health, and safety; and 4) identification and resolution of trespass.

All Wilderness Study Areas would be closed to saleable mineral disposal until Congress makes a decision regarding designation of these areas as wilderness. Areas not designated as wilderness could become available for saleable mineral disposal during the life of the RMP.

3.19 Watershed Management

3.19.1 Existing Conditions

The Ely District encompasses all or portions of 61 hydrologic subbasins or watersheds (watershed management units). Subbasins, as defined by the U.S. Geological Survey, are intermediate-sized drainage areas within the widely accepted hierarchical system of hydrologic units. Broad basins, or valleys, and discrete mountain ranges, whose ridges form the boundaries between the watersheds, characterize the District watersheds (see **Map 3.19-1**). District subbasins range from approximately 9,000 to approximately 767,000 acres in size. See **Table 3.19-1** for the acreage of watershed management units within the Ely District.

Table 3.19-1
Hydrologic Watershed Management Units within the Ely District[1]

Name	Number	Public Land Area (acres)	Name	Number	Public Land Area (acres)
Antelope Valley	119	199,300	Newark	121	483,000
Beaver Dam Wash	215	122,600	North Antelope	7	44,300
Big Sand Springs Valley	164	127,500	North Little Smoky Valley	143	56,000
Butte	9	420,100	North Spring Valley	120A	118,800
Cave Valley	181	223,400	Panaca Valley	210	201,500
Central Little Smoky Valley	122	131,100	Park Range	175	8,700
Clover Creek North	212N	82,600	Patterson Wash	187	257,300
Clover Creek South	212S	144,300	Railroad Valley	156	287,000
Coal Valley	188	293,100	Rose Valley	202	29,100
Coyote Springs	228	24,600	Ruby Valley	6	81,800
Deep Creek	118	87,100	Sand Hollow Wash	222	48,100
Delamar Valley	211	229,500	Sand Spring Valley	204	327,000
Dry Lake Valley	183	571,400	Smith Valley	131	34,100
Dry Valley	207	71,200	Snake Valley North	125	140,300
Duck Creek Basin	128	22,700	Snake Valley South	148	120,700
Duck Water	154	186,300	South Little Smoky Valley	176	25,400
Eagle Valley	206	13,600	South Spring Valley	120A	294,800
Egan Basin	123	42,500	South Steptoe	161	171,500
Emmigrant	220	15,900	Spring Valley	120B	384,600
Escalante Desert	208	66,800	Spring Valley Southeast	184E	91,400
Fox-gap Mountain	186	52,300	Spring Valley Southwest	184W	84,600
Garden Valley	185	210,700	Steptoe A	8A	45,100
Gleason Creek	136	40,900	Steptoe B	8B	260,500
Hamblin Valley	180	268,400	Steptoe C	8C	189,000
Huntington	4	94,700	Tikaboo Valley	213	245,100
Jakes Valley	129	198,500	Toquop Wash	230	185,200
Kane Spring Wash	217	158,800	Tule Desert	218	121,900
Lake Valley	182	339,500	White River Central	160B	645,300
Long Valley	117	402,900	White River North	160A	205,300
Meadow Valley Wash North	214A	229,600	White River South	160C	767,000
Meadow Valley Wash South	214B	322,900	**TOTAL**		11,349,200

[1]Based on 5th level hydrologic unit subdivisions.

There are two main types of watersheds. One is the traditional Great Basin type of interior draining watershed that resembles an irregularly shaped bowl with the boundaries occurring at the highest portion (the rim) of the bowl. This type has a closed-drainage system that coalesces to a playa or old lake plain at the center. The other type is the externally draining watershed, which is traditional in shape but occurs in a desert climate. The network of stream channels begin as generally dry ephemeral stream channels high in the watershed and continue downslope joining other channels to form larger channels. These may join small perennial waters in some watersheds. These are desert areas where the precipitation infiltrates locally and mainly supports the on site vegetation. Most channels flow infrequently for brief periods of time during short intense precipitation events. Perennial waters exist only as outflow from springs or groups of springs. Subsurface water movement also occurs along many drainage courses.

3.19.2 Trends

While it is the general consensus of researchers and land management personnel that overall ecological health of watersheds within the Ely District has deteriorated over several decades, specific trends for watershed functional health (expressed in terms of vegetation and soil stability, aquatic communities, and water quality values) have not been established for individual watersheds. The Ely Field Office is implementing a major shift from allotment evaluation at the grazing allotment level to evaluation at the watershed (landscape) level. This change in management approach will help facilitate restoration and management of ecological systems at the landscape level. As discussed under Section 3.19.3, Current Management, the District is currently conducting analyses for nine watersheds. Appendix D describes the methods being used for this review. The results of these watershed studies will provide a basis for future monitoring and follow-up restoration actions.

3.19.3 Current Management

Watershed management refers to a comprehensive approach to land management focused at the landscape level, essentially the subbasin level. Multiple ownerships and jurisdictions within a single watershed require coordination of efforts, because ecological system components and ecological processes do not readily conform to political boundaries. Nevada contains over half (14) of the subbasins nationwide with more than 80 percent on BLM-administered land (USGS 2003). Of these, one-third (5) are located within the Ely District. Therefore, BLM has greater management responsibilities and opportunities relative to restoration within these watersheds. In most cases, the other primary watershed stakeholders involved with restoration on the District are other federal agencies, such as the Humboldt-Toiyabe National Forest, Great Basin National Park, and National Wildlife Refuges.

Since 1972 and the passage of the Clean Water Act, federal agencies have been working to prevent degradation of high quality waters and sensitive aquatic ecological systems and to restore degraded water resources. In 2000, federal agencies adopted a unified federal policy on watershed management as a framework for consistent and enhanced implementation of land management activities to meet their respective goals and mandates for watershed protection (USDA et al. 2000). The adopted policy included standardization of the fifth-level classification of hydrologic units as the common unit for delineating, assessing, and classifying watersheds. Each agency is mandated to conduct and prioritize watershed assessments on a roughly 10-year cycle to guide the management of natural resources. Each watershed

assessment is to determine existing and reference conditions in order to characterize the physical, biological, and chemical conditions and processes affecting water quality, aquatic resources, and overall watershed function.

Consistent with the unified federal policy for ensuring a watershed approach to resource management, Instruction Memorandum 2001-079 (BLM 2001) formally linked the watershed assessment process with the mandate to assess and evaluate rangeland health status (BLM 4180 Manual and 4180-1 rangeland health standards handbook, also 43 Code of Federal Regulations 4180). Implementation of this direction requires the assessment of resource conditions in relation to land health standards developed in concert with the local Resource Advisory Councils. Deviations from land health standards (see Chapter 2.0), also variously referred to as desired conditions, are identified, and factors are evaluated on the District according to a process generally described in Appendix D.

The restoration and maintenance of healthy ecological systems within watersheds is a primary focus for the future management of the Ely District. Healthy ecological systems are geographically diverse and change over time. They are compatible with soil potential and are resilient to disturbance.

Resources and resource uses would be managed to restore or maintain ecological health. Certain resource management changes and active treatments may need to be implemented, in portions of watersheds, to accomplish this objective. Adaptive management would be pursued to avoid deteriorating conditions favoring invasive plants and catastrophic fires. Any projects would be implemented so as to result in a mosaic of vegetation within a watershed.

In the long term, natural disturbance (such as drought or fire) would occur and fewer treatments would be needed to maintain ecological health. The result would be a variety of vegetation phases within a watershed, which would provide diverse, healthy conditions for future generations.

In the past, project proposals would have been developed and implemented based upon boundaries of livestock grazing allotments. The Ely RMP/EIS will implement a policy change that directs BLM to plan and implement decisions based on watershed boundaries.

In the future, watershed analyses will be performed to determine if rangeland health standards are being met within a watershed. This involves an analysis of uses of vegetation by livestock, wildlife and wild horses as appropriate. It also involves analysis of other uses within the watershed. These include such things as: mineral exploration and/or development; off-highway vehicle use; hunting; and rights-of-way and corridor designations. If rangeland health standards are being met, the restoration plan (a portion of the watershed analysis) will propose projects and resource uses designed to maintain the healthy condition of the watershed. If standards are not being met, the restoration plan will propose projects and resource uses designed to improve the condition of the watershed.

There are 61 watershed units within the planning area. It is expected that completion of watershed analyses, including restoration plans with proposed projects, on the 30 high priority watersheds will take approximately 10 years. Completion of watershed analyses on the remaining 31 lower priority watersheds will take longer

than 10 years as more and more effort will be needed to implement projects proposed on the earlier analyzed watersheds.

To date, District implementation of the unified federal policy and 4180 Manual direction has involved ongoing analysis of nine watersheds. Watershed analyses are in progress on the Antelope Valley, Clover Creek South, Gleason Creek, North Antelope, North Spring Valley, Smith Valley, South Steptoe, Spring Valley, and Steptoe A, with completion scheduled for 2005. Priorities for analysis are areas where soils inventories from the National Resources Conservation Service are available.

Ongoing watershed management on the District has substantial support from agricultural, conservation, cultural, environmental, and scientific interests through partnership with the Eastern Nevada Landscape Coalition. The Eastern Nevada Landscape Coalition is a non-profit, community-based organization formed in 2001 to facilitate the BLM Ely Field Office's implementation of the Great Basin Restoration Initiative. It is dedicated to the restoration of diverse, dynamic, and resilient landscapes in the Great Basin.

3.20 Fire Management

3.20.1 Existing Conditions

Fire is an integral part of the ecological process of the many plant communities in the Great Basin. Most of the vegetation types on the Great Basin portion of the District developed under a regime of intermittent fire and are adapted to the effects of fire in some way. Each vegetation type is characterized by a fire frequency that is generally inversely related to fire intensity. Grasslands characterized by fine fuels carry fires at a high frequency and burn rapidly with low intensity. In contrast to desert plant communities, the pinyon-juniper woodlands and upper montane forest types receive higher amounts of precipitation and have cooler mean temperatures. The cooler and wetter conditions at the higher elevations foster plant growth, which in turn can provide higher resistance to fire for long periods, allowing fuels to accumulate. Conditions that promote burning at the higher elevations tend to occur in episodes such as drought cycles, with long intervals between them and higher relative fire intensity when they do occur.

Fire has been a less important factor in the Mojave Desert vegetation communities where the native perennial vegetation is relatively resistant to fires. However, the spread of exotic annual species such as red brome has resulted in increased supplies of fine fuels and greater vulnerability to fire in the Mojave Desert ecological systems.

Within each vegetation type, fire behavior varies with many factors including topography and site productivity. Highly productive sites, such as north slopes, generally have greater biomass and, therefore, can carry fires better than poor sites characterized by less fuel. General fuel characteristics of broad vegetation zones on the Great Basin portion of the District and their typical fire behavior are summarized in **Table 3.20-1**. Flashy fuels, such as cured out annual bromes and steep brushy mountain slopes, have the highest potential rates of spread. In contrast, where crested wheatgrass is dominant, fuel hazards are extremely low, because it remains green though much of the fire season.

Table 3.20-1
General Fuel Characteristics of Broad Vegetation Types
on the Great Basin Portion of the Ely District

Vegetation	Current Fuel Descriptions	Typical (Current) Fire Behavior
Sagebrush dominated communities	Fuel volumes in all of the sagebrush communities vary substantially depending on site conditions and history.	Where grasses are present, fire spreads quickly, however; where fuel continuity is absent, winds are needed to spread. Burned areas generally are over 5,000 acres.
Salt desert shrub	Fuel loads generally are low.	Winds generally are needed to carry fire in sparsely vegetated areas. Natural barriers tend to inhibit fire sizes. Rapid spread generally requires wind.
Pinyon-juniper woodland	Sparse understory grasses due to high tree densities limit the ability to carry fire. High woody fuels, including highly flammable resin and pitch, are widespread.	Fires are either single-tree low intensity events or wind-driven high intensity events covering thousands of acres.
Ponderosa pine/mixed conifer- upper montane forests	High accumulations of down and dead woody fuels combined with high vertical and horizontal fuel continuity.	Variable behavior from low intensity ground fires to stand-replacing crown fires.
Mountain meadows/ herbaceous grasslands	Native grass distribution keeps fuel loads low except where annual bromes have become dominant.	When annual grasses are “cured,” the rate of spread typically is extremely high, and flame lengths can be unsafe for initial attack. Fires often burn on an annual basis.

Literature data regarding historic fire regimes for District vegetation types are summarized in **Table 3.20-2**. Historic fire regimes can be difficult to construct for many vegetation types, and historic return intervals derived for a particular site within a vegetation type may not be representative of other sites in similar vegetation. Tree ring data have been used extensively as a means of reading the fire history of long-lived trees. Shrubs and non-woody plants that are wholly consumed by fire record little or no historic events. Historic fire sizes are potentially the most difficult to ascertain without extensive sampling of trees.

Table 3.20-2
Historic Fire Regimes of Vegetation Communities
on the Great Basin Portion of the Ely District

Vegetation Community	Historic Fire Return Interval (years)	Comments
Wyoming big sagebrush	25 to 100	Fire frequency was closer to 100 years where shrubs were small in stature with sparse grasses due to low site productivity.
Basin big sagebrush	30 to 70	--
Mountain big sagebrush	11 to 40	--
Black sagebrush	100 to 200	--
Salt desert shrub	40 (mean)	Fire interval highly variable due to soils that can range from wet to extremely droughty.
Pinyon-juniper woodland	30 to 300	Understory fires burned more frequently.
Mountain mahogany	13 to 22	--
Mixed conifer-upper montane	Variable	Long intervals in bristlecone pine (300 plus years), subalpine fir (90- to 350-year intervals), Engelmann spruce (150 plus years), limber pine (50- to 200-year intervals). Shorter intervals in ponderosa pine (20- to 50-year intervals), white fir (6- to 20-year intervals), and aspen (10- to 40-year intervals).
Mountain meadows	Less than 20	--
Riparian	No data	Riparian areas have characteristics that reduce the frequency and severity of fire relative to their surrounding uplands.

Source: Arno and Wilson 1986; Bradley et al. 1992; Hann et al. 2003; Miller 1998; Welch and Criddle 2003; BLM 2000; and BLM unpublished data.

Fire regimes in the Intermountain West have been altered greatly by the introduction of the non-native annual bromes such as cheatgrass, historic livestock grazing, and nearly 100 years of fire suppression. Livestock grazing that decreases perennial grass cover and height also reduces the availability of fine fuels to carry fires when ignitions occur. Historic livestock grazing has combined with other factors, such as fire suppression, to result in longer fire-free intervals and increased fuel accumulations in higher elevation sagebrush communities. This situation, in turn, leads to increased competition from pinyon pine and juniper seedlings and increased likelihood of intense fires that may eliminate the sagebrush species. At lower elevations, the reduction in perennial grasses and forbs in the sagebrush understory has commonly lead to invasion by cheatgrass and other invasive annual weeds or to dense stands of sagebrush with little or no herbaceous understory. The latter are prone to intense fires that effectively remove the sagebrush and set the stage for cheatgrass proliferation.

Fuel conditions across the Intermountain West have become a concern, especially to communities that adjoin undeveloped landscapes, commonly referred to as the wildland-urban interface. In these areas, high fuel loads can create hazards that combine with a high risk of ignition by humans and high values of homes, ranches, and other infrastructure. Although no structures were lost, the town of Pioche experienced a wildfire in the wildland-urban interface in the spring of 2003.

3.20.2 Trends

Wildland/Urban Interface – Pioche, Nevada
Photo by Dave Tilford

Between 1986 and 2002, approximately 332,286 acres burned in 3,141 wildfires within the Ely District. This 16-year total represents less than 1 percent of the District and averages 20,767 acres and 196 managed wildfires per year over all vegetation types combined. Wildfires occurred in 11 of 18 vegetation communities during this period as shown in **Figure 3.20-1.** The 18 vegetation communities shown in **Figures 3.20-1** through **3.20-4** are based on a more refined land classification scheme than the vegetation classifications used elsewhere in this RMP/EIS. Greasewood and hopsage used in the fire analysis correspond to the salt desert shrub cover classes in **Table 3.20-2**.

As shown in **Figure 3.20-1,** the proportion of area burned in each of the broad vegetation types is roughly proportionate to their relative abundance on the District (**Table 3.20-2**). The exception is the grassland type where the high frequency of fire results in a disproportionately higher total number of fires and burned areas compared to its relative abundance on the overall landscape.

The predominance of acreage burned, and greatest frequency of fires in this period, were in the pinyon-juniper woodland, followed by grassland, blackbrush-creosote, and sagebrush. At least one wildfire in the pinyon-juniper woodland, sagebrush, and mountain shrub communities has occurred every year. In contrast, all wildfires in the greasewood, hopsage, playas, and barren communities amounted to less than 1 acre for all years combined.

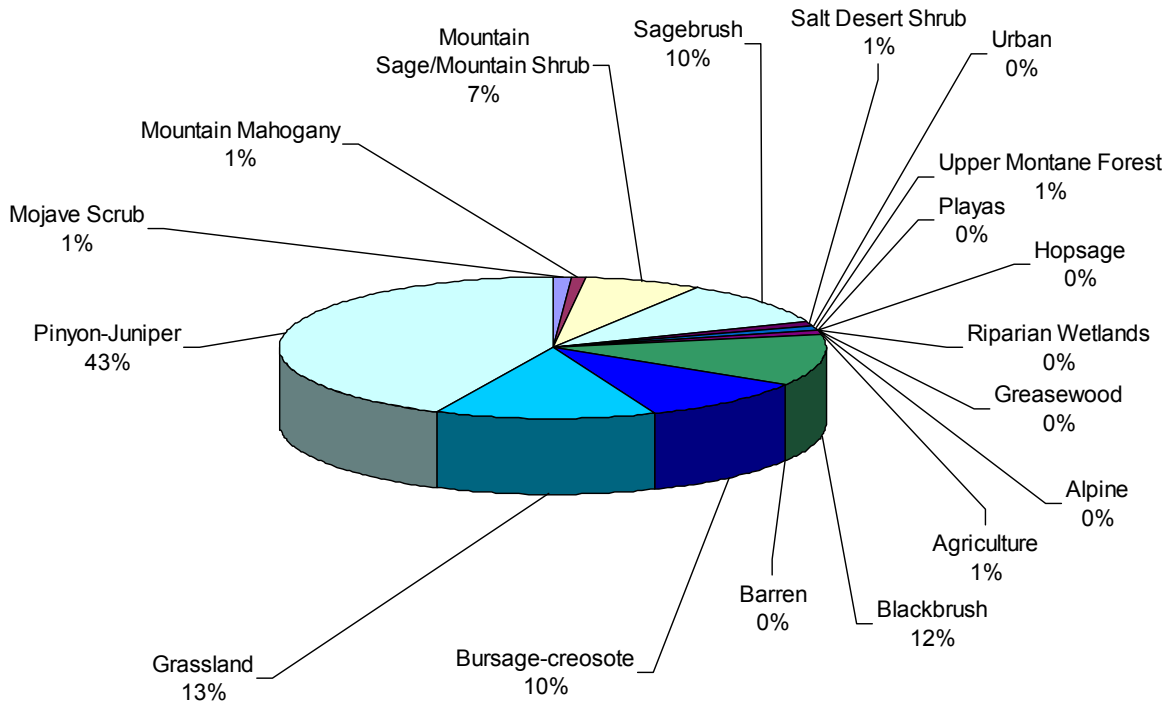


Figure 3.20-1. Proportion of Total Areas Burned in Wildfires by Vegetation Type (1986 to 2002)

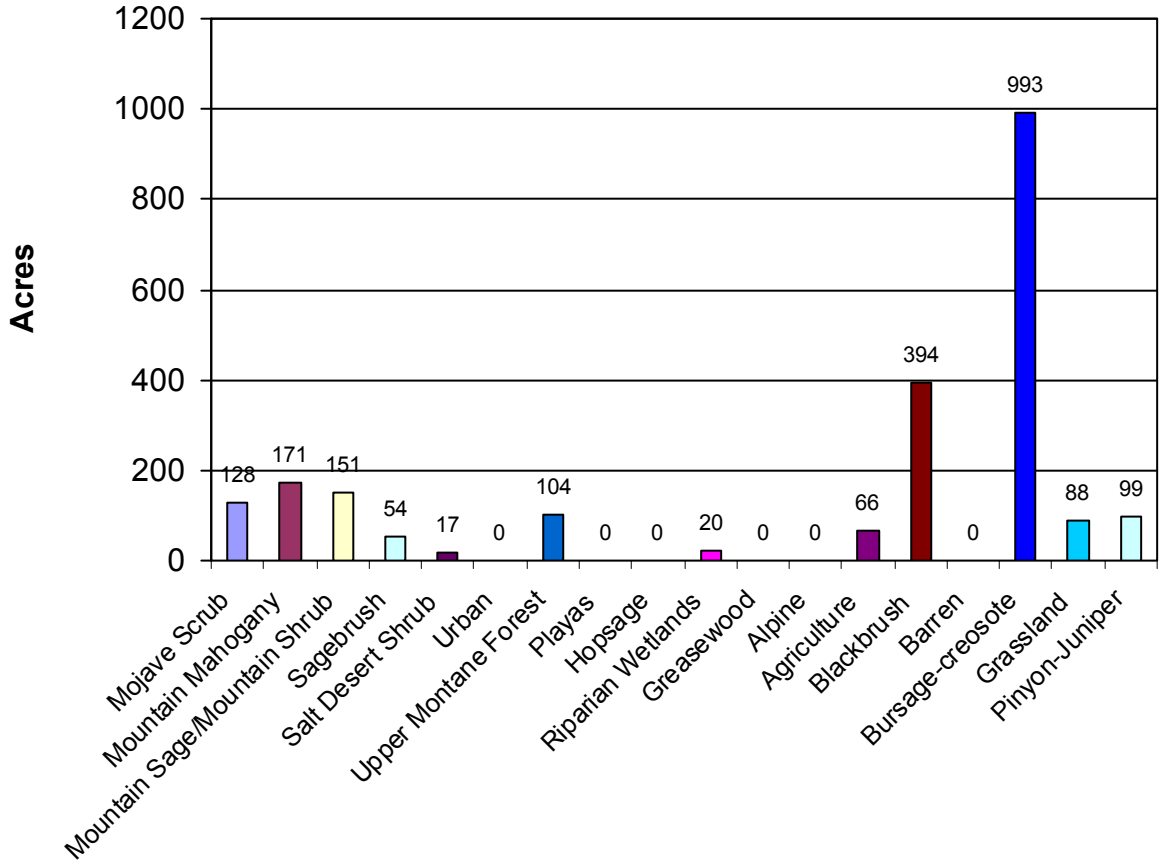


Figure 3.20-2. Mean Fire Size by Vegetation Type (1986 to 2002)

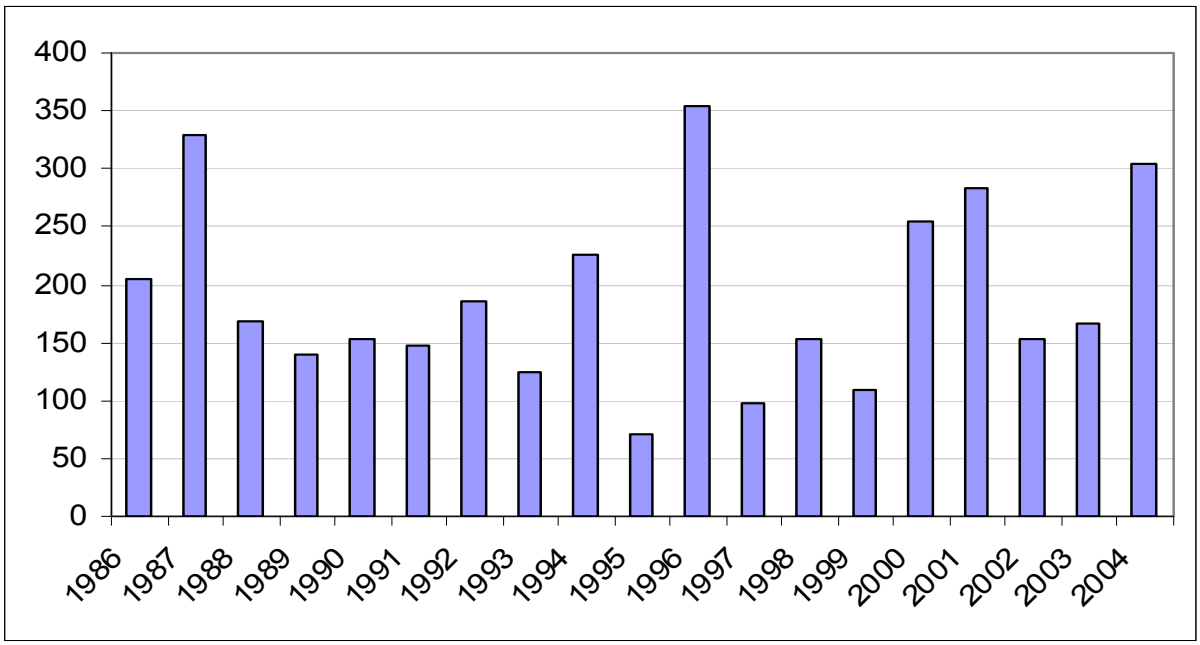


Figure 3.20-3. Number of Wildfires by Year (1986 to 2002)

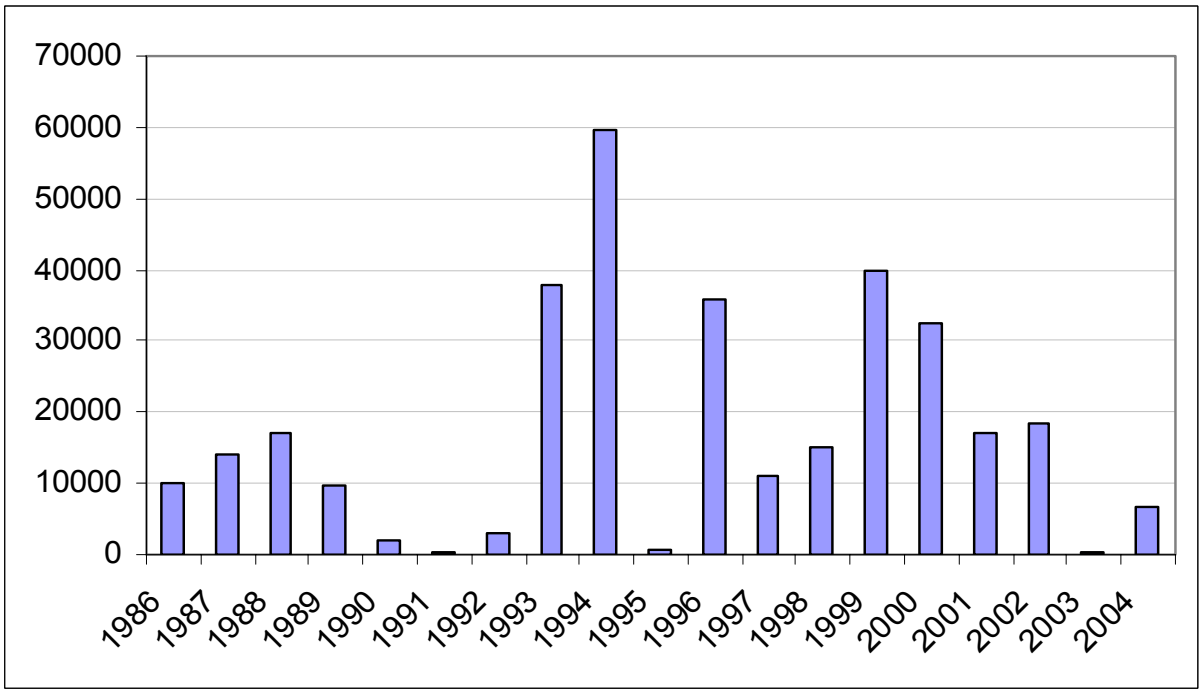


Figure 3.20-4. Total Acres Burned in Wildfires (1986 to 2002)

There have been three large peaks in the number of wildfires on the Ely District in the past 16 years (1987, 1996, and 2000-2001) (**Figure 3.20-3).** However, the greatest acreage burned in 1993, 1994, 1996, 1999, and 2000 when over 30,000 acres burned each year (**Figure 3.20-4).**

Where annual bromes are present, fire activity in the woodland and shrub communities facilitates the spread of these annual species, especially where perennial grass species are at low density or abundance. Hence, as wildfires occur and increase, the trend is toward increasing areas infested with annual bromes.

It is generally accepted that wildland fires in the Intermountain West have been increasing in size, intensity, suppression costs, and human related losses. This trend largely has been attributed to long-term fire suppression and the resulting accumulation of woody fuels, combined with alterations of the natural fire regime resulting from vegetation changes such as reductions in fine fuels due to livestock grazing. As the population of Nevada and surrounding areas increases, greater numbers of recreationists increase the risk of human caused ignitions. As the local communities in the wildland-urban interface areas grow, the potential for fire-related losses in these areas correspondingly increases.

3.20.3 Current Management

The Ely District currently manages planned and unplanned ignitions according to the Ely Managed Natural and Prescribed Fire Plan (BLM 2000), which was developed with extensive public involvement. The Ely fire plan was prepared in response to the Federal Wildland Fire Management Policy and Program Review of 1995 and the threats posed by current fuel loading in the Intermountain West. Under current management, the short-term goal is to re-introduce fire using managed natural and prescribed fire. The long-term goal is for fire to be re-introduced to the District ecological systems and allowed to function as a natural process to the extent possible.

Prescribed and wildland fire use must comply with applicable smoke management requirements as required by the Nevada Smoke Management Program, including obtaining annual permits, as well as daily evaluation of the fire conditions, to ensure applicable air quality regulations are not violated.

The Ely District is classified into general fire management categories based on current fuel types, distributions, and amounts. Seventy-five percent of the District generally is unsuitable for restoring natural fire at the present time and is classified as full suppression areas. Approximately 1.2 million acres that are managed as full suppression occur within desert tortoise habitat in the southern portions of the District. Approximately 3.2 million acres currently are managed with constraints, such as fire size, to conserve wildlife habitat features (**Table 3.20-3** and **Map 3.20-1**) (BLM 2000). It is expected that 75 percent of the time, individual managed natural fires will not exceed the maximum allowable burned acres (BLM 2000).

Appropriate management response is applied to all wildland fire incidents occurring on the District. The Wildland Fire Management Policy (U.S. Department of the Interior et al. 2001) provides for a full range of responses and for the opportunity for all wildland fires to be managed for resource benefits. Appropriate management responses are based on land management objectives, relative risk, complexity, and defensibility of fire management boundaries and are continually updated as conditions change. Fire

suppression can involve high levels of organization and cooperation to implement initial attack, containment, and control.

Table 3.20-3
Maximum Allowable Burn Area within Constraint Zones

Maximum Allowable Burn Area (acres)	Total Constraint Zone Area (acres)
Full Suppression	10,326,100
300	133,700
500	136,900
1,000	74,700
1,500	555,100
2,500	158,000
Few Constraints	2,171,100
Total	**13,555,600**

When selecting an appropriate management response, firefighter and public safety is always the highest concern. Minimum impact suppression tactics are used on all District wildfires in order to incur the least possible impact to the land while achieving fire management objectives. Minimum impact techniques might include using existing roads for fire breaks rather than building new lines or watching dying fires rather than disturbing them during "mop-up" operations.

The Ely Field Office cooperates extensively with other wildland firefighting agencies and units. Due to its central location in eastern Nevada, Ely is a major center for firefighting logistics and operations. Memoranda of Understanding between the Ely Field Office and surrounding public lands management agencies (e.g., Humboldt-Toiyabe National Forest, BLM Elko Field Office) have been established and identify responsible parties for initial attack of fires.

Wildfires are evaluated for emergency stabilization and rehabilitation to reduce the adverse effects of wildfire on soils, vegetation, crucial wildlife habitat, property, water quality, and other resources. Emergency stabilization refers to planned actions within 1 year of a wildland fire to:

- Stabilize and prevent unacceptable degradation to natural and cultural resources;
- Minimize threats to life or property resulting from the effects of fire; and
- Repair/replace/construct physical improvements necessary to prevent degradation of land and resources.

Priorities of emergency stabilization include:

- Human life and safety; and
- Property and unique or critical biological/cultural resources. (Based on an evaluation of relative values and stabilization costs.)

Rehabilitation refers to actions taken within 3 years of the fire containment date to:

- Repair or improve lands unlikely to recover to a management approved condition; or
- Repair or replace minor facilities damaged by fire.

Priorities of rehabilitation include:

- The repair or improvement of lands damaged directly by a wildland fire; and
- The rehabilitation or establishment of healthy, stable ecological systems in the burned area. (Based on an evaluation of relative values and stabilization costs.)

Restoration refers to the continuation of rehabilitation beyond the initial 3 years of rehabilitation funding or the repair or replacement of major facilities damaged by fire, including:

- Replacement of major infrastructure (visitor center, residences, administration offices, work centers) burned in the fire; and
- Watershed restoration.

Emergency stabilization and rehabilitation may involve grazing closures and horse gathering in revegetated areas, fence repair or replacement, various forms of seeding including site preparation and planting, installation of erosion control structures, and road repairs.

In 2001, in cooperation with the Humboldt-Toiyabe National Forest, the Ely Field Office identified two high priority wildland-urban interface areas in need of fuels reduction on approximately 32,000 acres. Wildland-urban interface areas on the District are listed in **Table 3.20-4**. In December 2003, Congress passed the Healthy Forests Restoration Act. This new law includes provisions for reducing destructive wildfires by allowing land managers to reduce hazardous fuels and restore wildfire-damaged landscapes.

Table 3.20-4
Wildland-urban Interface Communities Within The Ely District

Community	County	Community	County
Baker	White Pine	Caliente	Lincoln
Cherry Creek	White Pine	Caselton Heights	Lincoln
Cold Creek	White Pine	Eagle Valley	Lincoln
Ely	White Pine	Hiko	Lincoln
Lackawanna	White Pine	Panaca	Lincoln
Lund	White Pine	Pioche	Lincoln
McGill	White Pine	Ursine	Lincoln
Mount Wilson Guest Ranch Community	Lincoln	Duckwater	White Pine
Preston	White Pine	Alamo	Lincoln
Ruth	White Pine		

3.21 Noxious and Invasive Weed Management

3.21.1 Existing Conditions

Invasive and noxious plant species are common impediments to management objectives within the Great Basin. Invasive species are alien (non-native) species whose introduction into an environment where they did not evolve does or is likely to cause economic or environmental harm or harm to human health. Noxious species are those species designated by a federal, state, or county government as injurious to public health, agriculture, recreation, wildlife, or property (Sheley, Petroff, and Borman 1999). Noxious weeds designated by the State of Nevada and known to occur on the Ely District are listed in **Table 3.21-1**. Invasive species known to occur on the Ely District are listed in **Table 3.21-2**.

Currently, 6.3 million acres, or approximately half of the District, have been inventoried at least once for noxious weeds. Over 168,000 acres of noxious weed infestations have been recorded. Noxious weeds on the District tend to be associated with frequently disturbed areas such as roads, campgrounds, airstrips, rodeo grounds, and heavily used areas around towns and communities. For example, notable infestations of Dalmatian toadflax and spotted knapweed are located around the community of Pioche. Disturbed riparian areas appear to be particularly susceptible. However, the overall distribution of noxious weeds on the District does not suggest that, with the exception of roads and riparian areas, some habitats are more susceptible than others.

The most abundant noxious weed species is Russian knapweed, which accounts for two-thirds of the known infestations on the District. Approximately 44 percent of noxious weeds inventoried along roads have been attributed to spotted knapweed. Of the noxious weed species presently known on the District, the highest concerns are posed by tall whitetop, saltcedar, dalmatian toadflax, and spotted knapweed, due to their abundance and ability to spread rapidly.

Sixteen species of invasive plants known to occur on the Ely District are listed in **Table 3.21-2**. The annual bromes, specifically cheatgrass and red brome, are of particular concern because of their expanding distribution and adverse effects to native ecological systems. The invasive species filaree long ago became naturalized covering millions of acres in the Mojave Desert and has become culturally acceptable because it provides forage for livestock and wildlife. The remainder of the invasive species listed in **Table 3.21-2** generally are restricted to disturbed areas.

Cheatgrass and halogeton are the most prevalent invasive species on the District. They are most prolific in the lower elevations from the woodland and shrub communities to the hot desert. Cheatgrass and other annual bromes occur in the understory of one-third of the vegetation types within the District. The blackbrush, salt desert, Wyoming and black sagebrush shrub communities are most susceptible to cheatgrass invasion. Halogeton is a common invader into the salt desert, winterfat, and black sagebrush shrub communities.

Table 3.21-1
Nevada Noxious Weeds Known to Occur on the Ely District

Common Name	Scientific Name
Black henbane	*Hyoscyamus niger*
Canada thistle	*Cirsium arvense*
Dalmatian toadflax	*Linaria dalmatica*
Diffuse knapweed	*Centaurea diffusa*
Hoary cress (whitetop)	*Cardaria draba*
Leafy spurge	*Euphorbia esula*
Musk thistle	*Carduus nutans*
Poison hemlock	*Conium maculatum*
Puncture vine	*Tribulus terrestris*
Russian knapweed	*Acroptilon repens*
Saltcedar (tamarisk)	*Tamarix ramosissima*
Scotch thistle	*Onopordum acanthium*
Spotted knapweed	*Centaurea masculosa*
Squarrose knapweed	*Centaurea virgata Lam.* var. *squarrose*
Tall whitetop (perennial pepperweed)	*Lepidium latifolium*
Water hemlock	*Cicuta maculata*

Table 3.21-2
Ely District Invasive Species

Common Name	Scientific Name
Cheatgrass	*Bromus tectorum*
Red brome	*Bromus rubens*
Tumble mustard	*Sysimbrium altissimum*
Kochia	*Kochia scoparia*
Russian thistle	*Salsola kali*
Halogeton	*Halogeton glomeratus*
Bull thistle	*Cirsium vulgare*
Annual foxtail	*Hordeum jubatum*
Wild licorice	*Glycyrrhiza lepidota*
Moth mullein	*Verbascum blattaria*
Common mullein	*Verbascum thapsus*
Common cocklebur	*Xanthium spinosum*
Filaree/cranesbill	*Erodium circutarium*
Sahara mustard	*Brassica tournefortii*
Elongated mustard	*Brassica elongate*
Horehound	*Marrubium vulgare*

3.21.2 Trends

Similar to other public lands in the west, the Ely District has experienced an expansion of several species of noxious and invasive weeds in the last two decades. These expansions have involved previously

established species as well as increasing numbers of new species. These plants dominate localized native plant communities and compete for water and nutrients, ultimately displacing native species. This displacement has altered fire regimes, diminished forage for animals, and decreased productivity of the land.

The current trend for noxious weeds is upward in the region as a whole, although current roadside-based efforts to control these species may be slowing the trend locally. It is expected that additional noxious species will continue to spread and approach the District throughout the planning period. For example, camelthorn and Malta starthistle presently are known to occur in neighboring Clark County but have not yet been recorded within the District.

Invasive weeds such as cheatgrass and other annual bromes from the Mediterranean region are widespread in the Intermountain West where they have been reported to extend over approximately 25 million acres of public land alone (BLM unpublished data). Large scale ecological system changes have been attributed to the monocultural conditions brought on by the rapid establishment of cheatgrass (Billings 1994). Annual bromes are prolific seeders that mature earlier than native species and form a continuous bed of highly flammable fine fuels at a time of year that fires did not historically burn. Cheatgrass evolved in hot dry environments with a frequent fire interval that fosters its proliferation. Its presence in western ecological systems has affected both the timing and the frequency of wildfires, which in turn have affected ecological system function.

3.21.3 Current Management

Contemporary, agency policy and management direction for preventing, detecting, and treating noxious and invasive species includes Executive Order 2399 (1999), Instruction Memorandum 99-076 (1999), and the BLM National Partners Against Weeds Action Plan (1996).

At the local level, the Ely Field Office has been managing noxious and invasive weeds as described and evaluated in the programmatic environmental assessment (BLM 2000), landscape herbicide application environmental assessment (BLM 2001a,b,c), and the Ely Field Office policies stated in Instruction Memorandum NV 04-001, Instruction Memorandum 99-076, and NV-040-9015-01 (BLM 1999). The Ely Field Office uses the most current species lists developed by the Nevada Department of Agriculture.

The BLM adheres to the concept of integrated weed management. This refers to the use of a wide range of available tools and techniques and their combinations to meet weed objectives in each site-specific situation. Vegetation treatments, including those for noxious weeds that are conducted on public lands, currently are implemented under the principles and methodology in the 1991 Record of Decision and Final EIS for Vegetation Treatment on BLM Lands in Thirteen Western States (BLM 1991). Site-specific documentation is prepared for each vegetation treatment plan on the District.

Treatments of noxious weeds have focused on cooperative efforts with White Pine, Lincoln, and Nye counties and Nevada Department of Transportation along roads and abandoned rights-of-way. Treatments have been almost entirely chemical from truck-mounted sprayers. Treatment of saltcedar also has been

predominantly with herbicides in drainages such as Meadow Valley Wash. Effective treatment of infestations in disturbed riparian areas is frequently constrained by the need for corresponding treatment on adjoining private lands.

3.22 Special Designations

3.22.1 Existing Conditions

The following sections describe areas that have received special designations on the Ely District. These special designation areas are presented in **Table 3.22-1** and on **Map 3.22-1**.

Table 3.22-1
Existing Special Designation Areas on the Ely District[1,2]

ACECs	
Beaver Dam Slope	36,900 acres
Kane Springs	65,900 acres
Mormon Mesa	109,700 acres
Backcountry Byway	
Mount Wilson Backcountry Byway	65 miles
Geologic Areas	
Cave Valley Cave	40 acres
Goshute Cave	120 acres
Leviathan Cave	1,000 acres
Whipple Cave	80 acres
Rockhounding Areas	
Garnet Fields	1,200 acres
Scenic Areas	
Blue Mass	950 acres
Mount Grafton/North Creek	16,100 acres
Kious Spring	40 acres
Weaver Creek	640 acres
Natural Areas	
Goshute Canyon	7,600 acres
Shoshone Ponds	1,200 acres
Swamp Cedar	3,200 acres
Research Natural Areas	
Heusser Bristlecone	480 acres
Pygmy Sage	160 acres
Historic Areas	
Bat Cave and Guano Mine	40 acres
Archaeological Sites	
Baker	80 acres
Baker Creek	75 acres
Garrison	120 acres
Mount Irish	640 acres
Rock Animal Corral	160 acres
Snake Creek Indian Burial Cave	40 acres
White River Petroglyphs	480 acres
Archaeological Districts	
Panaca Summit	7,040 acres
Sunshine Locality	34,560 acres
White River Narrows	4,000 acres
National Historic Trails	
Pony Express Trail	153 miles
California National Historic Trail	15 miles
Designated Wilderness	
Big Rocks	12,900 acres
Clover Mountains	85,700 acres
Delamar Mountains	111,000 acres
Far South Egans	36,300 acres
Fortification Range	30,500 acres
Meadow Valley Range	122,000 acres
Mormon Mountains	146,000 acres
Mount Irish	28,300 acres
Mount Moriah	6,400 acres
Parsnip Peak	43,500 acres
South Pahroc Range	25,700 acres
Tunnel Spring	5,400 acres
Weepah Spring	51,300 acres
White Rock Range	24,200 acres
Worthington Mountains	30,600 acres
Wilderness Study Areas	
Antelope Range	540 acres
Blue Eagle	14,300 acres
Goshute Canyon	38,100 acres
Marble Canyon	15,100 acres
Mount Grafton	73,000 acres
Park Range	30,700 acres
Riordan's Well	36,200 acres
South Egan Range	93,600 acres

[1]Note: The acreage presented is within the planning area. Special designation area acreage outside the planning area is not included.
[2]Note: Acreage figures are approximate and have been rounded.

3.22.1.1 Areas of Critical Environmental Concern (ACECs)

Existing Conditions

Currently, there are three existing ACECs (Beaver Dam Slope, Kane Springs, and Mormon Mesa) in the District (see **Table 3.22-1**). The Beaver Dam Slope ACEC is located in southeastern Lincoln County, west of the Nevada/Arizona/Utah border (**Map 2.4-40**, **Map M-2**). The area extends north from the Lincoln/Clark County line and northwest of the city of St. George, Utah. The Kane Springs ACEC is located in southwestern Lincoln County, west of the existing Mormon Mesa ACEC (**Map 2.4-40**, **Map M-2**). The area extends north along U.S. Highway 93 towards Alamo from the Lincoln/Clark County border. The Mormon Mesa ACEC is located in south central Lincoln County, west of the existing Kane Springs ACEC, and east of the existing Beaver Dam Slope ACEC (**Map 2.4-40**, **Map M-2**). The ACEC extends north from the Lincoln/Clark County line and is north of the communities of Mesquite and Moapa, Nevada, near the Mormon Mountain Range.

These ACECs consist of a total of 212,500 acres of critical desert tortoise habitat and are managed primarily for recovery of the species. They also have several relationships to existing rights including several highway and utility right-of-way corridors, several existing mining claims, oil and gas leases, and water filings/appropriations.

3.22.1.2 Backcountry Byways

Backcountry byways are roadways that have been designated by the BLM as providing access to aesthetic and scenic resources. These roads can range from narrow, graded roads with seasonal access to paved two-lane highways with year-round access. At present, there is one existing backcountry byway on the District (see **Table 3.22-1**).

The Mount Wilson Backcountry Byway begins on State Road 322 at Pioche, or off of U.S. Highway 93 at the Pony Springs Rest Area about 22 miles north of Pioche. This route consists primarily of gravel roads that wind through an ancient volcanic caldera now forested with pinyon and juniper trees at the lower elevations and with aspen, mountain mahogany, and ponderosa pine at higher elevations. Access is extremely limited during the winter and route signing is minimal.

3.22.1.3 Geologic Areas

Geologic areas are areas designated by the BLM as having unique or outstanding geologic importance that requires special attention and management to ensure preservation of these resources. At present, there are four existing geologic areas on the District (see **Table 3.22-1**). These geologic areas offer unique underground geological features and are highly regarded by cavers for their underground exploration and geological study opportunities.

3.22.1.4 Rockhounding Areas

At present, there is one existing rockhouding area on the District (see **Table 3.22-1**). Garnet Hill (Garnet Fields) is an internationally known site for collectors of garnet, a ruby red semi-precious gem found in rocky volcanic outcrops. Garnet Hill facilities include picnic sites with grills and a handicap accessible restroom.

3.22.1.5 Scenic Areas

National scenic areas are areas designated to provide for the conservation and protection of certain scenic, recreation, or pastoral values and to provide enhancement of those values. These areas can exhibit a number of unique features such as interesting land forms, lakes, or streams with attractive natural settings. At present, there are five existing scenic areas on the District (see **Table 3.22-1**).

3.22.1.6 Natural Areas

Natural areas are areas designated by the BLM that have outstanding scenic characteristics, natural characteristics, or scientific importance that require special management to preserve these characteristics in a natural condition. At present, there are three existing natural areas on the District (see **Table 3.22-1**).

3.22.1.7 Research Natural Areas

Research natural areas are areas set aside by Congress or a public or private agency to preserve and protect ecological communities, associations, phenomena, characteristics, or natural features or processes for scientific and educational purposes. The primary management objective is to protect ecological processes, conserve their biological diversity, and provide opportunities for observational activities associated with research and education. Research natural areas may consist of diverse vegetation communities, wildlife habitat, unique geological formations, cultural resource values, and other values identified by physiographic provinces established in state or agency natural resource planning documents. At present, there are two existing research natural areas on the District (see **Table 3.22-1**).

3.22.1.8 Historic Areas

Historic areas are areas designated by the BLM to preserve and protect sites exhibiting significant cultural resources. These areas typically contain evidence of American history or prehistoric resources. At present, there is one existing historic area on the District (see **Table 3.22-1**).

3.22.1.9 Archaeological Sites

Archaeological sites are areas designated by the BLM to preserve and protect sites exhibiting significant cultural resources. These areas typically contain evidence of American history or prehistoric resources. At present, there are seven existing archaeological sites on the District (see **Table 3.22-1**).

3.22.1.10 Archaeological Districts

An archaeological district is an area that contains a number of archaeological resources that are related and are considered as a whole rather than as a number of individual sites.

At present, there are three existing archaeological districts on the District (see **Table 3.22-1**). The White River Narrows Archeological District contains numerous rock art sites that include both pictographs and petroglyphs. The Panaca Summit Archaeological District contains 74 prehistoric sites, which include base camps, short-term campsites, activity loci, and isolates. The Sunshine Locality National Register District consists of a series of 12 sites representing a subsistence pattern known as the Western Stemmed Tradition. The sites primarily are fragile surface deposits composed almost entirely of lithic tools and lithic debris.

3.22.1.11 National Historic Trails

National historic trails are designated by Congress for routes that follow as closely as possible to original trails or routes of travel of national historic significance, and that meet a specific set of criteria. The purpose is to identify and protect historic routes and their associated artifacts. At present, there are two existing national historic trail on the District (see **Table 3.22-1**).

3.22.1.12 Designated Wilderness

A wilderness area is an area designated by Congress and defined by the Wilderness Act of 1964 as a place that "(1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value."

At present, the Ely district manages approximately 6,400 acres of the 82,000-acre Mount Moriah Wilderness. Mount Moriah is the Nevada BLM's first designated wilderness and is managed in accordance with the Wilderness Act of 1964, the Nevada Wilderness Protection act of 1989, and the 1995 Wilderness Management Plan for the Mount Moriah Wilderness. The Ely District also manages approximately 754,600 additional acres of wilderness as created by the Lincoln County Conservation, Recreation, and Development Act of 2004. These areas have high-quality opportunities for primitive and unconfined recreation and solitude due to the variety of landforms and low level of human activity. Special features include prehistoric and historic resources, caves, bristlecone pines and riparian vegetation (see **Table 3.22-1**). The existing wilderness area is managed in accordance with BLM's Wilderness Management Regulations.

3.22.1.13 Wilderness Study Areas

A Wilderness Study Area is an area identified by the BLM as having wilderness characteristics, thus making it worthy of consideration by Congress for wilderness designation. Wilderness Study Areas are managed to

prevent impairment of the area's suitability for designation by Congress as wilderness under the Interim Management Policy for Lands under Wilderness Review (H-8550-1). The BLM no longer identifies wilderness study areas through land use planning but continues to manage existing wilderness and wilderness study areas as such. The BLM currently manages the Mount Moriah Wilderness and manages the wilderness values on eight wilderness study areas within the District.

3.22.2 Trends

BLM special designations commonly result from the recognition and need for protection of the unique natural and cultural resource qualities of certain areas. These unique qualities often are identified from the results of institutional research and public and external agency input. In general, input concerning potential special designation areas is received continuously by BLM. The periodic RMP revision process provides the opportunity to systematically evaluate a variety of natural and cultural features for special designation. As indicated in the discussion of potential ACEC designation, the public has been involved in nominating potential sites, and the BLM has furthered screened these nominations to a smaller number of sites that have been selected for further analysis in the EIS. The RMP Record of Decision will provide the framework for the establishing the boundaries and management prescriptions for any new special designation areas.

3.22.3 Current Management

3.22.3.1 Areas of Critical Environmental Concern

The ACEC designation is an administrative designation used by the BLM that is accomplished through the land use planning process. It is unique to the BLM in that no other agency uses this form of designation. The Federal Land Policy and Management Act states that the BLM will give priority to the designation and protection of ACECs in the development and revision of land use plans.

BLM regulations (43 Code of Federal Regulations part 1610) define an ACEC as an area "within the public lands where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards." Private lands and lands administered by other agencies are not included in the boundaries of ACECs. ACECs differ from other special management designations (e.g., Wilderness Study Areas) in that designation by itself does not automatically prohibit or restrict other uses. In order to be designated, special management beyond standard provisions established by the plan must be required to protect the relevant and important values. Further information about these criteria is presented in Appendix M.

3.22.3.2 Other Designations

The BLM may decide to protect specific areas either alone, or in conjunction with other agencies. Examples of BLM designations authorized under the Federal Land Policy and Management Act include backcountry byways (BLM Handbook H-8357-1), archaeological and historic sites, and natural areas.

National Historic Trails are authorized under the National Trails System Act, administered by the National Park Service. However, the BLM has responsibility for managing the land uses and activities occurring on or near these trails where they cross BLM public lands.

The Classification and Multiple Use Act of September 19, 1964 (78 STAT 986, 43 USC 1411) authorizes the Secretary of Interior to review the public lands to determine which lands shall be classified as suitable for disposal and which lands are considered to contain such values as to make them more suitable for retention in federal ownership.

A public land order is one type of withdrawal order to segregate land for a specific reason. A withdrawal does not become effective until one of the following are published in the Federal Register:

1. Public land Orders (approved by the Secretary, Department Secretaries, and Assistant Secretaries)
2. Executive Orders, early withdrawals were done by this, often handwritten.
3. Presidential Proclamations: these are few and far between and new monuments.
4. Secretarial Orders, similar to Executive Orders
5. Geologic Land Office Orders, pre-BLM
6. Bureau of Land Management Orders: (general, Administrative Order, Director)
7. Act of Congress or Public Law (Military withdrawals over 5,000 acres)

3.23 Economic Conditions

3.23.1 Employment and Unemployment

The BLM does not have direct management responsibility for economic and social conditions. However, the predominance of public lands in the District gives rise to interest and concern over the social and economic (socioeconomic) conditions arising from the interactions between people, their activities, and associated public use and management of public lands. As a result, the social structure of the region also must be recognized during the planning process, and social impacts associated with the RMP alternatives assessed as part of the NEPA review. Information related to social conditions is interspersed within the information presented throughout this section.

The Ely District includes land in three of Nevada's 17 counties: Lincoln, Nye, and White Pine. All of Lincoln and White Pine counties, but only the eastern portion of Nye County, including the Duckwater Shoshone Indian Reservation, are within the District. The portion of Nye County within the District is rural and isolated by distance from the major communities and government service centers in the county. Consequently, important economic and social linkages connect the area to Ely and other nearby areas of White Pine County.

Communities and population centers in the District include two incorporated municipalities: Ely, the county seat of White Pine County, and Caliente in Lincoln County. Unincorporated communities in the District include McGill, Ruth, Lund, Baker, Preston, and Cherry Creek in White Pine County; Panaca, Ash Springs, Alamo, and Pioche in Lincoln County; and Duckwater and Currant in Nye County. Pioche is the county seat of Lincoln County. Ely is the largest trade and service center in the District, followed by Caliente. Pioche, Panaca, and McGill; all support a limited range of essential consumer and community services. Three American Indian reservations located within the District also are population centers.

Lands administered by the BLM and other federal agencies comprise the majority of all lands in the three counties (98.3 percent in Lincoln, 92.7 percent in Nye, and 93.5 percent in White Pine counties). The statewide average is 85.3 percent. Privately owned lands and lands controlled by units of state and local government total about 1.3 million acres in the three counties, approximately 415,000 acres of that in Lincoln and White Pine counties. Most of the private and locally controlled land in Nye County is outside the District.

Additional concerns arise in the context of environmental justice considerations under Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. All or part of three federally recognized American Indian reservations are located within the District: the Duckwater Shoshone Reservation, the Ely Shoshone Colony, and the Goshute Shoshone Reservation. The latter straddles the Nevada-Utah state line, with two-thirds located in White Pine County and the remainder in Juab County, Utah.

The description of the socioeconomic environment for the District focuses on Lincoln and White Pine counties. This emphasis reflects the geospatial limitations inherent in the available data (i.e., data compiled

and reported at the county level) and the limited population and economic activity of the Duckwater Census Civil Division. Data or qualitative descriptions are included for Nye County or the Duckwater Census Civil Division where appropriate to describe conditions in that portion of the District. Additional information regarding socioeconomic conditions in the Ely District is contained in a separate document Socioeconomic Profile, U.S. Bureau of Land Management, Ely District, Lincoln, White Pine, and Nye Counties, Nevada. Copies of that report are available through the Ely Field Office.

The economies of rural Nevada, including that of the District, historically have been relatively undiversified and dependent upon mineral or other natural resource development, agriculture, and government. That dependency subjects the local economy to expansion and contraction cycles tied to changes in one or more key sectors, and to the subsequent amplifications of those changes due to "multiplier" effects as the direct changes in business and consumer spending ripple through the economy. Economic data for White Pine and Lincoln counties indicate a net change of 2.63 jobs for each job gained or lost in gold mining, 1.67 net jobs per job in cattle ranching, 1.4 to 1.7 jobs per construction job, and 1.2 jobs per state government job. The corresponding multipliers for income are 2.18 for gold mining, 1.72 for cattle ranching, 1.27 to 1.60 for construction, and 1.10 for state government employment (Minnesota Implan Group 2001). Such volatility is apparent in the total employment trends for White Pine and Lincoln counties as illustrated in **Figure 3.23-1** and underlies the population trends as discussed in Section 3.24, Social Conditions.

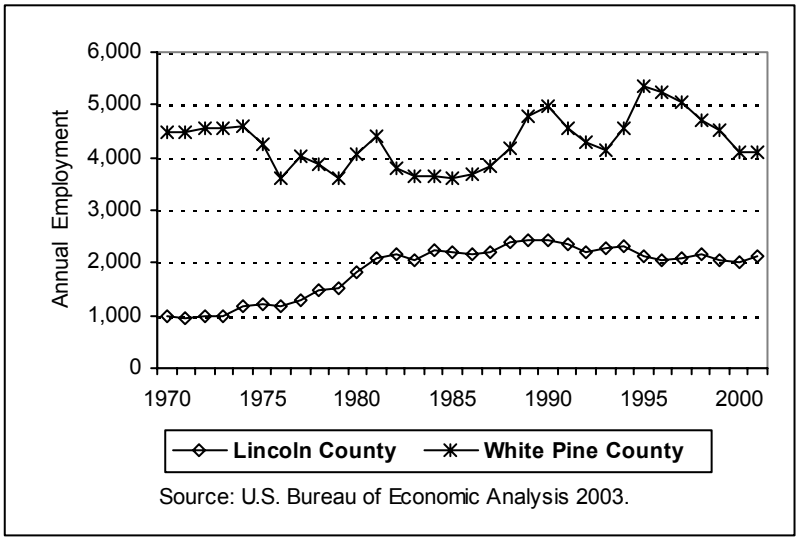


Figure 3.23-1. Total Employment in Lincoln and White Pine Counties 1970 to 2001

Total employment in Lincoln County numbered 996 jobs in 1970. Through the 1970s and 1980s, much local employment growth was tied to federal activities at the Nevada Test Site. The opening of the Caliente Youth Center helped boost total employment to a peak of 2,426 in 1989. Subsequent cutbacks at the Nevada Test Site initiated a period of contraction as the job and income losses rippled through the economy. Modest growth in retail trade, services, and construction has occurred in concert with recent population growth,

raising total employment to 2,125 in 2002. Total farm employment stood at 147 jobs in 2002. Employment growth between 1970 and 2002 averaged 2.4 percent per year.

Over time, White Pine County's economy has been larger and more diverse than that of Lincoln County, anchored by mining, manufacturing, services, and trade. In part, the latter resulted from Ely's location at the crossroads of regionally important highway travel routes and a railroad built to serve the area's mining industry. However, White Pine County has been unable to sustain long-term employment growth over the decades since 1970.

Beginning in the mid-1970s, the mining industry went through several expansion and contraction cycles. In the mid-1980s, local manufacturing also declined. Total employment fell from 4,597 in 1974 to 3,625 jobs in 1979, before climbing to 4,394 in 1981 and falling again to 3,597 in 1985. Mining in White Pine County had a resurgence in the 1990s when as many as eight major mining projects were operational. Peak production, in terms of value, occurred in 1998 when local mines produced more than 253,000 ounces of gold and 300,000 ounces of silver. Mining subsequently waned as depleted reserves and weak market conditions caused all but Placer Dome's Bald Mountain Mine, to cease operation. By 2002, mining employment had fallen to 176 jobs, the lowest level since the current employment reporting series began in 1969. The local mining industry experienced continued weakness through 2003, but was buoyed by the acquisition and subsequent reopening of the historic Robinson copper mine by Quadra, Ltd in 2004. The present mine plan anticipates a 10-year life-of-mine (Quadra Mining, Ltd. 2004).

Construction and opening of the Ely state prison in 1990 brought a new and stable source of jobs to White Pine County. Those jobs, along with increases in Federal government employment, were the primary factors underlying the increase in total government employment from 771 employees in 1988 to 1,434 jobs in 2002. Farm employment, including both proprietors and hired hands, totaled 177 in 2002. On average, employment in White Pine County declined by about 0.3 percent per year between 1970 and 2002.

Agriculture plays a historically important role in the contemporary settlement and subsequent economic, social, and political development of the state and region. However, in recent years, farm employment has been stagnant as private non-farm and government employment have grown rapidly. Between 1985 and 2002, more than 680,000 net new non-farm private jobs and 65,800 government jobs were created statewide, compared to a net loss of about 430 farm jobs. Statewide in 2002, non-farm private jobs accounted for 88.8 percent of all jobs, compared to 10.8 percent in government and 0.4 percent in farming.

In Lincoln County, farm employment increased slightly near the end of the 1980s. Since that time, it has declined steadily. In 2002, government accounted for 28 percent of all jobs in Lincoln County, compared to 7 percent in farming and 65 percent in non-farm private industries (see **Table 3.23-1**).

Table 3.23-1
Employment by Major Category for Year 2001

Industry	Lincoln County		White Pine County	
	Employment	Percent of Total	Employment	Percent of Total
Farm	147	7	177	4
Non-farm Private	1,381	65	2,499	61
Government	597	28	1,434	35
Total	2,125	100	4,110	100

Source: U.S. Bureau of Economic Analysis 2003.

Both the number and share of farm and non-farm private jobs declined in White Pine County between 1985 and 2002. By 2002, non-farm private jobs accounted for 61 percent of all local jobs. During that same period, the number of government employees nearly doubled and the share of all jobs in the public sector increased to 35 percent.

In rural areas, changes in employment opportunities trigger multiple responses in the local labor market. In the short term, unemployment rises or falls in a countercyclical manner. Major layoffs and new openings also can trigger changes in local labor force participation and in- or out-migration contributing to changes in the region's resident population.

Statewide unemployment from 1995 to 2004 ranged between 4.1 and 5.5 percent. During the same period, workers in the District saw a much wider fluctuation in unemployment. In Lincoln County, unemployment climbed to 12.6 percent in 1996 following reductions in federal activity at the Nevada Test Site. Unemployment has since moderated, though it is consistently higher than statewide averages (see **Table 3.23-2**).

Table 3.23-2
Average Annual Unemployment Rates 1995 to 2002
(percent)

County and State	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Lincoln County	11.9	12.6	7.8	6.1	6.1	6.6	7.2	5.8	6.6	5.8
White Pine County	6.4	8.0	5.8	5.8	3.8	3.9	4.5	3.8	3.9	3.7
Nevada	5.4	5.4	4.1	4.5	4.4	4.1	5.3	5.5	5.2	4.1

Source: Nevada Department of Employment, Training, and Rehabilitation 2002 and 2005.

Economic migration has played an important role in White Pine County's labor market, triggered by a loss of about 1,300 mining jobs. As a result of these job losses, unemployment peaked at 8.0 percent in 1996 but has since declined to 3.7 percent in 2004 as residents moved from the area, secured other employment, or withdrew from the labor force. Workers entering and leaving the labor force in response to the relative availability of jobs provide another labor market adjustment mechanism. Labor force data published by the

state indicate that gross labor force participation has declined by 20 to 25 percent in Lincoln and White Pine counties since 1995.

Commuting also plays an important role in the local economy (see **Table 3.23-3**). As reported in the 2000 census, 89.7 percent of employed Lincoln County residents also worked in the county. In White Pine County, 92.4 percent of employed residents worked in the county. Clark County was the primary non-local place of work for residents of Lincoln County. Among White Pine County residents who were employed elsewhere, Elko and Eureka counties, and locations in Utah were the most common non-local places of work. Little cross-commuting occurs between Lincoln and White Pine counties.

Table 3.23-3
Place of Work of Local Resident Workers for Year 2000

County or State	Lincoln County		White Pine County	
	Workers	Percent of Total	Workers	Percent of Total
Lincoln County	1,303	89.7	6	0.2
Nye County	9	0.6	39	1.2
White Pine County	8	0.6	3,036	92.4
Clark County	113	7.8	35	1.1
Other Nevada	0	0.0	115	3.5
Not in Nevada	20	1.4	55	1.7
Total Workers	1,453	100.0	3,286	100.0

Source: U.S. Census Bureau 2003.

Work force commuting flows also involve workers who lived elsewhere and commuted to jobs in the District. In 2000, 21.4 percent of all workers employed in Lincoln County lived elsewhere. Only 6.2 percent of workers in White Pine County lived elsewhere. Clark County was the principal source of non-local workers employed in the two counties.

3.23.2 Economic Base

The gross county economic output, that is, the aggregate value of goods and services produced, provides another perspective on the relative size of the local economies. Estimates of the monetary value of output can be clustered into four major categories that highlight the composition of the local economies. Those categories are:

- Production or commodity based, such as livestock, minerals, and manufacturing;
- Trade, which includes the wholesale and retail sale of products;

- Services, which involves utilities, shipment of commodities, and business and personal services, such as lodging, guided hunting, and health care; and

- Government services.

Estimated gross county economic output for Lincoln County in 1999 was $129.9 million. The service-based cluster, with an estimated production of $70.9 million, was the largest in terms of output (see **Table 3.23-4**). Results of the clustering show a relative lack of production- or commodity-based output in Lincoln County and the higher dependency on service-based and government outputs.

Table 3.23-4
Composition of County Economic Output for Year 1999

Economic Cluster	Lincoln County		White Pine County	
	Annual Output (in millions)	Percent of Total	Annual Output (in millions)	Percent of Total
Production	$22.1	17.2	$171.5	43.7
Trade	$8.1	6.2	$36.1	9.2
Services	$70.9	54.5	$110.9	28.2
Government	$28.7	22.1	$74.3	18.9
Total	$129.9	100.0	$392.8	100.0

Source: Minnesota Implan Group 2001.

White Pine County's economy had a total output of $392.8 million; approximately three times that of Lincoln County. At that time, production-based activity, lead by mining, was the largest cluster with annual output of $171.5, followed by government at $74.3 million. Contractions in mining since that time have undoubtedly reduced overall output substantially. The high reliance on a production-based economy may typify the natural resource-based economies of many western, rural economies, but also the economic development challenges that communities face with an erosion of that base.

The restoration and maintenance of healthy ecological systems within watersheds is a primary focus for the future management of the Ely District. Healthy ecological systems are geographically diverse and change over time. They are compatible with soil potential and are resilient to disturbance.

Resources and resource uses would be managed to restore or maintain ecological health. Certain resource management changes and active treatments may need to be implemented, in portions of watersheds, to accomplish this objective. Adaptive management would be pursued to avoid deteriorating conditions favoring invasive plants and catastrophic fires. Any projects would be implemented so as to result in a mosaic of vegetation within a watershed.

In the long term, natural disturbance (such as drought or fire) would occur and fewer treatments would be needed to maintain ecological health. The result would be a variety of vegetation phases within a watershed, which would provide diverse, healthy conditions for future generations.

Farming and Ranching

Farming and ranching were traditionally major parts of rural Nevada's economic

base. Over the past several decades, that role has been largely supplanted by tourism, mining, and government. Agriculture has struggled to remain viable in an environment characterized by increasing production costs, productivity gains, weak prices, and the effects of extended drought. Nevertheless, agriculture and its strong links to the use of public lands, primarily in the form of grazing, remains an important dimension of the socioeconomic environment in the Ely District. However, recent data indicate that the agricultural sectors of Lincoln and White Pine counties have experienced economic contractions mirroring the overall trend statewide.

Every 5 years, agriculture is the subject of a national economic census. The most current data release is from the 2002 agriculture census. The 2002 census tallied 230 farms and ranches (collectively termed farms in the census) operating in Lincoln and White Pine counties, 6 fewer than five years earlier in 1997.[2] Farms in White Pine County comprised 203,106 acres in 2002, down from 247,446 acres in 1997. The total farm acreage in Lincoln County was not disclosed for 2002, but is estimated at about 46,500 acres, down from 48,497 in 1997. Thus, the combined area of farmed land in Lincoln and White Pine counties declined by an estimated 46,337 acres, or 16 percent, between 1997 and 2002. **Table 3.23-5** presents selected farm data from the 1997 and 2002 agriculture censuses for Lincoln and White Pine counties.

Table 3.23-5
Summary Characteristics of Local Agriculture for Census Year 1997

	Lincoln County			White Pine County		
Category	1997	2002	Percent Change	1997	2002	Percent Change
Number of Farms	121	109	-10	115	121	5
Acres in Farming	48,497	46,500 (est.)	-4	247,446	203,106	-18
Average Acres per Farm	404	427 (est)	6	2,152	1,679	-22
Farms by Size						
1 to 50 acres	37	38	3	28	30	7
50 or more acres	84	71	-16	87	91	5
Farms by Volume of Sales						
Less than $5,000	40	47	18	38	39	3
$5,000 or more	81	62	-23	77	82	6
Principal Occupation						
Farming	60	67	12	71	67	-6
Other	61	42	-31	44	54	23
Tenure						
Farming owners	90	80	-11	82	92	12
Part owners & tenants	31	29	-6	33	29	-12
Number of Farms						
With cattle	102	89	-13	71	76	7
Head of Cattle (Inventory)	14,784	13,703	-7	25,469	24,940	-2
Harvesting Alfalfa	78	43	-45	86	74	-14
Acres Harvested	10,069	14,996	49	18,136	16,332	-10

Source: U.S. Department of Agriculture 1999 and 2004.

[2]A farm is "any place from which $1,000 or more of agricultural products were produced and sold, or normally would have been sold during the year." Government payments are included in sales (U.S. Department of Agriculture 1999).

Farms in Lincoln County averaged 427 acres (estimated) in 2002, an increase of 6 percent over the 404-acre average in 1997. Average farm size in White Pine County declined by 22 percent, down from 2,152 acres in 1997 to 1,679 acres in 2002. The latter reflects the reduction in total farmed land and declines in the number of large farms that either abandoned farming operations or subdivided one large ranch into several smaller units. Most of the local farms are operated as an ongoing economic enterprise. In 2002, 134 farmers and ranchers identified farming as their principal operation, up from 131 in 1997, while 144 operations had sales of $5,000 or more, down from 158 in 1997.

Raising livestock, mainly cattle, is the principal source of cash income for most farming operations in the District. Cash receipts from livestock sales in the two counties totaled $11.8 million in 2002, compared to $14.4 million in 1997. Sales of feed and other crops yielded total receipts of $5.8 million in 2002, compared to $6.3 million in 1997, and $2.3 million from all other sources in 2002, compared to $2.4 million in 1997.

Livestock-related income accounted for over 70 percent of the total farm income in White Pine County in 1997 and 2002 and about 46 percent in Lincoln County in 2002, compared to 51 percent in 1997. In 2002, 165 farms reported a combined inventory of 38,643 head of cattle compared to 173 farms in 1997 that reported a combined inventory of 40,253 head of cattle. In the two counties together, farmers harvested 31,328 acres of alfalfa in 2002 as a cash crop or as winter feed for their herds compared to 28,205 acres of alfalfa harvested in 1997.

Net farm income in Lincoln County, excluding corporate farms, was substantially higher in 2002 compared to 1997, having climbed from $0.52 million to $2.53 million in Lincoln County between 1997 and 2001 before dropping to $1.96 million in 2002. Higher farm income reflected the price gains sustained during the period. Net farm and ranch income also grew in White Pine County from $0.38 million in 1997 to $2.67 million in 2001 and then to $3.22 million in 2002. Net farm income in the two counties combined was $5.2 million in 2001, or 5.5 percent of the statewide farm income of $95.1 million, and $5.2 million in 2002, or 6.5 percent of $79.5 million of farm income statewide (U.S. Bureau of Economic Analysis 2004).

Grazing on public lands serves an important role in sustaining the local agriculture industry. Such grazing provides the summer range for cattle, allowing pastures and cropland to be used to raise winter feed. As described in Section 3.16, Livestock Grazing, there are 232 grazing allotments in the District. Licensed grazing use in 2002, following several years of extended drought, was 183,702 animal unit months. That total represents a 20 percent decline from 2000. Changes in licensed grazing use on public lands are a contributing factor to changes in farm and ranch income.

Mineral Development

Mineral development has been part of White Pine County's history for nearly 150 years, dating to exploration by Army personnel and early prospectors in the 1860s. The Robinson mining district, home to one of the nation's largest low-grade copper ore deposits and still active today with the recent reopening of the Robinson mine by Quadra Mining, Ltd. was discovered in 1868. Copper mining was the driving force bringing the Nevada Northern Railroad to the area. The railroad now operates as a tourist train, but is at the center of a plan to reestablish freight rail service in the region.

Over decades, copper production in the region has fluctuated in response to the demands accompanying the nation's involvement in two world wars, other military conflicts, and increasing industrial and household consumer markets. Those demands carried the industry into the 1970s, at which time falling market prices and foreign production forced cutbacks in local production. The industry remained relatively dormant until rising prices for gold and silver and improvements in mining technology and productivity triggered a new round of mining expansion in White Pine County. In 1989, 10 gold and copper mines were operating in White Pine County. Several of those operations involved reworking of tailings and thus had relatively short life spans. Falling prices through the mid-to-late 1990s triggered the curtailment of several other mines, including the Robinson mine then operated by BHP. In 2002, only two operating mines remained in White Pine County, Bald Mountain and Mooney Basin, with other plans on hold because of weak economics.

The recent acquisition and reopening of the Robinson mine by Quadra Mining in 2004 and higher gold prices may be indicative of changing economic conditions that could trigger new mineral development during the life of the RMP. Ore processing at the Robinson mine was initiated in August 2004, and the first copper concentrate was shipped in October 2004. Quadra and its mining contractor Washington Group Nevada reported a combined employment in February 2005 of 369 persons, approximately 95 percent of whom live in White Pine County. Current reserves support a 10-year mine life. In addition to copper, production at the Robinson mine will include gold and possibly molybdenum and rhenium (Quadra Mining, Ltd. 2005). Other mineral development in the region includes some crude oil production in Nye County, sand and gravel in many locations across the District, and perlite from a deposit in Lincoln County.

Recreation and Tourism

Public lands, be they federal, state, or local, comprise a resource base for public recreation and tourism in the District. Uses include off-highway vehicle use, camping, hunting, hiking and biking, wildlife observation, fishing, historical/geological/cultural exploration, backcountry use of wilderness areas, and various winter sports. Abundant recreation opportunities are located within the District, supporting substantial annual use by residents and visitors, which in turn generates support for the local economies.

Insights into the significance of recreation to the local economy can be gained from the estimated use reported by the various key agencies. Annual visitation to the Great Basin National Park, established in 1986, was 79,879 in 2004 and has averaged 83,087 over the past 5 years. Visitation to the Park is highly seasonal, concentrated primarily from May through September. Seven of Nevada's 21 state parks are located within the District, five of which are in Lincoln County. Annual visitation totaled 324,275 users at these 7 state parks in 2003 and 316,045 through November 2004 (Nevada State Parks 2005). In recent years, organized off-highway vehicle events in Lincoln County and northern White Pine County have been attracting increased levels of activity.

The area also supports substantial levels of hunting and fishing. The Nevada Department of Wildlife licenses hunts for antelope, elk, mule deer, and a limited number of mountain lion in the area. Licenses also are issued for bird and small game hunting. Big game tags for deer, elk, bighorn sheep, antelope, and mountain lion are issued by lottery draw. Applicants exceed the number of available tags, often by a

substantial margin. Hunting of upland game and small game species and fishing occur under the auspices of the general hunting license and stamps.

Travel and tourism is yet another form of economic activity in the District that is tied to the public lands. Tourism resources and attractions include the Nevada Northern Railroad, the historic railroad depot in Caliente, U.S. Highway 50 and Great Basin scenic routes, and numerous historical sites throughout the region.

The economic contributions associated with recreation and tourism has not been quantified, but the linkages are apparent in the types of businesses operating in the District. The U.S. Census Bureau reported that 100 of the 300 private sector establishments doing business in Lincoln and White Pine counties in 2001 were either in retail stores, eating and drinking places, or motels or other overnight lodging accommodations.

Hunting and Fishing

Hunting, fishing, and non-consumptive recreation pursuits associated with wildlife, such as watching or photographing, are an important part of the regional economy and quality-of-life. A national study of such pursuits estimated residents and non-residents spent $681 million in Nevada on wildlife-related recreation in 2001. Of that total, about $168 million was related to the actual, active participation, for example, food, lodging, or fuel. The remaining $513 million was for equipment, licenses, guide and outfitting services, and memberships. Non-consumptive activities accounted for 42 percent of the total spending, following by fishing (36 percent) and hunting (22 percent). Total activity levels within the state were estimated at 1.58 million days of fishing, 490,000 days of hunting, and 609,000 days of non-consumptive wildlife related use (USDOI 2003).

All three types of activity occur on public and private lands across the Ely District. County-level estimates of sportsmen fishing were not prepared as part of the 2001 national study, but the 5,738 resident and 1,140 nonresident hunting and fishing licenses sold in Lincoln and White Pine Counties in 2002-03 are indicative of the economic and social importance of these activities in the region (see **Table 3.23-6**).

Table 3.23-6
Nevada Fishing and Hunting Licenses Sold, 2002-3

	Lincoln County	White Pine County
Resident Fishing	1,395	2,216
Resident Hunting	244	336
Resident Hunting/Fishing Combination	494	1,053
Nonresident Fishing	186	887
Nonresident Hunting	33	34
Total Licenses Sold	**2,352**	**4,526**

Source: Nevada Division of Wildlife 2004.

Published big-game tag sales and hunting statistics indicate about 6,500 resident and 550 non-resident big game hunts occur within the District, although not necessarily on lands managed by the Ely Field Office (NDOW 2004). Applying results for Nevada from the 2001 national survey to the combination of license and tag sales yields estimated annual spending of $25 million to $30 million by resident and non-resident participants in the District. However, that spending is not captured entirely within the District due to factors such as mail order purchasing and fishing and hunting by residents outside of the District.

Guided fishing and hunting trips are an important economic stimulus because of the income they generate for the guides and outfitters and the purchases of goods and services made by those guides and outfitters to provision the hunts. Local guides and outfitters, licensed by Nevada Department of Wildlife, provide guided big game hunts for residents and non-residents alike. Such hunts are typically 1 week in duration and involve packing into remote areas. In addition to involving a licensed master guide, such hunts require special recreation permits issued by the BLM when they occur on BLM-administered lands. An outfitter and guide service may provide services to multiple hunters during the course of the complete hunting season. Nevada Department of Wildlife has licensed nearly 90 master guides for one or more big game species in areas included within the District, 10 of whom reside in the area. Another 19 sub-guides, who work with master guides, also live in the area (NDOW 2004).

The number of guided hunters conducting hunts under special recreation permits issued by the Ely Field Office has increased over the past several years from 63 in 2000 to 174 in 2003. Fee receipts in 2003 totaled $9,631.

Native Plant Products

Another economic linkage between the District and the local economy stems from personal collection and use of woodland products. The Ely Field Office issues permits allowing the collection of firewood, pinyon pine nuts, Christmas trees, and cacti. In 2003, an estimated 3,400 cords of wood were sold under commercial permit or harvested for private use. Free, private use accounted for nearly 93 percent of the total, with commercial sales accounting for 7.4 percent. Quantitative estimates of the total amount and value of products collected are not available, in part due to the limited scale of such activity relative to the District's size and resource base.

Personal Income and Poverty. Total personal income has grown consistently over time. Between 1985 and 2002, total personal income in Lincoln County increased by 86 percent, climbing steadily from $48.3 million to $89.6 million (see **Table 3.23-7**). Personal income in White Pine County increased from $91.9 million to $228.6 million during the same period (a 149 percent increase) exceeding the previous peak of $224.7 million that occurred during the height of mining activity. Adjusting for inflation reduces the gains in total personal income to 13 and 51 percent in Lincoln and White Pine counties, respectively.

Table 3.23-7
Total Personal Income 1985 to 2002
(in millions)

County	1985	1990	1995	2001	2002	Percent Change
Lincoln County	$48.3	$68.9	$74.0	$83.7	$89.6	86
White Pine County	$91.9	$155.3	$196.8	$220.5	$228.6	149

Source: U.S. Bureau of Economic Analysis 2003 and 2004.

Wage and salary earnings accounted for about 66 percent of total personal income in the District in 2002. The statewide average was 76 percent. Dividends, interest, and rents accounted for 17 percent of local income, comparable to the 21 percent statewide. Transfer payments such as social security, Medicaid, and unemployment benefits accounted for about 18 percent of the total income, compared to just 12 percent statewide.

Government and government enterprises account for 30 percent of all direct earnings paid to workers in Lincoln County and 32 percent of earnings in White Pine County in 2002. Both shares are considerably higher than the 11 percent of statewide labor earnings from government. The high local concentrations of earnings from the government sectors reflect a shift away from natural resource-based development (i.e., mining) as the predominant source of high-paying jobs. Jobs in the mining industry historically have been among the highest paying jobs in the region. In 2000, annual earnings per worker in mining in White Pine County averaged nearly $54,300. While the average earnings for federal government employees also were comparatively high, those for state and local government lagged behind those in the private sector. The average earnings for state employees in Nevada have risen in recent years, outpacing earnings growth in the private sectors. As a result, state employees in the District, most of whom work at the state correctional facilities and the Nevada Department of Transportation, had average earnings in excess of $54,000 in 2000. Moreover, employment levels of these state agencies do not fluctuate dramatically, providing a degree of economic stability for local communities.

Gains in total personal income translate to increased personal income on both a per-household and per capita basis. The increases in local income, however, have not kept pace with broad gains made across the state and nation. As a result, per capita personal incomes continue a long-term trend of lagging statewide and national averages. As measured by the Bureau of Economic Analysis, per capita incomes in Lincoln and White Pine counties in 2002 were 69 percent and 87 percent, respectively, of the Nevada average of $30,559 and 71 percent and 89 percent, respectively, of the U.S. average of $29,847.

Median household income in 1999, as recorded in the 2000 Census, was $31,979 in Lincoln County and $36,688 in White Pine County. The two counties ranked seventeenth and thirteenth lowest among Nevada counties and were well below the statewide average of $44,581 (see **Table 3.23-8**). Note that the Census Bureau measures income using a different definition from the Bureau of Economic Analysis.

The percentage of households in the District with very low incomes is substantially higher than the statewide average (see **Table 3.23-9**). Lower incomes translate to an elevated incidence of poverty among residents in the District, particularly in Lincoln County.

Across the state, almost one in 10 households lived in poverty. By comparison, in Lincoln County the rate was about one in 6 households (16.5 percent), the highest in Nevada. Countywide poverty rates in Nye and White Pine counties, at 10.7 percent and 11.0 percent, respectively, were above the statewide average, too, but only by a small fraction.

Table 3.23-8
Household and Per Capita Income for Year 1999

County or State	Median Household Income		
	Amount	Statewide Rank[1]	Percent of State Average
Lincoln County	$31,979	17	72
White Pine County	$36,688	13	82
Nevada	$44,581	NA	NA

[1]Rank is among Nevada's 17 counties, with 1 being the highest.

N/A = Not applicable.

Source: U.S. Census Bureau, Census 2000.

Table 3.23-9
Poverty Rates Among Residents 1999

County or State	Persons Below Poverty	Percent of Population	Statewide Rank[1]
Lincoln County	626	16.5	17
Nye County	3,454	10.7	9
White Pine County	866	11.0	11
Nevada	205,685	10.5	NA

[1]Rank is among Nevada's 17 counties, with 1 being the lowest.

N/A = Not applicable.

Source: U.S. Census Bureau, Census 2000.

Several communities within each county have high poverty rates relative to county and state averages. In Lincoln County, 20 to 25 percent of the residents of the communities of Alamo and Caliente were below the poverty threshold in 1999. In the Duckwater Census Civil Division of Nye County, 17.4 percent of residents lived at or below the poverty threshold, and in White Pine County the poverty rate was above average in the McGill and Ruth areas. In the communities of Ely and Baker, also in White Pine County, the poverty rate was comparable to the statewide average.

Moderately high incomes in the $50,000 to $60,000 range also occur more frequently in Lincoln and White Pine counties than across the state, most likely due to the large numbers of federal and state employees in those counties. However, the relative frequency of households with incomes of $75,000 or more is lower in the District than in the state as a whole: 12 percent locally compared to 21 percent statewide.

Payments in Lieu of Taxes. Congress authorized "payments in lieu of taxes" to local governments that have certain federal lands within their boundaries (31 U.S. Code 6901-6907 – 1976). Payments in lieu of taxes are part of the federal receipts for land and resource use that are shared with local governments to help defray the costs of providing public services such as law enforcement, fire protection, and roads that are affected by the presence and use of those federal lands.

Payments in lieu of taxes payments are authorized to local governments, generally counties, based on the acres of "entitlement lands" within their boundaries. Entitlement lands consist of lands in the National Forest and National Parks systems, some lands involved in U.S. Army Corps of Engineers projects, National Wildlife Reserves, and lands administered by the BLM. The amount of payments in lieu of taxes allocated to each local government is formula based, factoring in the number of entitlement acres, a per acre payment rate, deductions for certain other federal land payments, and a per-capita ceiling or cap on payments based on the area's population. The cap is a sliding scale, ranging from $110.00 per capita for counties with population of 5,000 or less, to $44.00 per capita for counties with 50,000 residents. The amount of payments in lieu of taxes is not a direct function of the land use activity or any mineral production that might occur on the land, although such activities may generate other payments to the local government that could be deducted from the payments in lieu of taxes entitlement.

A total of 20.2 million acres of entitlement land are located in the three counties: 6.4 million acres in Lincoln, 5.3 million in White Pine, and 8.5 million in Nye. The majority of the overall total is BLM administered land. Public lands managed by the Ely Field Office account for about 1.3 million acres of the Nye County total.

Total annual payments in lieu of taxes payments to the three counties have doubled since 1999 from $1,255,770 in 1999 to $2,571,415 in 2004 (see **Table 3.23-10**). Payments in lieu of taxes payments were $396,803 to Lincoln County in fiscal year 2004, $1,531,911 to Nye County, and $642,701 to White Pine County.

Table 3.23-10
Federal Payments in Lieu of Taxes to Local Counties for Fiscal Years 1999 to 2003

Fiscal Year	Lincoln County	Nye County	White Pine County
1999	$221,171	$685,535	$349,064
2000	$222,136	$763,264	$368,447
2001	$314,534	$1,186,179	$519,000
2002	$330,193	$1,245,237	$544,839
2003	$385,964	$1,490,188	$625,150
2004	$396,803	$1,531,911	$642,701

Source: BLM 2003.

Payments in lieu of taxes payments to all three counties are constrained by the population based caps. In other words, all three counties receive less than the base entitlement amount calculated from the local entitlement acreage. For Lincoln County and White Pine counties, the effects of the population cap have been substantial reductions in actual receipts. Recent and ongoing population growth in Nye County has diminished the impact of the population constraint over time.

Actual payments in lieu of taxes payments to counties are subject to further reductions based on the level of Congressional funding appropriated for the payments in lieu of taxes program. Historically, appropriations levels have not funded the program fully. For fiscal year 2004, the appropriations were about 67.7 percent of the full funding level. Consequently, the actual payments to counties for fiscal year 2004 reflected about a 32.3 percent pro-rata reduction.

Countywide Assessed Valuation. Taxes imposed on real and personal property and on the proceeds from mining operations are an important revenue source for local governments in Nevada, particularly counties. Although federal lands are exempt from taxation, the proceeds of natural resource development are subject to tax. Under Nevada law, a county's assessed valuation includes the net proceeds derived from the production of minerals (ores, oil, gas, and other hydrocarbons) after production expenses are netted out from gross receipts. The derivation of assessed valuation captures changes in the amount of development or level of production and changes in mineral commodity prices due to market forces.

Lincoln County has a relatively low assessed valuation that has increased steadily, albeit modestly, from $77.4 million in 1994/95 to $105.1 million in 2004/05 (see **Figure 3.23-2**). With limited natural resource development occurring in the county, primarily sand and gravel, mining-related assessments have accounted for little of the county's tax base.

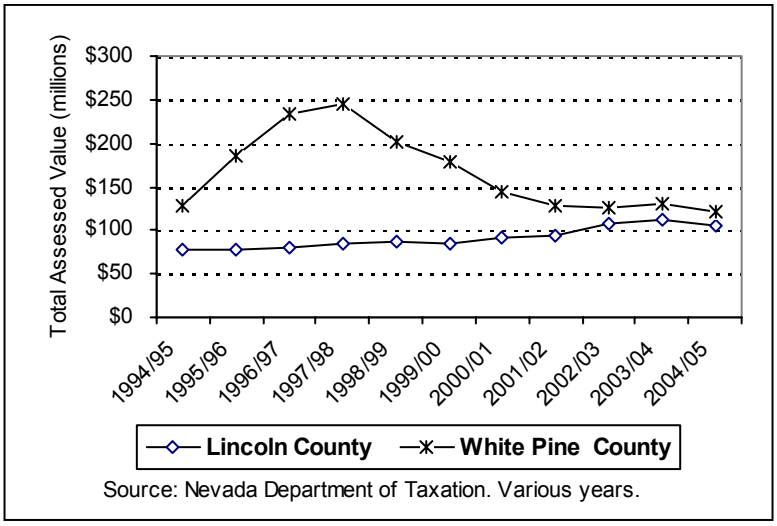


Figure 3.23-2. Assessed Valuation in Lincoln and White Pine Counties 1994 to 2004

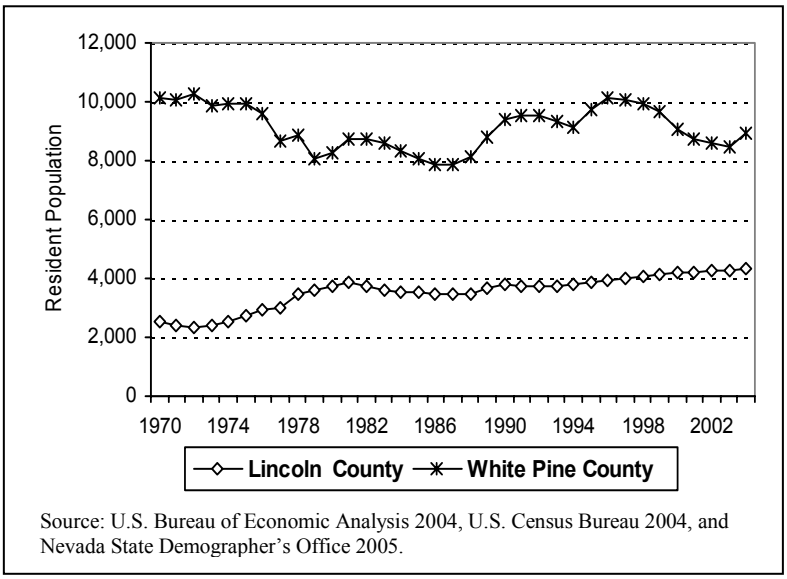
The trends in White Pine County's assessed valuation are more pronounced. Increases in mineral development and the commercial and residential development it help spawn, resulted in a $117.9 million (92 percent) increase in total assessed valuation in just 3 years. A similar decline occurred from 1997/98 to 2001/02 due to falling production, mine closures, and falling real estate values prices. The volatility of mineral related assessed value, which is in part attributable to the limited tax base that is inherent in rural counties with large public land holdings, is another common dimension of the local socioeconomic environment that challenges residents and governments alike. White Pine County may expect to realize an increase in assessed valuation from the recent reopening and renewed production at the Robinson Mine near Ely.

3.24 Social Conditions

3.24.1 Population

Historical Population Trends

The Ely District is a rural and sparsely populated area where historical population trends reflect the influence of mineral development activity and of federal activities at the nearby Nevada Test Site and Nellis Air Force Range. Mineral development has been the strongest influence in White Pine County, causing a series of population cycles since 1970 (see **Figure 3.24-1**). From 1972 to 1979, population decreased 22 percent in White Pine County. Beginning in 1979, White Pine County population was in an upward trend that included an increase of 29 percent from 1987 to 1997. Then, from 1997 to 2000, population in White Pine County decreased by more than 1,850 persons following closures and layoffs at several of the area's gold and copper mines. Activities at the nearby Nevada Test Site and Nellis Air Force Range, the other major economic force in the Ely District, have had more of an influence on Lincoln County The effect of federal energy and defense activity on population in Lincoln County has been some cyclical change but more generally a modest upward growth trend since 1970.



Source: U.S. Bureau of Economic Analysis 2004, U.S. Census Bureau 2004, and Nevada State Demographer's Office 2005.

Figure 3.24-1. White Pine and Lincoln County Populations 1970 to 2004

Between 1990 and 2000 the Ely District experienced a net increase in population (see **Table 3.24-1**). The District's population was 13,596 in 2000, up from 13,337 in 1990, a gain of 1.9 percent.[3] The District's population in 2000 represented less than 0.7 percent of Nevada's total population. Within the District,

[3]The Nye County part of the District does not directly coincide with the census geographies used for Census 2000. The Duckwater Census Civil Division offers a reasonable estimate of the population in the Nye County part of the District because the area is very rural with few farm and ranch households due to the limited amount of private land.

Lincoln County gained population from 1990 to 2000, and White Pine County and the eastern portion of Nye County both lost population. In 2000, White Pine County's 9,181 residents accounted for 67.5 percent of the District total.

Table 3.24-1
Estimated Population in the BLM Ely District 1990 to 2000

County	Year		Change 1990 to 2000	
	1990	2000	Absolute	Percent
Lincoln County	3,775	4,165	390	10.3
Nye County (Duckwater Census Civil Division)	298	250	(48)	-16.1
White Pine County	9,264	9,181	(83)	-0.9
District Total	13,337	13,596	259	1.9

Source: 1990 Census of Population and Census 2000; U.S. Census Bureau.

The American Indian Reservations involved in the District had a combined population of 387 in 2000, a net increase of 73 individuals over the total in 1990. Of the total in 2000, 297 residents lived within the District's outer boundaries and the remainder lived on the Utah part of the Goshute Reservation. The Ely and Duckwater reservations gained population between 1990 and 2000. Population declined by 19 persons on the Nevada portion of the Goshute Reservation during that period.

Estimated Population Since 2000

Lincoln County as a whole grew by 10.3 percent from 1990 to 2000. All areas of Lincoln County grew during that time, but growth was the strongest in the Pioche area. White Pine County as a whole lost 0.9 percent of its population from 1990 to 2000. Within White Pine County, population decreased in the Ely and Lund areas during that time and increased in the McGill and Baker areas.

Population estimates prepared by the Nevada State Demographer's Office and the U.S. Census Bureau paint somewhat different pictures of population change since 2000 in the principal counties of the District. The State Demographer's estimates indicate that Lincoln County experienced modest population decline through 2003, with a slight gain to 3,822 in 2004, down 343 persons from 2000. In White Pine County, the State Demographer's estimates show several years of population decline, followed by modest growth to yield a population of 8,966 in 2004, up 215 from 2000.

The Census Bureau's estimates for 2000 to 2003 indicate a net population growth of approximately 100 persons in Lincoln County, to 4,264 in 2004, but a net reduction of nearly 600 residents to 8,490 in White Pine County. Recent population estimates are not available for the Duckwater Census Civil Division.

The reasons for the difference between the two sources of county-level population estimates are not known. However, other available economic data would tend to support the higher estimates for each county, or the Census Bureau's estimate of 4,264 in 2004 in Lincoln County and the State Demographer's estimate of 8,966 in 2004 in White Pine County. In Lincoln County, other data suggest that there have been gains in

retirement migration and in migration by households in which one or more workers commute to jobs in Clark County to the south. In White Pine County the reopening of the Robinson mine in 2003 and subsequent expansion of its workforce would argue against population declines.

Demographics. In 2000, over 87 percent of residents in the Ely District identified themselves as white. That percentage is substantially above the statewide average of 75 percent whites (see **Table 3.24-2**). Individuals identifying themselves as American Indians or Alaska Natives, including 204 individuals living off the reservations, comprise 3.6 percent of the District's population. Blacks, Asian, individuals of other races or of two or more races accounted for a much smaller share of residents in the District than in the state as a whole; 9.1 compared to 24 percent, respectively.

Table 3.24-2
Ely District Population by Race for Census Year 2000

Race	Nevada (percent)	Ely District (percent)
White alone	75	87.3
American Indian or Alaska Native	1.3	3.6
Black, Asian, other race, or two or more races	24	9.1

Source: U.S. Census Bureau, Census 2000.

Across Nevada, 98.3 percent of all residents lived in households, the other 1.7 percent of residents living in group quarters.[4] The percentage of residents in group quarters is much higher in Lincoln and White Pine counties, 8.4 percent and 13.5 percent, respectively, due to the location of state correctional facilities in Caliente and near Ely. The large institutionalized population in White Pine reflects the 1989 opening and subsequent expansion of the Ely State Prison to its present capacity of about 1,200 inmates.

Residents of the Ely District are slightly older than the statewide population, in terms of median ages; 39 years in Lincoln County and 38 years in White Pine County compared to 35 years statewide. Factors that likely contributed to the variances include the outflow of working age households following recent declines in the mining industry, the relatively static size and age profiles associated with the institutionalized populations at the Caliente Youth Center and the Ely State Prison, and the attraction of retired residents to the area. Residents aged 65 and older account for 16 percent of Lincoln County and 13 percent of the White Pine County residents.

Student enrollment in public schools is an important barometer of local socioeconomic conditions. The schools in the district operate under a unified school district in each county. Total county enrollment at the beginning of the 2002/03 school year was 1,006 students (kindergarten to 12) in Lincoln County and 1,446 (pre-kindergarten to 12) in the White Pine School District. Overall enrollments have trended

[4]The Census Bureau classifies all people not living in households as living in group quarters. There are two types of group quarters: institutional (correctional facilities, nursing homes, and mental hospitals) and non-institutional (for example, college dormitories, military barracks, group homes, missions, and shelters).

downward in Lincoln and White Pine counties until very recently. During the eight years ending with the 2002/03 school year, the declines numbered 117 students in Lincoln County and 545 students (28 percent) in White Pine County. Since then, Lincoln County has gained 14 students and White Pine has gained 11 students. The Nye County School District teaches grades K-6 at a school in Duckwater. Enrollment at that school was 12 students at the beginning of the 2004/05 school year. Middle and high-school students, grades 7-12, living in the Duckwater area attend school in Eureka under an agreement between the respective districts.

Housing. Housing availability, affordability, and conditions are important elements of community development and local socioeconomic conditions. Housing conditions can affect migration, quality of life, the cost of living, and a community's capacity to accommodate growth and public infrastructure investment.

From 1990 to 2000, the housing stock in Lincoln County increased by 378 to a total of 2,178 dwelling units. There were 4,439 housing units in White Pine County in 2000, 457 more homes than the 1990 count of 3,982 units. The housing supply in the Duckwater Census Civil Division totaled 154 housing units, 65 on the reservation and 89 units in the remainder of the Census Civil Division. While the total number of units in both Lincoln and White Pine counties increased, the number of occupied units actually declined in White Pine County. Across the District, about 73 percent of all units were occupied in 2000. Owner occupancy of the occupied units averaged about 75 percent, and 25 percent were renter-occupied.

In 2000, nearly half of the 638 vacant homes in Lincoln County were for seasonal, recreational, or occasional use. Only 87 units were available for rent or sale. Units listed for sale or rent numbered 422 in White Pine County, with another 232 units identified for seasonal or recreation use. Single-family homes were the largest shares of housing in Lincoln and White Pine counties, 63 percent and 72 percent, respectively.

The housing stock in Lincoln and White Pine counties is relatively old. Homes built 30 or more years ago accounted for 43 percent of all homes in Lincoln County and 58 percent of homes in White Pine County. There were 206 homes in Lincoln County built in 1995 or later. The number of homes less than 6 years old totaled 435 units in White Pine County.

Social Values and Attitudes Regarding Public Land Management. The process of planning and administering public lands involves trade-offs and balancing among competing demands and opportunities associated with the physical and natural resources within the statutory and regulatory framework established by Congress and various administrative guidance.

The vast land area and concentration of BLM-administered lands within the District spawn substantial stakeholder interest in the Field Office's management decisions for the area. For this discussion, stakeholders are defined as individuals or groups of people who have an interest or interests in public lands and the decisions affecting those lands. The commonalities within a stakeholder group can arise due to geography, occupation, lifestyle interests, membership or group affiliation, or ethnic and cultural ties. Individuals often belong to multiple stakeholder groups (e.g., a local businessman/rancher who holds a grazing permit, hunts, and serves on a local economic development organization). Depending on the forum and topic, stakeholders may participate in the planning process as individuals, as well as in some type of

official capacity. Stakeholder groups need not have a physical presence in the area to participate or be engaged in the process.

Because of the diversity of issues involved in land management planning, some stakeholders focus their attention narrowly, on specific issues. Others are concerned about a much broader range of issues and topics. Stakeholders who engage in the process typically do so with the aim of influencing the decision in a way promoting their particular interest, position, or values. Stakeholder groups may be characterized in terms of one or more key attributes or descriptors, such as consumptive versus non-consumptive uses, local or nonlocal, individual or organization, programmatic (e.g., wild horses or wilderness), or philosophical (sustainable development or maximum yield). While some of these attributes are dichotomous in form (e.g., supports off-highway vehicle use or opposes such use), others relate to positions along some type of continuum (e.g., number of acres of designated wilderness that is desirable).

Scoping conducted at the outset of the RMP/EIS process identified a broad range of social values and stakeholder interests in the Ely District (see Section 1.6, Scoping Issues). Ongoing intergovernmental coordination efforts and participation by cooperating agencies provide additional insights into stakeholder interest and values (see Chapter 5.0, Consultation and Coordination).

Local residents and organizational interests have a strong and often direct relationship with BLM administration of public lands in the Ely District. Many residents are at least partially dependent on these lands for their economic livelihood (e.g., ranchers who maintain and operate livestock grazing permits, commercial big game hunting guides and outfitters, individuals employed in mining, and the staff of the agencies themselves). Some long-time residents see these uses of the land as part of their local custom and culture, which they believe ensures them to at least some preferential consideration. In turn, the revenues generated by those activities help support other local businesses and the functioning of local government. Maintaining and expanding economic uses of the public lands are important for these stakeholders.

Local governments and Tribes also are interested in expanding uses that support economic development in the District. That interest reflects recognition of the region's historical economic dependency on natural resource use and the recent downturn in such use, but also a belief that the economic development of the area is being constrained by the lack of private land and the impacts of public land management decisions that affect agricultural, industrial, and commercial recreation and tourism development. These interests manifest themselves in policies discouraging actions that would result in the loss of additional private lands, promoting additional land disposal to local governments or to private ownership, and expanding outdoor recreation opportunities, particularly for off-highway vehicle use. Due to recent wildfires, both local and nonlocal governments are increasingly concerned about wildfires on public lands; the risks they pose to lives, private property, and local communities; and the potential impacts on fiscal resources and government operations.

The interests of Native American in the region extend beyond land disposal issues because of their traditional ancestral and cultural ties to the area. Thus, protection of cultural resources and maintaining subsistence use of woodland products by Tribal members also are important social values (see Section 3.9,

Cultural Resources, Section 3.25, Native American Issues, and Chapter 5.0, Consultation and Coordination).

Another major stakeholder group is local residents having strong attachments to the public lands for various recreation pursuits and the contributions of such pursuits to their quality of life. These pursuits include rock-hounding, hunting, wildlife viewing, backcountry touring, four-wheeling and off-highway vehicle use, and camping. Proximity and ready access to these opportunities, which are ancillary attributes of the rural character and lifestyle of the area, are also key factors influencing their choice to live in the area. Along with factors such as affordable housing and Nevada's favorable personal income tax structure, local economic development interests are promoting outdoor opportunities to recruit retirees and others, whose residency choices are largely independent of a specific work-site or location, to move to the area.

Non-local interest in the RMP/EIS process echoed some of the same values and interests held by residents. At the same time, other non-local interests supported a management emphasis more focused on ecological system health and restoration. An example of the former was support voiced for increased opportunities for off-highway vehicle use, both for individuals and in the context of organized events. Much of that interest, which is consistent with local economic development interests, emanated from Las Vegas, Mesquite, and Reno, urban areas with many off-road vehicle/off-highway vehicle/dirt bike enthusiasts interested in expanding the area and range of trails and riding environments open to the public. Others, however, view off-highway vehicle use as threatening ecological system health and wildlife and being incompatible with other forms of outdoor recreation. Livestock grazing, declining biodiversity, wildfire risks, and the associated implications for invasive and noxious weeds also were identified as threats to ecological system health and wildlife. For these stakeholders, the value of ecological system health and wildlife warrants limiting or eliminating others uses, even if doing so may have adverse social and economic implications within the region for other users. Therein lies one of the classic challenges for land use planning and management, balancing the interests of local residents, which are often directly tied to the land, with those of non-locals whose interests are more philosophical or programmatic.

3.25 American Indian Issues

3.25.1 Indian Trust Resources

Indian Trust Resources are natural resources, either on or off Indian lands, that are retained by, or reserved by or for Indian tribes through treaties, statutes, judicial decisions, and executive orders, which are protected by a fiduciary obligation on the part of the U.S. Federal laws and guidance that may apply to Indian Trust Resources and other Indian issues within the conditions of the RMP include, but are not limited to, the American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, Indian Sacred Sites, and Secretarial Order #3206. Indian Trust Resources located on the Goshute, Ely Shoshone, or Duckwater Indian reservations, which are found within the District, are managed and protected by the tribes. Indian Trust Resources located on lands administered by the BLM are managed and protected by the BLM; however, no Indian Trust Resources have been identified on BLM-administered lands within the District.

American Indian tribes within the Ely District have used pinyon pine nuts as a traditional food source. The pinyon pine nut is culturally significant as it has been the focal-point of American Indian traditional ways of life and important to maintaining historical tribal gathering areas or culture-geography areas. Historically, tribes would have pinyon pine nut festivals at the conclusion of the harvest. These festivals provided an opportunity for: 1) tribes to gather with other tribal members; 2) the sharing of oral histories; 3) a social gathering that included dancing and hand-game tournaments; and 4) the performance of traditional religious practices. These cultural values have been practiced for generations, and are expected to be practiced into the future, as part of maintaining American Indian traditional ways of life.

3.26 Environmental Justice

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority and Low Income Populations," requires federal agencies to identify and address disproportionately high adverse impacts to human health or environmental impacts of federal actions on minority or low income populations. The three American Indian tribes and their members in the District are a population of concern, both as a minority and as a low income population. Historically, the administration of public land use may have affected existing subsistence or traditional culture practices of these peoples (see Section 3.9, Cultural Resources). The agency's goal when environmental justice issues arise is to reduce, to the extent practicable, the inequitable distributions of environmental benefits and costs, based on race, ethnicity, or income. The BLM also will promote and provide opportunities for full involvement of Tribes in BLM decisions that affect their lives, livelihoods, and health.

3.27 Health and Safety

Health and safety includes hazardous materials and conditions (including solid wastes) that have resulted from prior industrial or commercial activities on public lands or adjacent privately held properties. Hazardous materials also may include chemicals used by the agency for land treatment. The potentially affected environment resulting from the presence of hazardous materials includes, air, water, soil, and biological resources.

Hazardous materials, which are defined in various ways under a number of regulatory programs, can represent potential risks to both human health and to the environment when not managed properly. The term hazardous materials includes the following materials that may be utilized or disposed of in conjunction with a variety of industrial and commercial activities:

- Substances covered under the Occupational Safety and Health Administration Hazard Communication Standard (29 Code of Federal Regulations 1910.1200). Materials and substances covered under the Standard may be used in a variety of industrial and commercial activities and also may be subject to the regulations listed below.

- Hazardous materials as defined under the U.S. Department of Transportation regulations in 29 Code of Federal Regulations, Parts 170-177.

- Hazardous substances as defined by the Comprehensive Environmental Response, Compensation, and Liability Act and listed in 40 Code of Federal Regulations Table 302.4. Comprehensive Environmental Response, Compensation, and Liability Act regulations also govern the cleanup of contaminated sites. Sites evaluated under the Comprehensive Environmental Response, Compensation, and Liability Act that pose serious threats to human health and the environment may be placed on the National Priorities List and commonly are referred to as Superfund sites.

- Hazardous wastes as defined in the Resource Conservation and Recovery Act.

- Hazardous substances and extremely hazardous substances as well as petroleum products such as gasoline, diesel, or propane, that are subject to reporting requirements (Threshold Planning Quantities) under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act.

- Petroleum products defined as “oil” in the Oil Pollution Act of 1990. The materials defined under the Oil Pollution Act of 1990 include fuels, lubricants, hydraulic oil, and transmission fluids.

- There are a number of other federal statutes such as the Toxic Substance Control Act and Federal Insecticide, Fungicide, and Rodenticide Act that regulate substances such as polychlorinated bi-phenyls and pesticides. Asbestos is regulated by the Asbestos Hazardous Emergency Response Act.

In conjunction with the definitions noted above, the following lists provide information regarding management requirements during transportation, storage, and use of particular hazardous chemicals, substances, or materials:

- Superfund Amendment and Reauthorization Act Title III List of Lists (USEPA 1996) or the Consolidated List of Chemicals Subject to the Emergency Planning and Community Right-to-Know Act and Section 112(r) of the Clean Air Act.

- U.S. Department of Transportation listing of hazardous materials in 49 Code of Federal Regulations 172.101.

Resource Conservation and Recovery Act governs the handling and disposal of solid wastes (USEPA 1998). Solid wastes comprise a broad range of materials that include garbage, refuse, sludge, non-hazardous industrial waste, municipal wastes, and hazardous waste. Solid waste as defined includes solids, liquids, and contained gaseous materials. Hazardous wastes are those materials that exhibit certain characteristics (as defined by laboratory analysis), are generated from specific industrial processes, or chemical compounds, that if abandoned could pose a threat to human health and the environment.

In addition to the body of federal regulations listed above, the State of Nevada regulates hazardous materials through a number of environmental statutes and regulations that are enforced by the Nevada Division of Environmental Protection. The Nevada Division of Environmental Protection also supervises and implements a number of programs that regulate hazardous materials or are involved with the cleanup of contaminated sites.

3.27.1 Existing Conditions

Contaminated Sites

The BLM has limited regulatory authority over hazardous materials. However, the agency is part of the regulated community and has an obligation to abide by the existing federal and state statutes and regulations regarding hazardous materials and to require that leasees and right-of-way grantees also abide by such regulations as part of the lease or grant terms and conditions. However, there may have been past activities on BLM-administered lands that have resulted in conditions where hazardous wastes or substances may pose a potential threat to human health and the environment. Based on review of U.S. Environmental Protection Agency and Nevada Division of Environmental Protection databases (USEPA 2003a,b; NDEP 2003), there are no uncontrolled hazardous waste sites on BLM-administered lands in the Ely District that are under enforcement actions for clean up or violation of environmental regulations. However, there are several sites, that while not on the U.S. Environmental Protection Agency and Nevada Division of Environmental Protection lists as under cleanup enforcement actions, may pose a threat to human health and the environment. These sites include the Castleton Tailings site 3 miles southwest of Pioche and the Johnson Mill site 20 miles southeast of Caliente.

The database review indicated only one site on BLM-administered lands that has been investigated as a potential Superfund site. The site is known as the BLM-Caliente Landfill located in Section 28 Township 3

South, Range 67 East in Lincoln County and is listed on the Comprehensive Environmental Response, Compensation, and Liability Act Information System list of sites. The site investigation indicated that there was not evidence of a threat and the status of the site was designated as no further remedial action proposed.

Hazardous Conditions

In addition to potential contamination issues at mining sites, unsecured shafts and adits at abandoned mining sites present severe physical hazards to people and animals. The Nevada Division of Minerals cooperatively manage the Abandoned Mine Lands program and are responsible for identifying hazardous conditions at abandoned mines sites and securing dangerous mine openings. BLM and the Nevada Division of Minerals have a formal memorandum of understanding for the cooperative management of hazardous mining sites. According to the Nevada Division of Minerals, there are 313 and 347 identified abandoned mine hazards in Lincoln and White Pine counties, respectively. In Lincoln County, 254 hazards have been secured and in White Pine County, 313 hazards have been secured. No breakdown of hazards was readily available for the portion of Nye County in the Ely District. Nye County has a total of 883 identified hazards, 580 of which have been secured (NDOM 2003).

Chemical Use

Periodically the BLM uses herbicides to treat land that has been invaded by noxious weeds and invasive exotic species.

3.27.2 Trends

Contaminated Sites

It is likely that there are abandoned mines, mill sites, landfillls, illegal dumps, and drug labs that pose a threat to human health and environment that have not been discovered, or that conditions at current sites have not manifested themselves to the extent that a threat has been perceived. For mining sites, contaminants potentially could move off-site onto federal lands.

Hazardous Conditions

Hazardous conditions at abandoned mine sites will continue to be mitigated through the Abandoned Mine Lands program conducted by Nevada Division of Minerals as funds become available to deal with the potentially most hazardous sites.

Chemical Use

The BLM is conducting a nation-wide evaluation of the use of herbicides on BLM-administered lands. The evaluation is to determine the safest chemicals that will efficiently treat affected lands.

3.27.3 Current Management

Contaminated Sites

The Ely District handles contaminated sites when those sites become a recognized problem (Caselton Tailings and Johnson Mill Sites). There is no program to proactively determine the number of potential sites on BLM-administered lands that may pose contamination risks.

Hazardous Conditions

The Ely District participates in the Abandoned Mine Lands program that deals with hazardous conditions at abandoned mine sites. The District must approve the mitigation of hazardous conditions at mine sites on public lands. Hazardous mine conditions are mitigated by the by the Nevada Division of Minerals.

Chemical Use

The use of herbicides is conducted in accordance with applicable federal and state regulations and BLM guidance.