3. Affected Environment

3.1 Climate

The climate of the planning area is typical of the Great Basin, with long dry winters and short dry summers. The planning area is in the intermountain west, which tends to be dominated meteorologically by recurring high and low pressure systems. Summer is often marked by stationary high pressure systems that develop over the region. These systems augment clear sky conditions but also can result in large-scale stagnation of underlying air when light wind conditions persist. Winter weather conditions are influenced predominantly by transient storm systems.

The climate in the study area is semiarid to arid, and summers are characterized by clear warm days and cool nights. Winters are not severe, with temperatures rarely dropping below 0 degrees Fahrenheit (°F). Between 1903 and 2005, the average maximum temperature at the climate station in Fallon reached 92.1 °F in July, and the average minimum temperature fell to 18.1 °F in January (Western Regional Climate Center [WRCC] 2007). Temperatures vary widely in the region, with normal winter lows in the Sierra Nevada below freezing and summer highs above 100 °F in the lower areas; for example, the temperatures recorded at Fallon range from -25 °F to 107 °F (California Department of Water Resources [CDWR] 1991).

Near the planning area, precipitation is limited because the Sierra Nevada Range to the west acts as a rain shadow for air flowing from the Pacific Ocean (CDWR 1991). The prevailing winds in the planning area are from the west. As the warm moist air from the Pacific Ocean ascends the western slopes of the Sierra Nevada west of the study area, the air cools, condensation occurs, and most of the winter moisture falls as snow. As the air descends the eastern slope of the Sierra Nevada range into the planning area, it warms, and very little precipitation occurs. The difference in precipitation levels from west to east in the Carson River hydrographic basin is demonstrated by the change in vegetation, from coniferous forests in the Sierra Nevada to sagebrush and alkali-tolerant grasses in the drier areas, including the planning area.

Between 1903 and 2005, the average annual precipitation at the Fallon climate station was 4.98 inches (Table 3.1-1). Winter precipitation is typically rain from large-scale weather systems. The average total annual snowfall at the Fallon climate station is 5.7 inches, with an average annual snow depth of zero inches. Summer precipitation is rain, which is often the result of localized activity caused

by solar heating, rising air, and associated thunderstorms. Average total precipitation ranges from 0.16 inch in July to 0.61 inch in May (WRCC 2007). Annual surface evaporation is relatively high (48 to 52 inches) because of the relatively warm and dry climate that prevails throughout the year.

Table 3.1-1 Climate Statistics for Fallon Experiment Station (NOAA National Climate Data Center Station 262780), 1903 to 2005

	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Average precipitation (inches)	0.53	0.54	0.45	0.49	0.61	0.44	0.16	0.22	0.29	0.39	0.38	0.47	4.98
Average temperature (°F)	31.2	37.2	43.4	49.9	57.7	65.5	73	70.7	62.1	51.5	40.1	32.3	51.2
Maximum temperature (°F)	44.3	51.2	58.9	65.9	74	83.1	92.1	90	81	69.3	55.4	45.7	92.1
Minimum temperature (°F)	18	23.1	27.8	33.9	41.4	47.9	53.9	51.3	43.1	33.7	24.8	19	18
Evapotranspiration (inches)	0.81	1.57	4.23	5.64	7.04	7.82	7.47	8.59	4.81	3.19	2.38	1.45	55.0

Source: WRCC 2007, TCID 2006

During many years, perennial plants, such as alfalfa, experience only short periods of dormancy during the winter. The average wind velocity is seven miles per hour, and on average the planning area experiences 132 frost-free days per year.

Climate Change and Greenhouse Gasses (GHG)

Climate change is a phenomenon that could alter natural resource and ecologic conditions on spatial and temporal scales that have not yet been experienced. The Intergovernmental Panel on Climate Change (IPCC) has stated, "Most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic [man-made] GHG concentrations" (IPCC 2007). The general consensus is that as atmospheric concentrations of GHGs continue to rise, average global temperatures and sea levels will rise, precipitation patterns will change, and climatic trends will change and influence earth's natural resources in a variety of ways. Ongoing scientific research has identified the potential impacts of man-made GHG emissions, changes in biological carbon sequestration, and other changes due to land management activities on the global climate. Through complex interactions on a regional and global scale, these changes cause a net warming of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into

space. Although natural GHG levels have varied for millennia, recent industrialization and burning fossil carbon sources have caused GHG concentrations to increase dramatically and are likely to contribute to overall global climatic changes. The IPCC recently concluded that "warming of the climate system is unequivocal" and "most of the observed increase in globally

average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic GHG concentrations" (EPA 2012, IPCC 2007). Topography

The topography of the planning area influences the climate and is generally flat, with elevations ranging from approximately 3,850 feet to 5,640 feet (based on the 1 arc second National Elevation Dataset provided by the United States Geological Survey [USGS]). The total relief, or distance from the lowest to the highest point in the planning area is approximately 1,790 feet. The flattest portion of the planning area is the Carson Sink. Slopes increase slightly toward the edges of the planning area, particularly to the western edge. The edges of the planning area include the gently sloping beginnings of surrounding ranges, such as the Hot Springs Mountains to the northwest, the West Humboldt Range to the north, the Dead Camel Range to the southwest, the Virginia Range to the west, and the Stillwater Range to the east. Most of the planning area is underlain by soils with less than 10 percent slopes; many soils are reported with slopes of one percent (Natural Resources Conservation Service [NRCS] 2007).

3.2 Air Resources

The EPA has established national ambient air quality standards for several different pollutants, which are often referred to as criteria pollutants (ozone, nitrogen dioxide, carbon monoxide, sulfur dioxide, fine and inhalable particulate matter (PM) [$PM_{2.5}$ and PM_{10}], and lead). The EPA has established standards for each pollutant that must not be exceeded. Like all states, Nevada has the right to establish more stringent state or county standards but may not lessen the federal standards. With minor exceptions, Nevada's ambient air quality standards must not be exceeded in areas where the general public has access. Table 3.3-1, Ambient Air Quality Standards, compares the national ambient air quality standards with those of Nevada.

Major sources of air pollution in the planning area include fugitive dust and automobile and aircraft emissions. Activities within the planning area that can contribute to the $PM_{2.5}$ and PM_{10} levels include vehicle travel on unpaved roads and farming activities on cropland.

If a county meets the federal or state air quality standards it is considered to be in attainment. All counties in the planning area, except for Washoe County, are in attainment for all criteria pollutants. Parts of Washoe County are in a nonattainment area for the federal carbon monoxide and PM_{10} standards (EPA 2008). Nevada State Legislation delegated Washoe County the authority to establish an air pollution control program. Under this authority, the county Air Quality Management Division operates and maintains an ambient air monitoring network separate from the state.

The monitoring station in Washoe County closest to the planning area is in Mustang, approximately 21 linear miles west of Fernley. The site monitored carbon monoxide, ozone, and PM_{10} but was shut down in March 2002 (Washoe County District Health Department, Air Quality Management Division 2006). While the monitoring site was in use, levels of monitored pollutants did not meet or exceed neither the National Ambient Air Quality Standards nor the Nevada Ambient Air Quality Standards (Washoe County District Health Department, Air Quality Management Division 2002). Monitoring stations are concentrated near Sparks and Reno, approximately 27 to 30 linear miles from Fernley.

There are three monitoring sites near the planning area, one at the Fernley Intermediate School, one at the Volunteer Fire Department, and the other is in the City of Fallon at the West End Elementary School (EPA ID #32-001-0002). The sites in Fernley monitor ozone and $PM_{2.5.}$ PM_{10} sampling commenced at the Fallon site in May 1993 and was discontinued at the end of June 1998, but ozone monitoring continues to the present day (State of Nevada 2003). Tables 3.3-2 through 3.3-5 show the monitoring data for the pollutants monitored at the three sites.

Table 3.3-1 Ambient Air Quality Standard

Pollutant	Averaging Time	Nevada Concentration Standards	National Concentration Standards	
			Primary	Secondary
Ozone	1 Hour	235 micrograms per cubic meter (μ/m^3)	235 μ/m^3	Same as primary
		(0.12 parts per million [ppm])	(0.12 ppm)	
Ozone, Lake Tahoe Basin, #90		195 μ/m^3 (0.10 ppm)	--	

Pollutant	Averaging Time	Nevada Concentration Standards	National Concentration Standards	
			Primary	Secondary
Carbon monoxide at any elevation	1 Hour	40,000 µ/m^3 (35 ppm)	40,000 µ/m^3 (35 ppm)	None
Carbon monoxide less than 5,000 feet above mean sea level	8 Hours	10,000 µ/m^3 (9.0 ppm)	10,000 µ/m^3 (9.0 ppm)	
Carbon monoxide at or greater than 5,000 feet above mean sea level		6,670 µ/m^3 (6.0 ppm)		
Nitrogen dioxide	Annual arithmetic mean	100 µ/m^3 (0.05 ppm)	100 µ/m^3 (0.05 ppm)	Same as primary
Sulfur dioxide	Annual arithmetic mean	80 µ/m^3 (0.03 ppm)	80 µ/m^3 (0.03 ppm)	None
	24 Hours	365 µ/m^3 (0.14 ppm)	365 µ/m^3 (0.14 ppm)	
	3 Hours	1,300 µ/m^3 (0.5 ppm)	None	1,300 µ/m^3 (0.5 ppm)
Particulate matter as PM_{10}	Annual arithmetic mean	50 µ/m^3	50 µ/m^3	Same as primary
	24 Hours	150 µ/m^3	150 µ/m^3	
Particulate matter as $PM_{2.5}$	Annual arithmetic mean	--	15.0 µ/m^3	Same as primary
	24 Hours	--	65 µ/m^3	
Lead (Pb)	Quarterly arithmetic mean	1.5 µ/m^3	1.5 µ/m^3	Same as primary

Pollutant	Averaging Time	Nevada Concentration Standards	National Concentration Standards	
			Primary	Secondary
Hydrogen sulfide	1 Hour	112 µ/m^3 (0.08 ppm)	--	--
Visibility	Observation	In sufficient amount to reduce the prevailing visibility to less than 30 miles when humidity is less than 70%.		

Source: State of Nevada 2007a

Table 3.3-2 Ambient Monitoring Data for PM

Years	Number of Samples	1st High (150 µg/m^3)	2nd High (150 µg/m^3)	Mean (150 µg/m^3)	24-hour Exceedances
Fernley: Intermediate School					
1992	No data	---	---	---	---
1993	No data	---	---	---	---
1994	No data	---	---	---	---
1995*	40	37	35	21	0
1996	59	104	96	18	0
1997	59	43	37	16	0
1998**	47	43	40	16	0
1999	No data	---	---	---	---
2000	No data	---	---	---	---
2001	No data	---	---	---	---
2002	No data	---	---	---	---
2003	No data	---	---	---	---
Fallon: EPA ID #32-001-0002					
1992	No data	---	---	---	---
1993*	35	111	103	40	0
1994	45	66	62	27	0
1995	47	74	60	28	0
1996	54	102	61	25	0
1997	53	53	53	26	0
1998**	25	79	47	19	0
1999	No data	---	---	---	---
2000	No data	---	---	---	---
2001	No data	---	---	---	---
2002	No data	---	---	---	---
2003	No data	---	---	---	---

Source: State of Nevada 2003
*New site: incomplete year of operation
**Discontinued monitoring

Table 3.3-3 Ambient Monitoring Data for PM

Years	Number of Samples	1st High (150 µg/m3)	2nd High (150 µg/m3)	Mean (150 µg/m3)	98th Percentile 24-Hour Exceedances
Fernley: Intermediate School					
1992	No data	---	---	---	---
1993	No data	---	---	---	---
1994	No data	---	---	---	---
1995	No data	---	---	---	---
1996	No data	---	---	---	---
1997	No data	---	---	---	---
1998	No data	---	---	---	---
1999*	187	32	24	4.4	0
2000	358	37	30	3.8	0
2001	345	55	41	5.5	0
2002	328	46	40	4.3	0
2003	295	13	11	2.9	0

Source: State of Nevada 2003
*Data for June to December

The GHGs that result from activities on Newlands Project lands include carbon dioxide, methane, and nitrous oxide. Although naturally present in the atmosphere, concentrations of carbon dioxide, methane, and nitrous oxide also are affected by emissions from industrial processes, transportation technology, urban development, agricultural practices, and other human activity. The activities on Newlands Project lands that have the potential to emit these pollutants include wildfires, prescribed burns, and other vegetation burns; fuel combustion in vehicle engines and equipment; and recreational campfires, camp stoves, and use of portable internal combustion engines. Livestock also produce GHG pollutants through digestive processes and manure generation. Carbon dioxide and methane are the primary GHGs emitted through human activities in the US, and account for 84% and 10%, respectively, of all US GHG emissions from human activities (EPA 2012).

Table 3.3-4 Ambient Monitoring Data for 1 Hour Ozone

Years	1st High (150 µg/m3)	2nd High (150 µg/m3)	Exceedance Hours	Exceedance Days
Fernley: Volunteer Fire Department				
1992	No data	No data	---	---
1993	No data	No data	---	---
1994	No data	No data	---	---
1995	No data	No data	---	---
1996	No data	No data	---	---
1997	No data	No data	---	---
1998	0.08	0.08	0	0
1999	0.09	0.08	0	0
2000	0.08	0.07	0	0
2001	0.08	0.08	0	0
2002	0.08	0.08	0	0
2003	0.09	0.08	0	0
Fallon: EPA ID #32-001-0002				
1992	No data	No data	---	---
1993	No data	No data	---	---
1994	No data	No data	---	---
1995	No data	No data	---	---
1996	No data	No data	---	---
1997	No data	No data	---	---
1998	No data	No data	---	---
1999*	0.07	0.06	0	0
2000	0.08	0.07	0	0
2001	0.07	0.07	0	0
2002	0.07	0.07	0	0
2003	0.08	0.07	0	0

Source: State of Nevada 2003
*Data for October to December

Table 3.3-5 Ambient Monitoring Data for 8-Hour Ozone

Years	4th High (150 µg/m3)	Exceedance Days
Fernley: Volunteer Fire Department		
1992	n/a	n/a
1993	n/a	n/a
1994	n/a	n/a
1995	n/a	n/a
1996	n/a	n/a
1997	n/a	n/a
1998	0.07	No
1999	0.07	No
2000	0.07	No
2001	0.065	No
2002	0.066	No
2003	0.067	No
Fallon: EPA ID #32-001-0002		
1992	n/a	n/a
1993	n/a	n/a
1994	n/a	n/a
1995	n/a	n/a
1996	n/a	n/a
1997	n/a	n/a
1998	n/a	n/a
1999*	0.05	No
2000	0.07	No
2001	0.059	No
2002	0.058	No
2003	0.067	No

Source: State of Nevada 2003
*Data for October to December

3.3 Noise

Background noise levels in the planning area vary with relative location. Besides highway traffic, sources of noise are mainly from Naval Air Station (NAS) Fallon aircraft flyovers, off road vehicle use, and hunting. Recreational off road vehicle use is prohibited on Reclamation-administered land, but it is found in isolated areas near residential developments. Some off road vehicle use is associated with livestock grazing. Noise associated with water recreation (e.g., motorized water craft) is limited to areas immediately adjacent to the larger bodies of water. There are no Reclamation connected noise issues within the planning area.

Two bombing ranges associated with NAS Fallon are next to the planning area, one just to the south of Sheckler Reservoir and the other at the northeast corner of the planning area boundary (US Navy 1998). The southern bombing range, known as B-16, is used for air-to-ground conventional bombing and for rockets. The northwestern range, known as B-20, is used for air-to-ground bombing, strafing, and laser targeting.

The Navy has taken steps to reduce noise from aircraft flyovers by changing aircraft flight patterns. A noise study performed in 1996 and based on the changed flight patterns showed that the city of Fallon and Sheckler District residents were outside of the contour lines for the acceptable noise level of 60 decibel day-night average (US Navy 1998). Near the training ranges, noise from air-to-ground gunnery cannot be detected because aircraft noise drowns out the gunnery noise.

3.4 Geology

3.4.1 Physiography and Geologic Units

The planning area is in the southern Carson Desert. At 70 miles long and ranging from 8 to 30 miles wide, it is the largest intermountain basin in northern Nevada. The Carson Desert occurs in the northwestern portion of the Basin and Range geomorphic province. This province is characterized by discrete, north- or northeast-trending fault-bounded mountain ranges, typically about 20 miles wide and less than 80 miles long, separated by narrow, deep, alluvium-filled valleys.

The faulting that formed the Basin and Range province began relatively recently in geologic time, about 16 million years ago, and resulted from the earth's crust extending and thinning in the region between the Sierra Nevada and Rocky Mountains. The crustal extension was accompanied by volcanic activity. Massive

volumes of pyroclastic materials (volcanic ash that erupted with great violence) covered some areas of the Basin and Range province to depths of many hundreds of feet. These eruptions primarily included rhyolitic material, which has a mineral composition similar to granite. Later, as the molten rock (magma) gradually became depleted in the more volatile constituents and increased in iron and magnesium content, eruptions became less violent, and basalt lavas prevailed.

The extensional tectonic regime caused vertical block faulting in which small blocks of crust dropped downward to create small basins, while adjacent blocks of crust tipped upward and formed ranges. The faulting exposed older Paleozoic layered sedimentary rocks in some of the ranges. The Paleozoic rocks include carbonate rocks (limestone and dolomite).

The region remained enclosed, with insufficient precipitation to create drainages that extended to the ocean for any significant length of time. Therefore, as the ranges eroded, the sediments filled the local basins, rather than being carried to the edge of the continent as occurred east of the Rocky Mountains. Many basins contain alluvial sediments thousands of feet thick.

During the last 100,000 years, the region was wetter than it is now, and the basins contained large lakes. Ancient shorelines of the Pleistocene lakes can still be seen high above the current valley floors in many basins. However, within the past 10,000 years, the climate has become drier, and the Pleistocene lakes have shrunk. Over the long term, evaporation of the runoff that reached the basins resulted in precipitation of the mineral salts dissolved in the water, creating brines and salt deposits at the centers of the basins. In portions of the planning area, the lakebeds, or playas, are covered with the precipitated salts, inhibiting vegetation growth. The geologic map of the planning area (Figure 3-1) shows the prevalence of thick alluvium and playas throughout the planning area.

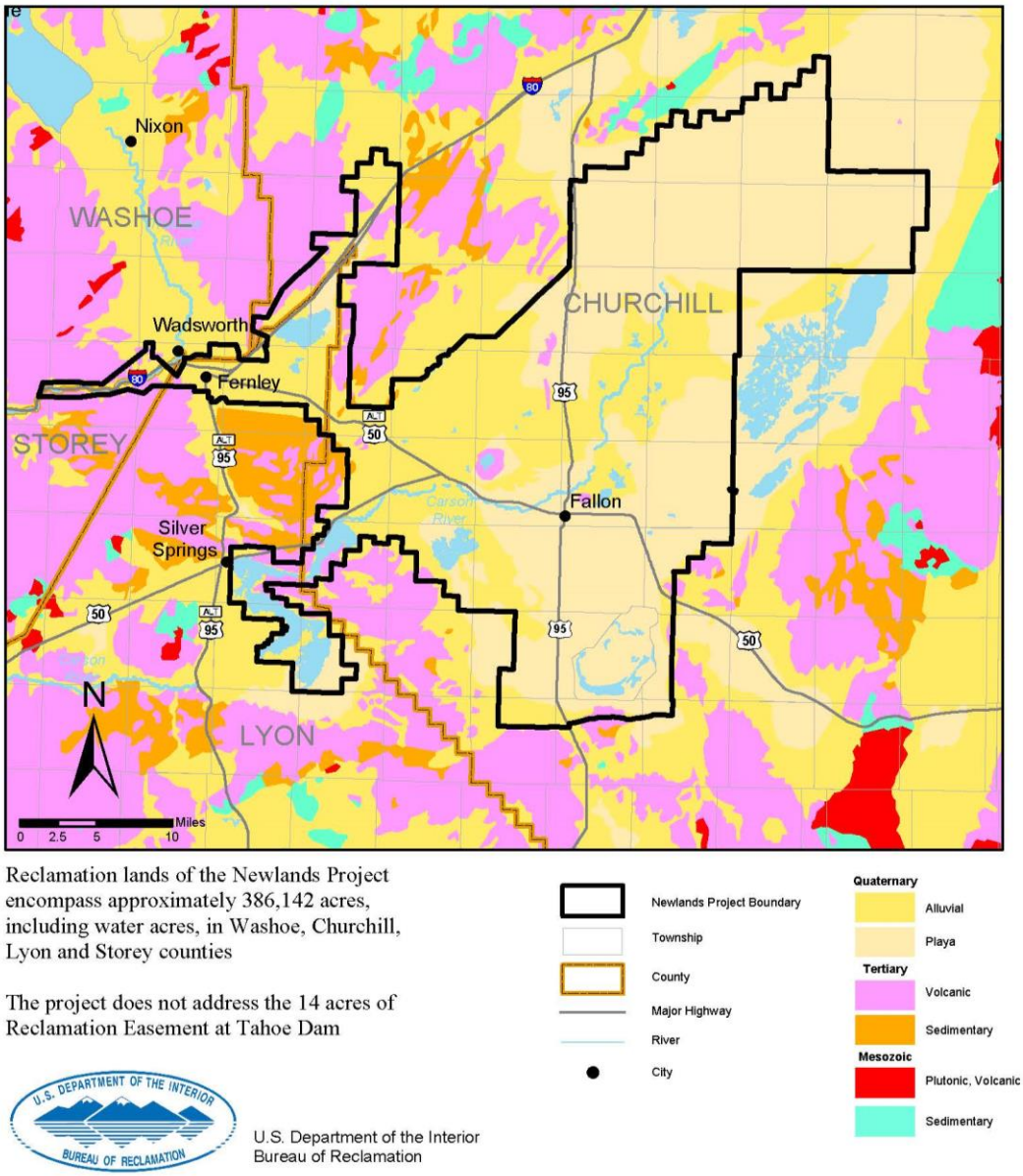

Figure 3-1 Newlands Project Geologic Map 1

In some areas the block faulting of the ranges has exposed older rocks at the surface. The cores of most of the ranges adjacent to the planning area consist of granitic rocks resulting from the cooling and crystallization of rhyolitic magma deep below the surface during the Mesozoic, before the formation of the Basin and Range topography.

Near the Lahontan Dam and Reservoir, the dam embankment and spillways are founded almost entirely on the Truckee Formation, which consists of sandstone, claystone, siltstone, conglomerate, hard sandy clay, tuffaceous sand, tuff, and minor volcanic flows (Reclamation 2007a).

3.4.2 Seismicity and Related Faults

Crustal extension and block faulting are ongoing, making the region seismically active. However, because of the flat slopes throughout the planning area, the potential for mass wasting (e.g., rock falls, landslides) is extremely low. Indirect evidence indicates two inactive faults are present in the foundation of Lahontan Dam (Reclamation 2007a).

Seismic activity has resulted in a relatively thin crust beneath the planning area. Molten rock occurs relatively close to the surface in this area, at depths up to several kilometers. In many areas, groundwater is in contact with hot rock at relatively shallow depths, creating underground convection systems that circulate the groundwater and transfer heat to the surface. Hot springs are one of the surface manifestations of this natural heat transfer process.

3.4.3 Soils

The soil associations in the planning area are shown in Figure 3-2. Soils within an association generally share a common landscape position and type of parent material. The largest portions of the planning area are underlain by the Playas-Wendane-Parran and Isolde-Appian-Parran soil associations. Relatively large portions also occur in the Carson-Haplaquolls-Stillwater, Dia-Sagouspe-Fallon, Hawsley-Stumble-Bango, and Lahontan-Bunejug-Erber soil associations. Each of these is relatively flat and therefore is not highly susceptible to water erosion. Potential wind erosion ratings vary. Some soils in the eastern portion of the planning area, including the Playas-Wendane-Parran, are rated as hydric. This is a soil formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (NRCS 2008).

Most of the soils in the planning area are classified as aridic, with sizeable areas receiving less than eight inches of precipitation per year. Many soils in the planning area have relatively high percentages of excess salts, including sodium,

which affects soil structure and permeability and limits vegetative species composition. Some of these soils also have aquic moisture regimes due to high water tables in the spring months or year-round. On alluvium areas in the valley floor, soils are deep and well drained and have varying amounts of coarse fragments in the soil profile. Soils with clayey lacustrine substrata are difficult to leach and are best left undisturbed. Some of the alluvial fan piedmont soils at the edge of the planning area are shallow, with a silica cemented

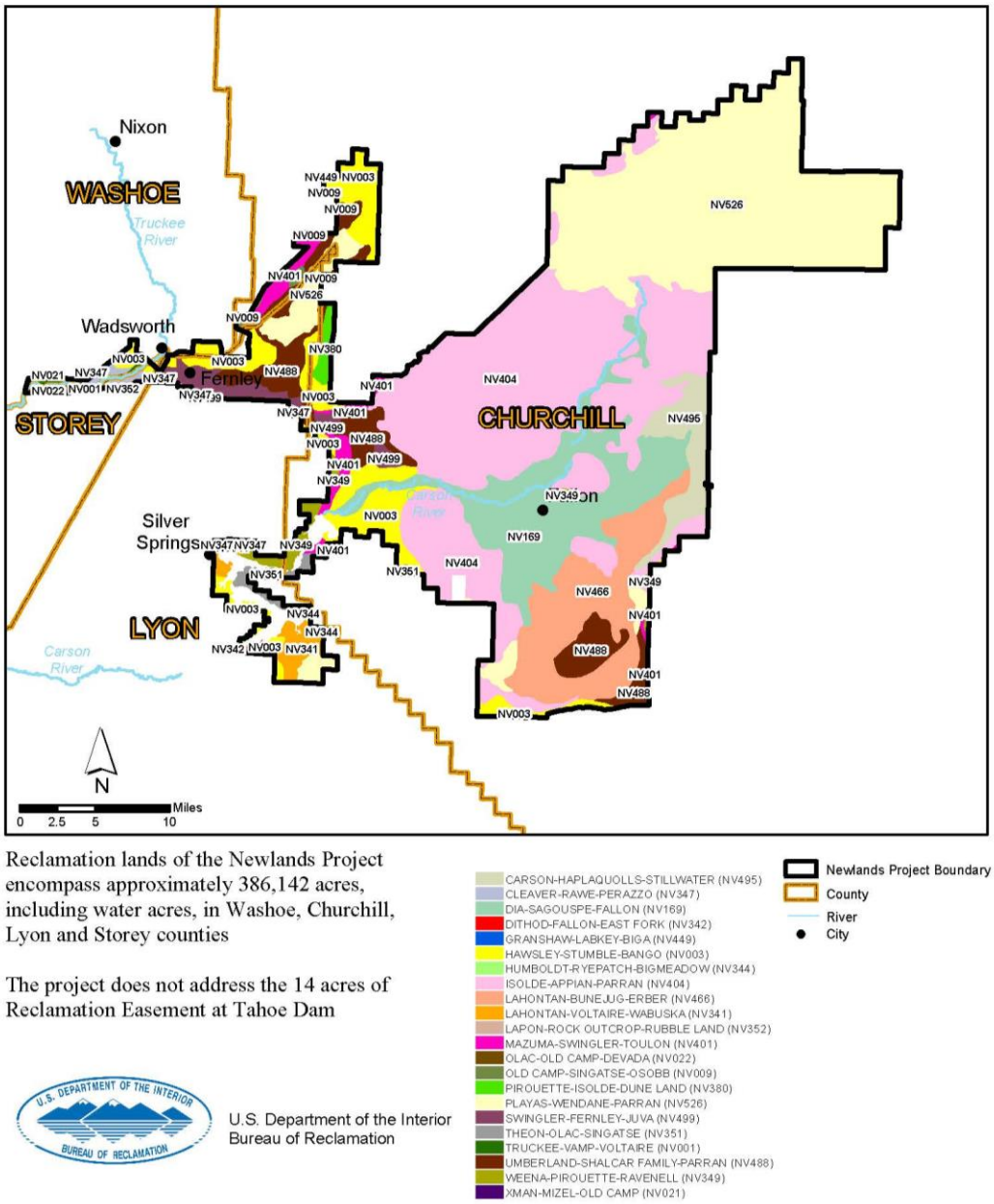

Figure 3-2 Soils Map

hardpan, and may contain a clayey or fine loamy textured horizon that contains excess sodium.

Farming on cropland within the planning area directly affects the soils. With the high excess salts in the soils, irrigation of the cropland includes drainage canals to allow the dissolved salts to be carried away from the productive soils.

Detailed site-specific soils information can be found in published surveys (Fallon-Fernley Area [parts of Churchill, Lyon, Storey, and Washoe Counties], Lyon County Area, Washoe County [south part], Churchill County Area [parts of Churchill and Lyon Counties], and the Storey County area) (NRCS 2007).

The irrigated land in the planning area is grouped broadly as nearly level soils on floodplains and low lake terraces (NRCS 2007; TCID 2006). Most of the irrigated area is between 3,850 and 4,050 feet above mean sea level. Farmed soils within the planning area include soils with the potential to support prime farmland, as designated by the NRCS. Prime farmland has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. Many areas not designated as prime farmland within the planning area have been designated as farmland of statewide importance. This designation does not include prime farmland but does include soils with a good combination of physical and chemical characteristics for the production of crops. Unlike prime farmland, farmland of statewide importance does not have any restrictions regarding soil permeability or rooting depth.

Soils in the eastern portion of the planning area between Carson Sink and Carson Lake are generally flat, fine-textured, and moderately fine-textured soils on floodplains (TCID 2006). These soils formed in alluvium of mixed origins and are used for crops and pasture, where irrigated, and for range and wildlife habitat, where not irrigated. The central farming area surrounding the city of Fallon and smaller areas near Fernley and along the Carson and Truckee rivers are generally flat, coarse-textured to moderately fine-textured soils on floodplains and low stream terraces (TCID 2006). These soils formed in alluvium derived from mixed rock. The major soils in this area are some of the most productive in the planning area.

Like most soils in arid and subarid regions, the soils in the planning area contain at least small amounts of soluble salts and alkali (TCID 2006). Because rainfall is low and evaporation is high, percolating rainfall is insufficient to leach salts out of the root zone. The salinity of the soils in the planning area has been responsive to good farming practices.

3.5 Minerals

Throughout the Newlands Project region, the circulation of heated mineral-laden groundwater (hydrothermal fluids) through fractured rock has resulted in precipitation and concentration of wealth of economic minerals, including gold, silver, copper, zinc, mercury, and many others. The basin fill is a source of sand, aggregate, and other mineral materials. There are many active and historic mines in the region (Figure 3-3). Close to the Newlands Project Planning Area, there are active diatomite and gypsum mines to the west of the Planning Area, south of Fernley, and a perlite mine to the south.

BLM manages the exploration and development of subsurface minerals on Newlands Project lands. BLM coordinates with Reclamation on the associated surface disturbance.

Leasables

With the exception of geothermal resources near the planning area, no significant production of solid leasables (e.g., phosphate, coal, oil shale, sodium, and nitrate) or fluid leasables (e.g., oil, and gas) is underway. Geothermal resources are underground reservoirs of hot water or steam created by heat from the earth. Geothermal steam and hot water can reach the surface of the earth in the form of hot springs, geysers, mud pots, or steam vents. These resources also can be accessed by wells, and the heat energy can be used to generate electricity or for other direct uses, such as heating greenhouses, facilitating aquaculture operations, and dehydrating vegetables. Within the planning area, Soda Lake, Stillwater, and Brady Hot Springs are all producing power from geothermal resources.

In addition to historic interest, future oil and gas resource exploration is likely near the planning area. BLM has approximately 20 parcels that have been nominated for oil and gas leasing that are currently under review (Reclamation 2008a). The major playas have been explored by drilling in the past.

Locatables

Locatable minerals are minerals for which the right to explore, develop, and extract mineral resources on federal lands open to mineral entry is established by the location (or staking) of lode or placer mining claims as authorized under the General Mining Law of 1872, as amended (BLM 2006). Mining is also regulated under 40 CFR 3802, *Exploration and Mining, Wilderness Review Program*, 40

CFR 3809, *Surface Management*, and 43 CFR 6304, *Uses Addressed in Special Provisions of the Wilderness Act*, and other applicable federal regulations. Locatable minerals include gold, silver, copper, and other hard rock minerals, as well as high quality limestone, dolomite, and other marketable minerals that do not fall under the heading of leasable under specific laws and regulations and are not considered salable (see below).

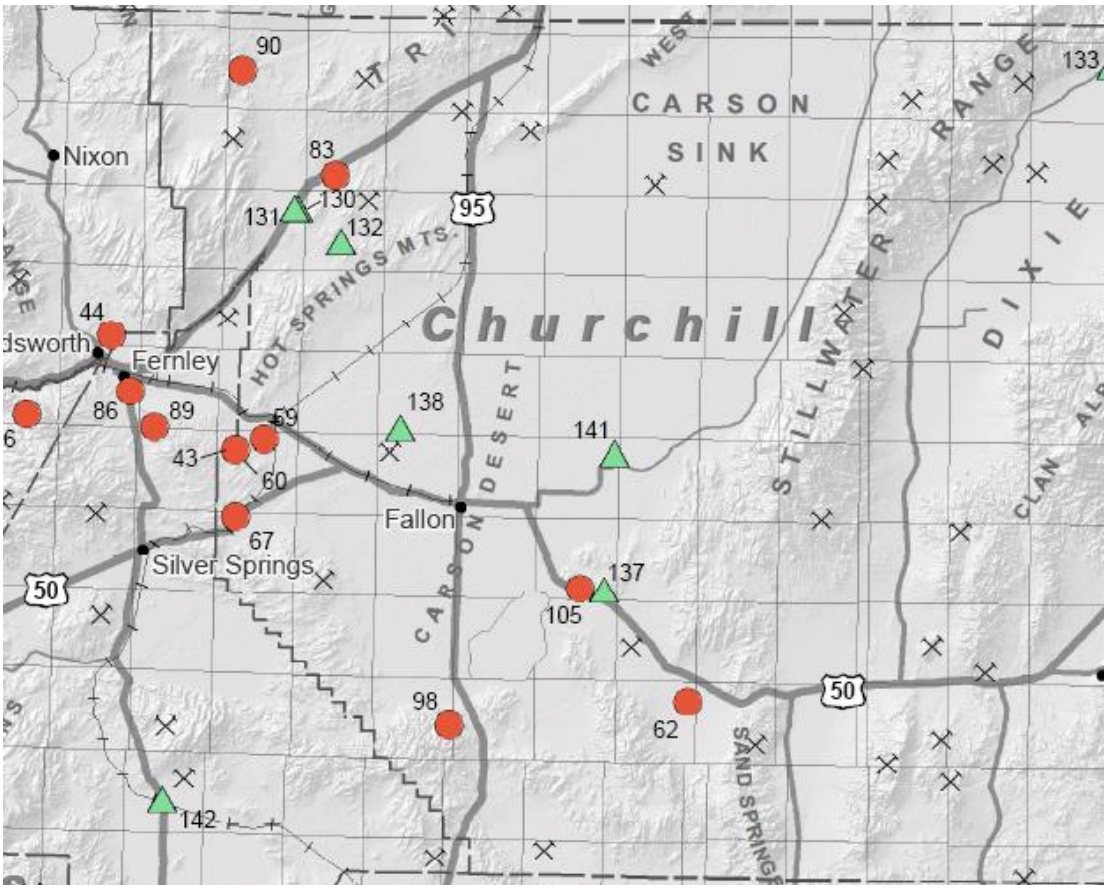

Figure 3-3 Active Mines in the Newland

Industrial Mineral Mines Geothermal Areas Historic Mining Districts

(NBMG 2010)

Active Mines in the Newland Table 1

Symbol #	Mining Development Name	Product
43	Celite Mine	Diatomite

44	Cemex Paiute Pit	Sand, gravel
59	Hazen Pit	Aggregate, sand
60	Hazen Pit	Diatomite
62	Huck Salt	Salt
67	Lahontan Pit	Aggregate
83	Moltan Mine	Diatomite
86	Mull Lane Pit	Aggregate
89	Nevada Cement Mine	Limestone
98	Popcorn Mine	Perlite
105	Salt wells Gravel Pit	Sand, gravel
130	Bradys	Geothermal, power generation
131	Bradys	geothermal, direct heat – food dehydration
132	Desert Peak	Geothermal, power generation
137	Salt Wells	Geothermal, power generation
138	Steamboat	Geothermal, power generation
142	Wabuska	Geothermal, power generation

There has been a large amount of historical gold and silver mining in the mountains to the west of the planning area and some in the mountains to the east.

Salables

Salable minerals include sand and gravel, pumice, dimension stone, and other relatively low-value materials used primarily in construction. According to the BLM Carson City District Office, the primary mineral commodities produced in the planning area are sand and gravel, crushed rock, and aggregate. A minor quantity of decorative stone and clay is also produced. The BLM and Reclamation have management responsibility for salable minerals in the planning area.

3.6 Water Resources

The planning area is in the Great Basin, a 188,000-square-mile region that includes most of Nevada and portions of eastern California and western Utah.

Great Basin stream systems drain internally instead of to the ocean. Streams in the Great Basin are generated from snowpack in high mountain ranges and terminate in sink areas that may contain lakes, wetlands, or playas.

Hydrographic Basins

A basin (drainage basin, watershed, or hydrographic region) is defined as a geographic area drained by a single major stream or an area consisting of a drainage system composed of streams and often natural or manmade lakes. The USGS and the Nevada Division of Water Resources (NDWR), Department of Conservation and Natural Resources (NDCNR) have divided the state into discrete hydrologic units for water planning and management. These have been identified as 232 hydrographic areas within 14 major hydrographic regions or basins within Nevada (USGS 2007). Hydrographic basins found in the planning area are shown in Figure 3-4.

Most of the planning area lies within the Carson River hydrographic basin. The irregularly shaped northwestern portion of the planning area, which includes Derby Dam, the Truckee Canal, and a short segment of the Truckee River, falls within the West Central Region and the Truckee River Basin hydrographic basins.

Within the hydrographic basin are smaller hydrologic units. Portions of the following hydrologic units, identified by hydrologic unit code (HUC), are included within the planning area:

- Carson Desert, HUC 16050104;
- Middle Carson, HUC 16050202;
- Granite Springs Valley, HUC 16050104; and
- Truckee, HUC 16050102.

Newlands Project

Although the RMP does not propose changes to the infrastructure of the Newlands Project or the management of water delivery, a brief description of the Newlands Project and its history is provided for context.

The Newlands Project, one of the nation's first projects under the Reclamation Act of 1902, is divided into two portions: the Truckee Division, near Fernley in the Truckee River watershed (most of which lies outside the planning area), and the larger Carson Division, near Fallon in the Lahontan Valley within the Carson

River watershed. Although the Project starts at Lake Tahoe, that region is outside the planning area.

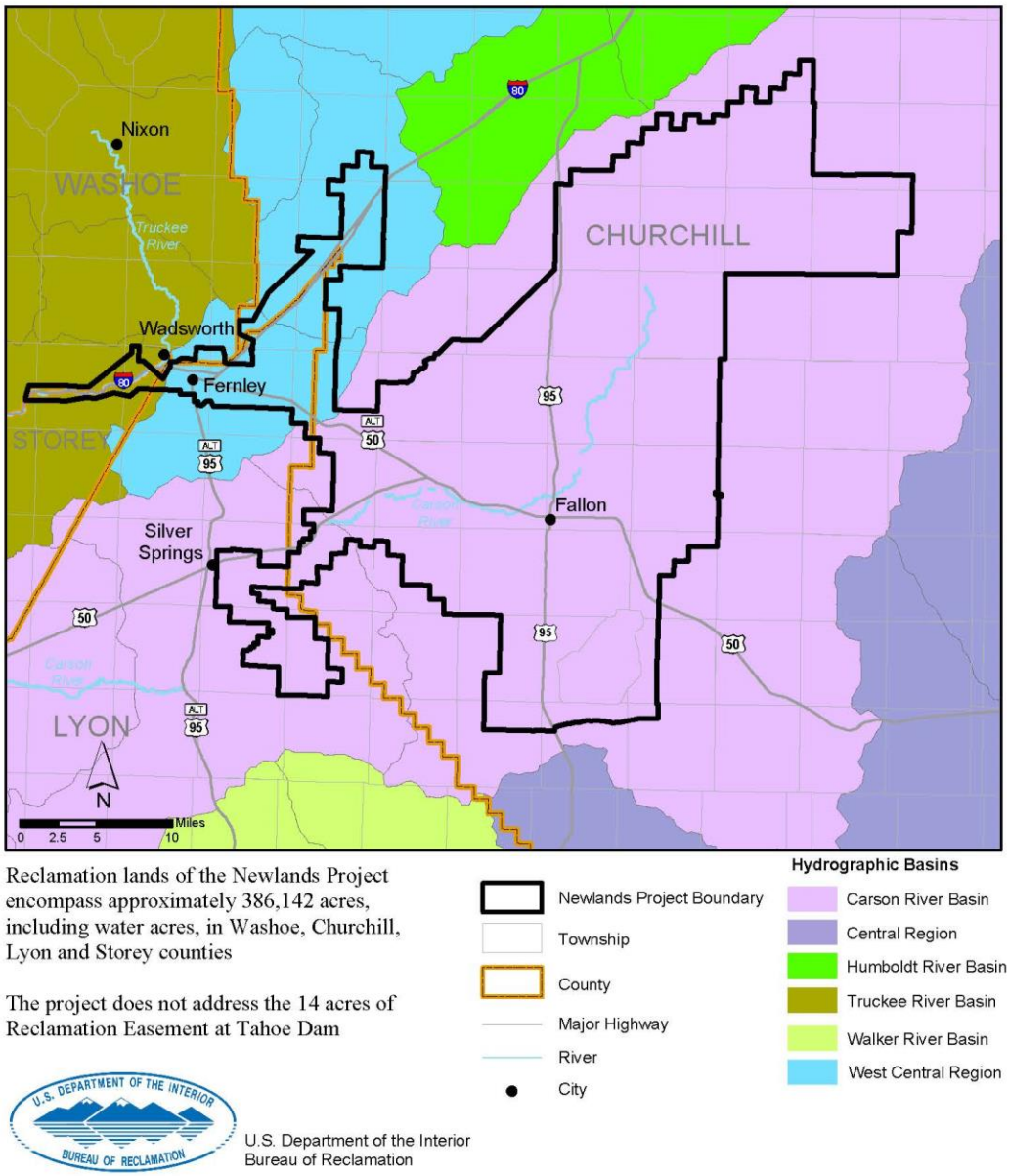

Figure 3-4 Hydrographic Basin Map

At the initiation of the Project, Reclamation determined that the flow of the Carson River alone would not be sufficient to irrigate the entire acreage estimated to be arable. The 32.5-mile long Truckee Canal was designed to divert a substantial amount of Truckee River water at Derby Dam to augment the Carson River flow at the site of Lahontan Dam. Water is released from Lahontan Dam into a network of canals and laterals maintained and operated for Reclamation by the Truckee-Carson Irrigation District (TCID) under Contract Number 7-07-20-X0348 "Contract Between the United States of America and the Truckee-Carson Irrigation District Providing for the Operation and Maintenance of the Newlands Project". Today, diversions from the Truckee River are governed by the Operating Criteria and Procedures. There are approximately 55,000 irrigated acres within the Newlands Project.

The facilities also include an agricultural drainage system (designed to minimize saline and alkaline soils and a locally high groundwater table) and several small downstream regulatory reservoirs (designed to aid in distributing water throughout the Project). Some of the Project's agricultural drainage water is used to supplement the water supply for wildlife areas at the Carson Lake Pasture and at the Stillwater National Wildlife Refuge.

Surface Water

The Truckee River originates at the outlet of Lake Tahoe at Tahoe City, California, and flows about 120 miles to its terminus in Pyramid Lake, within the Pyramid Lake Indian Reservation. As described above, Truckee River water is diverted at Derby Diversion Dam (about 36 miles upstream of Pyramid Lake) via the Truckee Canal. A portion of Truckee Canal flow is diverted upstream of Lahontan Reservoir to supply the Truckee Division.

The lower Carson River originates at the outlet of Lahontan Reservoir, flows about 50 miles through Lahontan Valley, and terminates in the Carson Sink. Most of the planning area lies within the Carson River hydrographic basin. The Carson River Atlas (CDWR 1991) provides a thorough characterization of this area. The following descriptions were summarized from that document.

The irregularly shaped southwestern portion of the planning area is the Lahontan Reservoir, the only large reservoir on the Carson River. Reclamation completed this reservoir in 1915 as part of the Newlands Reclamation Project. The reservoir, with a capacity of 314,000 acre-feet, is long and narrow, following the contours of the former river channel. Lahontan Dam, adjacent to US Highway 50, is a 162-foot-high earthfill dam with two hydropower plants immediately downstream. Lahontan Dam impounds the entire flow of the Carson River, plus water diverted from the Truckee River via the Truckee Canal. Lahontan Reservoir is sometimes thought of as the present-day terminus of the Carson River, and the reservoir is the

only point at which the entire river's flow can be controlled. Carson River discharge to Lahontan Reservoir averages about 276,000 acre-feet at Fort Churchill, Nevada (Reclamation et al. 2004).

Before construction of the Newlands Project, the Carson River terminated downstream of the planning area in the Carson Desert. Historically this arid basin, the Carson River watershed's point of lowest elevation, was a desert, but construction of irrigation works in the Fallon area has resulted in agricultural and municipal development on much former desert land.

Development in the region has altered the course of the Carson River below Lahontan Dam. Today, several individual sinks exist within the larger closed Carson River drainage basin. A sink is a common feature of closed drainage basins in which water leaves only by evaporation. Under normal circumstances, a sink can range from a shallow lake or marshland area to a dry alkali flat, depending on hydrologic conditions. In wetter years, a sink will fill with floodwaters and a shallow lake or series of lakes will be created, the level of which will fluctuate as the water evaporates. In drier years, a sink may contain little open water, but high groundwater levels may still support wetlands vegetation.

One channel of the Carson River turns northward near Fallon, leading to the Carson Sink playa lake. Water now reaches this portion of the basin only in the wettest years. Another channel turns southward toward a sink area known as Carson Lake Pasture. Historically, waters of the Carson River spread over a broad region east of Fallon, creating a series of ephemeral and perennial lakes and marshes. The Stillwater area, immediately east of the planning area, is one remnant of these earlier wetlands. Settlement and agricultural development have altered the flow patterns and amount of water reaching the remaining wetlands in the sink. When flows exceed the needs of agricultural users, the excess flows reach the Carson Lake Pasture and the Stillwater area. Several wildlife refuges have been established for waterfowl and migratory shorebirds in the area. Obtaining water to support these refuges has been one resource management issue on the Carson River.

The sole source of surface water for Lahontan Valley is provided by the Truckee and Carson Rivers. Historically between 1925 and 1967, the Truckee River furnished an average of 51 percent of the water stored in Lahontan Reservoir (Water Research and Development, Inc. [WRD] 2003). The remaining amount was supplied by the Carson River. More recently from 1983 to 1996, because of court decisions and federal mandates, the Truckee River contribution to Lahontan Reservoir was reduced to 38 percent. During drought years (1988, 1990, 1991, 1992, 1994), the Truckee River contributed an average of 62 percent of the water in Lahontan Reservoir.

Surface runoff of precipitation is the primary source of water supply in the Truckee and Carson River basins. Most of the available Truckee River water supply is generated upstream of the USGS stream gage at Farad, California (Reclamation et al. 2004). Most of the Truckee and Carson Rivers' supply is produced during the spring runoff, as the snow pack in the Sierra Nevada melts. In the planning area, spring runoff generally occurs from April to June for the Truckee River and from April to September for the Carson River (Figure 3-5). Detailed information for four USGS stream gage stations representative of hydrologic conditions in the planning area is included in Table 3.7-1. These stations correspond with Truckee River below Derby Dam, the Truckee Canal near Hazen, the Carson River below Lahontan Reservoir, and the Carson River downstream of Fallon.

The climate of the Truckee and Carson River basins is characterized by cycles of flood and drought, and precipitation and runoff vary widely from year to year, as shown in Table 3.7-1 and Figure 3-6. Although average annual precipitation is approximately five inches, floods have occurred in all parts of the planning area. Flood hazards in Nevada are typically underestimated due to the arid climate, few perennial streams, and low precipitation (NDWR 2005). The region is subject to two types of flooding: rivers overtopping their banks and alluvial fan flash flooding. The Federal Emergency Management Agency (FEMA) provides maps of flood hazards from river flooding. The standard flood zone is defined as area subject to inundation by the 1 percent-annual-chance flood event (i.e., "100 year flood"). Alluvial fan flash flooding is potentially more dangerous than river flooding because it is unpredictable and the threat is often not apparent, particularly to new residents in the state unfamiliar with the desert environment.

Along the Carson River, the greatest recorded historical annual flow below the confluence of the east and west forks (at the Carson City gage) was 587,600 acre-feet in 1969, and the lowest was 42,320 acre-feet in 1977 (CDWR 1991). Larger or smaller events likely occurred before regular records were kept, and, based on anecdotal accounts; the late 1800s appear to have been much wetter than normal, which may have translated to higher stream flows. One of the most significant historical droughts in the Carson River hydrographic basin, from a water supply perspective, occurred from 1928 to 1934. Lake Tahoe fell below its natural rim during this time, and Lahontan Reservoir held only 91 acre-feet of dead storage below the level of the outlet works. The Carson River near Fort Churchill has gone dry a number of times during dry years when upstream diversions take the river's flow. Another severe drought occurred in the late 1980s and early 1990s. Conversely, one of the greatest floods on record occurred in 1955, with estimated instantaneous peak flows of 30,000 cubic feet per second (cfs) at Carson City.

Groundwater

Within the planning area, groundwater basins generally are independent alluvium-filled valleys. In some cases, groundwater from one basin may flow into another, and often there is insufficient information to fully characterize this flow between basins. Principal groundwater aquifers in the planning area are basin-fill aquifers, though a volcanic-rock aquifer near Fallon has been developed for municipal use. Basin-fill aquifers are composed primarily of alluvium, colluvium, and lacustrine deposits, and most groundwater use has been from the upper 500 feet of the aquifers.

Groundwater provides a portion of the Carson River hydrographic basin's water supply (CDWR 1991). Many private wells serve homes, both in the alluvial valley-fill deposits and in fracture zones in otherwise less pervious rock. Generally, such wells are outside the service areas of municipal water suppliers and are low-yield wells sufficient for the needs of a single dwelling. Most private wells in the basin are used for domestic purposes; irrigation needs usually are supplied by surface water.

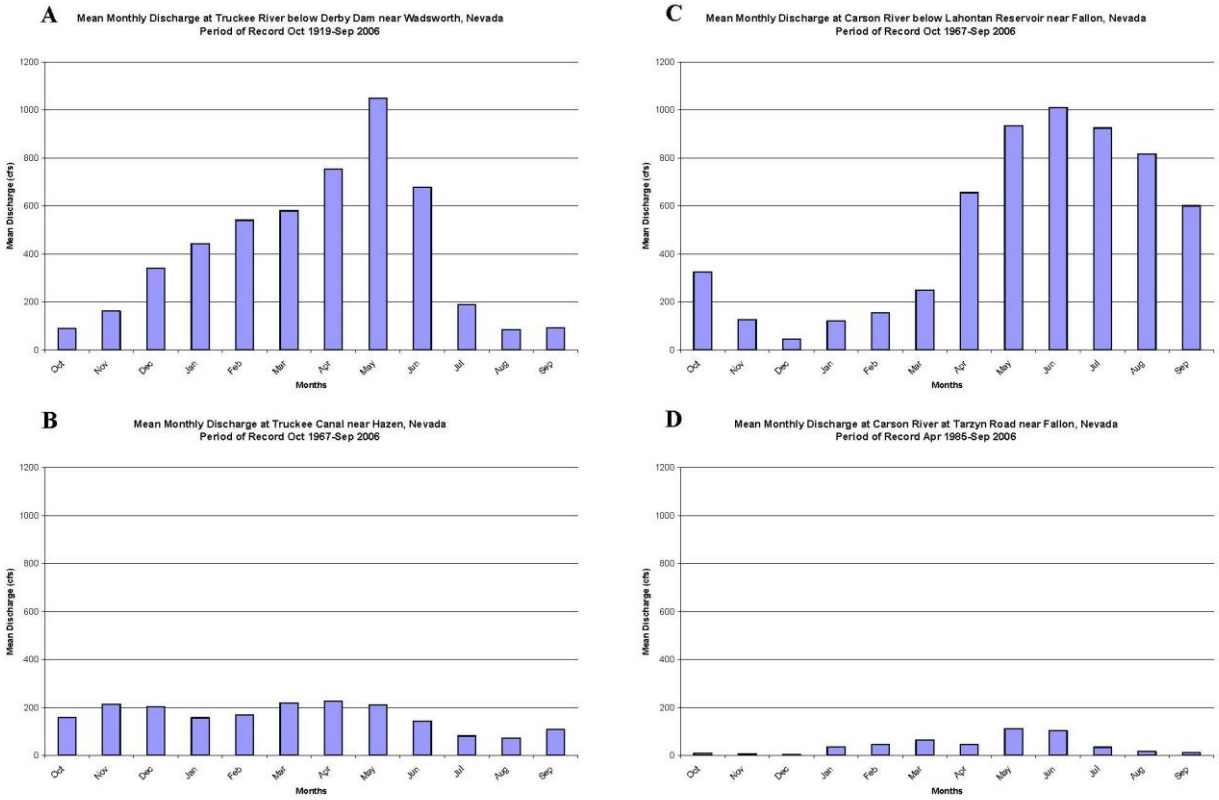

Figure 4. Mean monthly discharge for (A) the Truckee River below Derby Dam, (B) the Truckee Canal near Hazen, (C) the Carson River below Lahontan Reservoir, and (D) the Carson River downstream of Fallon.

Figure 3-5 Mean Monthly Discharge for the Truckee and Carson Rivers

Table 3.7-1 Information for Representative USGS Stream Gages in Planning Area

USGS Station	Name	Drainage Area	Elevation above mean sea level	Period of Record	Range in Mean Annual Discharge (cfs)	Long-Term Mean Flow (cfs)	Highest Peak Flows (cfs)
10312150	Carson River below Lahontan Reservoir near Fallon, NV	1,801 square miles	4,040 feet	Oct 1966 to current	181 (1992) to 1,066 (1983)	781	3,160 (Jun 23, 1983)
10312275	Carson River at Tarzyn Road near Fallon, NV	Undocumented	3,920 feet	Mar 1985 to current	2.38 (1992) to 169.8 (1997)	14.0	753 (Jun 4, 1983) 890 (Jul 15, 1995) 942 (May 27, 1996) 821 (Jan 22, 1997)
10351400	Truckee Canal near Hazen, Nevada	Not applicable	4,167 feet	Oct 1966 to current	2.32 (1999) to 329.7 (1978)	85.0	Not applicable
10351600	Truckee River below Derby Dam, Washoe County, Nevada	1,676 square miles	4,200 feet	Jan 1918 to current	6.2 (1931) to 2,430 (1983)	65.0	18,400 (Feb 1, 1963) 16,900 (Feb 19, 1986) 19,700 (Jan 3, 1997) 14,900 (Dec 31, 2005)

Source: USGS National Water Information System 2008

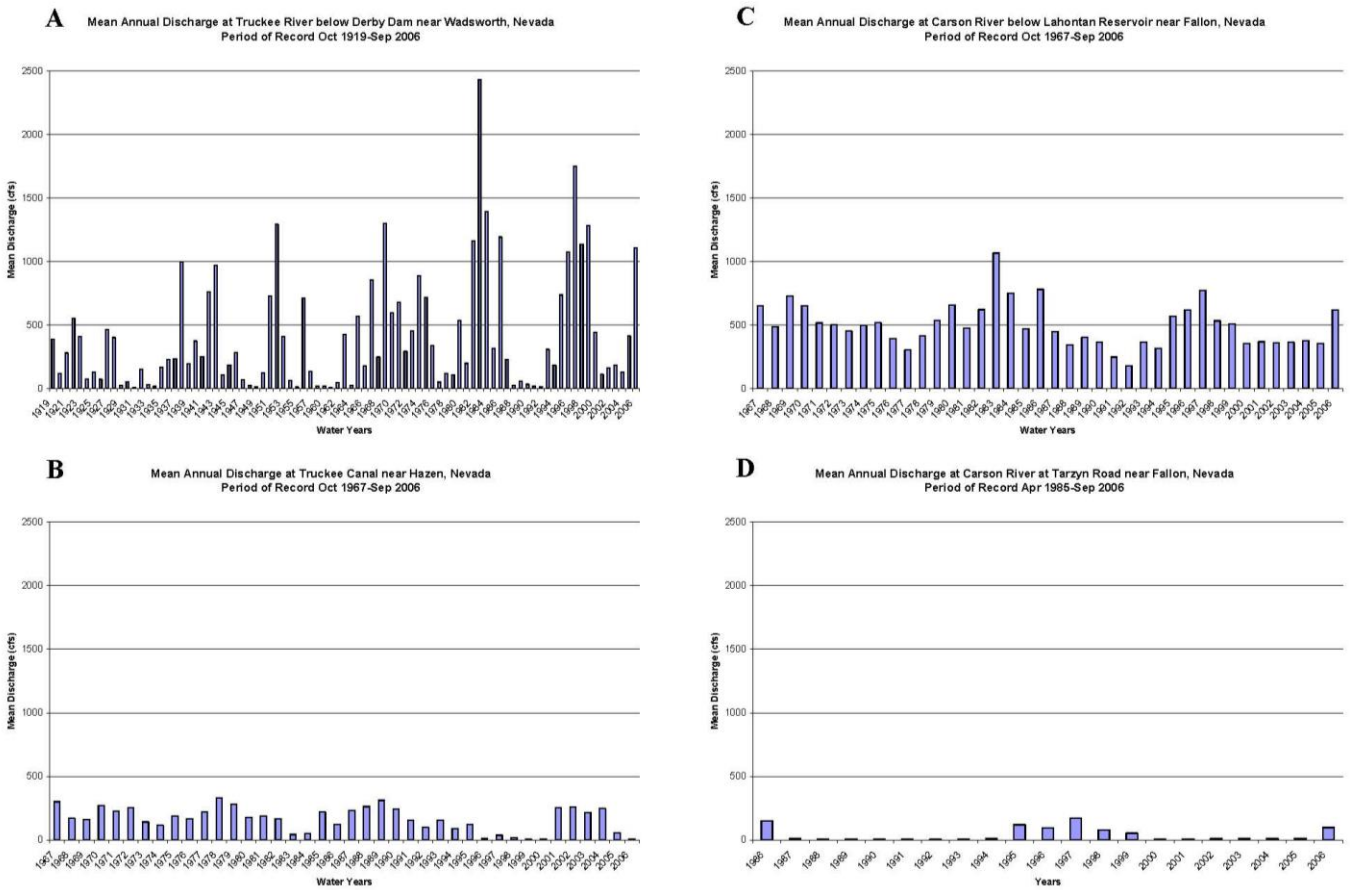

Figure 5. Mean annual discharge for (A) the Truckee River below Derby Dam, (B) the Truckee Canal near Hazen, (C) the Carson River below Lahontan Reservoir, and (D) the Carson River downstream of Fallon.

Figure 3-6 Mean Annual Discharge for the

Groundwater recharge resulting from precipitation within the Lahontan Valley is estimated at about 1,300 acre-feet per year (WRD 2003). This recharge is estimated to occur only on the eastern side of the valley. It does not contribute to the western and central portions of the valley where most potable wells are located. The estimated recharge from infiltration of irrigation water varies from 50,000 to 100,000 acre-feet per year.

Water Rights

Water rights in Nevada are administered by the State Engineer, and in some cases, the courts (CDWR 1991). Nevada has a statewide system for administration of both surface water and groundwater rights. Like many other western states, Nevada's water law is based on the appropriative doctrine for both surface water and groundwater. This doctrine was in common use throughout the arid west as early settlers and miners began developing the land. The appropriative doctrine is based on the concept of first in time, first in right. The first person to take a quantity of water and put it to beneficial use has a higher priority of right than a subsequent appropriative user. Under drought conditions, higher priority users are satisfied before junior users receive water. Nevada has a thriving market for water transfers. The federal government must obtain water rights for reclamation projects under state law, unless state law conflicts with clear congressional directives. Since the Reclamation Act, Reclamation normally has participated in the state permitting process. Reserved rights are a water rights category created by federal law and apply when the government withdraws land from the public domain to establish a federal reservation, such as a national park. By this action, the federal government is held to have reserved water rights sufficient for the primary purpose for which the land was withdrawn.

Within the planning area, Reclamation has no water rights, and lands managed by Reclamation are not irrigated. Reclamation is authorized to deliver water to legal water rights owners.

Water Uses

Some of the earliest diversions in the Carson River watershed were associated with timber and mining. The Newlands Project established agricultural uses, and Public Law 101-618 established additional purposes for the Project. Currently, the uses of water delivered by the Newlands Project include agricultural, municipal and industrial, hydroelectric power generation, fish and wildlife, and recreational.

Newlands Project agriculture in the Carson River hydrographic basin is the largest water user on both the Truckee and Carson Rivers (CDWR 1991). Principal irrigated land includes that for pasture, alfalfa, and grains. Two power plants at Lahontan Dam and another on the V-Canal downstream of the dam generate hydroelectric power on the Newlands Project.

Fish and wildlife resources exist in the Lahontan Valley wetlands. Recreational uses include boating and camping at the Lahontan Reservoir and hunting, fishing, and wildlife observation at the Lahontan Valley wetlands. The Carson Sink offers recreational opportunities, including the BLM's interpretive area on Reclamation-administered land at Grime's Point.

Because surface water in Nevada is virtually fully appropriated, groundwater has become a more important resource. Groundwater development is becoming more common in accommodating growth in large municipalities. In addition, groundwater is used for irrigation, domestic use, mining, and energy development and production. Groundwater can also be used to supplement surface water, so groundwater use is often greater during periods of low stream flow. Most of municipal water users in the Carson River hydrographic basin are supplied from groundwater sources (CDWR 1991).

The total population of Churchill County is estimated to increase by three percent annually, resulting in a water demand of approximately 21,500 acre-feet in 2025 and 45,700 acre-feet in 2050 (WRD 2003). The county has proposed different approaches to meet the demand, including purchasing surface water rights

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3.6.1 Water Quality

The EPA has delegated responsibility for regulating water quality to the State of Nevada within its border. The State Environmental Commission and the Nevada Division of Environmental Protection (NDEP) regulate water quality. Nevada's water quality standards, contained in the Nevada Administrative Code (NAC) 445A.119 – 445A.225, define the water quality goals for a water body, or a portion of a water body, by designating beneficial uses of the water and by setting criteria necessary to protect the beneficial uses. Beneficial uses include irrigation, recreation, aquatic life, fisheries, and drinking water. In many instances, NAC defines two or more reaches for a river system, with each reach possibly having different beneficial uses and water quality standards. Water quality standards do not extend to groundwater in Nevada, but the state has a policy to protect all groundwater to drinking water standards.

Most public land water resources in the planning area are small, discrete waterbodies such as springs, seeps, wet meadows, and short stream segments. Few waterbodies on public land have designated uses, so typically the narrative standards only apply. However, unless properly managed, activities on public land can have off-site impacts on waterbodies with designated uses. Groundwater quality is generally poor in this area because of the concentration of mineral salts in the basin sediments. Typically, water quality decreases with depth, and potable supplies must be taken from basin margins or higher elevation valleys.

Section 303(d) of the Clean Water Act requires that states develop a list of waterbodies needing additional work beyond existing controls to achieve or maintain water quality standards. Referred to as the Section 303(d) List, it provides a comprehensive inventory of waterbodies impaired by all sources, including point sources, nonpoint sources, or a combination of both. The 303(d) List is the basis for targeting waterbodies for watershed-based solutions, and the total maximum daily load (TMDL) process provides an organized framework to develop these solutions.

A TMDL is a calculated load of a specific pollutant that a water body such as the Truckee River can carry daily without becoming impaired. A TMDL identifies a specific limit for a pollutant, generally in pounds per day, which is calculated as the sum of all loads of the specific pollutant and is set at a level necessary to meet water quality standards. The sum of all loads includes inputs from wastewater treatment (waste load allocation), loads from nonpoint sources (load allocation), natural background conditions, and a margin of safety, as well as a consideration of seasonal variations. TMDLs are normally developed and authorized by a state environmental protection agency, such as the NDEP, and they must be approved by the EPA. Interested parties such as cities, watershed groups, and other organizations may develop a TMDL under strict oversight of the state agency. These are

referred to as third party TMDLs, and the state agency may adopt or reject a third party TMDL based on a variety of factors.

Table 3.7-2 lists waterbodies in the planning area that were included in the most recent 2006 303(d) List (NDEP 2009). In addition, the Carson River, from New Empire to the Carson Sink, is listed on the National Priorities List (Superfund) because of mercury contamination from historic mining. The Nevada State Health Division has issued a fish consumption advisory for all waters in the Lahontan Valley. The Carson River, from Lahontan Reservoir to the Carson Sink, also is listed as warranting further investigation for possible impairment by total iron.

The water quality of the Lahontan Reservoir is generally good, with turbidity of 5.5 to 14.0 national turbidity units (NTU) and total dissolved solids less than 300 milligrams per liter (WRD 2003). Water quality limitations include seasonal algae accumulations, arsenic detected at 17 parts per billion, trihalomethanes, and pathogens. The water quality of the Truckee Canal is also good, with average turbidity of 7.0 NTU, total dissolved solids of less than 200 parts per million, and arsenic concentrations of 14 parts per billion (WRD 2003).

Lahontan Valley groundwater meets Nevada drinking water standards, except for arsenic, which typically occurs in concentrations of 100 parts per billion, compared to the maximum contaminant level of 10 parts per billion (WRD 2003). Arsenic can be removed by expensive wellhead treatment.

Table 3.7-2 Designated Impaired Waterbodies in the Planning Area

Water Body ID	Nevada Administrative Code Reference	Water Body Name	Reach Description	Size	Units	Existing TMDLs	Pollutant or Stressor of Concern	TMDL Priority	New Listing?
Truckee River Basin									
	445A.189	Truckee River	Derby Dam to Pyramid Lake Reservation	11.22	miles	None	Temperature	Low (beyond 5 years)	X
							Total phosphorus	Low (beyond 5 years)	
							Turbidity	Low (beyond 5 years)	
Carson River Basin									
	445A.126	Carson River	Lahontan Reservoir to Carson Sink	40.46	miles	None	Mercury	Low (beyond 5 years)	X
							Iron (total)	Low (beyond 5 years)	X
							Zinc (Dissolved)	Low (beyond 5 years)	X

	Not applicable	All waters below Lahontan Dam in Lahontan Valley	n/a		n/a	n/a	None	Mercury	Low (beyond 5 years)	X

Source: NDEP 2009

Total Maximum Daily Loads

Although TMDLs exist for both the Carson and Truckee Rivers, they were established for the portions of the watersheds upstream of Lahontan Reservoir for the Carson and Lockwood, Nevada, for the Truckee and do not directly apply to the portions of these rivers in the planning area (Center for Collaborative Policy [CCP] 2008). The Carson River TMDL addresses dissolved oxygen, biochemical oxygen demand, orthophosphates, nitrates, and total dissolved solids. The Truckee River TMDL addresses total nitrogen, total phosphorus, and total dissolved solids. As shown in Table 3.7-2, the development of TMDLs for the listed waterbodies in the planning area has been assigned a low priority relative to other listed waterbodies in Nevada.

The Truckee River TMDL was developed in response to a series of events (CCP 2008). During the 1980s, NDEP observed low dissolved oxygen levels in the Truckee River, a condition that adversely affects many aquatic species. NDEP determined that the primary cause of oxygen depletion was the benthic algae growing in the Truckee River, which was attributed to excess nitrogen and phosphorus in the water. These nutrients were from nonpoint source runoff in the Truckee River watershed, minor and poorly defined point sources, and wastewater discharge from the water treatment facility now known as the Truckee Meadows Water Reclamation Facility. Throughout the 1980s and early 1990s, this facility was improved and successfully reduced the levels of nitrogen and phosphorus. At roughly the same time and in response to social concerns, permit requirements, and state designation of the Truckee River as an impaired water body, the NDEP set forth to establish a formal TMDL for nitrogen and phosphorus. In 1994, the NDEP established TMDLs to control total nitrogen and total phosphorous in the Truckee River upstream of the planning area. The NDEP also established a TMDL for total dissolved solids, which pose a threat to drinking water quality and is a general indicator of degraded water quality.

The Cities of Reno and Sparks, Nevada, have proposed to conduct a third-party TMDL review and potential revision for nutrient loads in the Truckee River in Nevada. The NDEP and the EPA agreed in principal that this proposal had merit but stipulated that the cities must have a comprehensive stakeholder component as part of the effort. They further recommended that the cities contact the CCP at California State University, Sacramento, to advise and assist them in assessing stakeholder conditions and providing public process recommendations (CCP 2008). The CCP conducted the assessment between January and June 2007, and it proved to be an exceptionally complex case. The CCP recommended that a regional multiparty stakeholder negotiation be conducted in support of the proposed nutrient TMDL, as well as other compelling water quality challenges for the Truckee River watershed. The NDEP and the EPA have reviewed the CCP's recommendations and have expressed their approval to the cities, which similarly supported the CCP's recommendations; consequently, the project began in fall 2007.

Lahontan Valley Wetlands

Water quality concerns over the Lahontan Valley wetlands have risen, along with concerns about increased salinity typical in closed basins. Other water quality problems include high levels of mercury in sediments, induced into the river upstream during the Comstock mining boom (CDWR 1991). A health advisory has been issued on eating shoveler ducks from Carson Lake Pasture because these bottom-feeding ducks may contain elevated mercury concentrations. Evaluations also have been made of the agricultural drain water entering Stillwater, where elevated levels of arsenic, boron, selenium, lithium, and molybdenum have been detected. Arsenic is elevated in groundwater. Stillwater lies at the edge of a geothermal resource area. Groundwater with elevated levels of minerals is common in geothermal zones. High arsenic levels in groundwater used for municipal supply in the Fallon area has required the use of special treatment processes.

3.7 Visual Resources

The planning area is in the Great Basin, which can be described as expansive. The often barren, but frequently colorful, elongated and steep mountain ranges provide unobstructed panoramic views of the Great Basin area. Steep, rugged mountain ranges parallel sun-saturated, brush-strewn valley floors interspersed with barren, bleached alkali playas (BLM 1974). Higher elevations support sagebrush, juniper, and pinyon pine. This vegetation provides visual diversity and contrasting darker color along ridgelines in the distant background. Vegetation on the valley floor grows low and evenly and primarily consists of monochromatic desert brush (US Navy 2000). Although the areas are sparsely populated, cultural modifications include fences, utility lines, roads (paved and dirt), historic trails, trailer houses, mines, and road signs (BLM 1974).

The form, line, color, and texture of the Great Basin landscape are influenced by the arid climate. The hills are gold and brown, and the blue sky can be dotted with fluffy clouds and thunder clouds at times. Sunlight is a dominating element in the area, and whirling winds create dust funnels (US Navy 2000; BLM 1974).

Sizeable natural areas within the planning area include Lahontan Reservoir, Carson Lake Pasture, and the Stillwater National Wildlife Refuge.

Lahontan Dam and reservoir are part of the Newlands Project (Nevada Division of State Parks 2012). The area is managed as a Nevada State Recreation Area where water-based recreation, hunting, camping, and picnicking occur. The park's vegetation is dominated by high desert sagebrush communities. Wooded areas of native cottonwoods and willows are scattered along the lake shore. Riparian zones are found upstream and downstream of the lake along the Carson River. Rock from ancient volcanic flows is common in the mountains around the lake. Wild horses, bobcats, coyotes, foxes, and deer share the park with a variety of birds. Migratory waterfowl, pelicans, herons, egrets, and hawks are frequently seen. Nevada's only known nesting bald eagles are found at Lahontan.

Carson Lake Pasture is a 30,000-acre wetland within Reclamation's Newlands Project. The wetland is a component of the Western Hemisphere Shorebird Reserve Network and is one of the largest in northern Nevada.

The Stillwater National Wildlife Refuge is in the Carson Sink west of the Stillwater Range. Areas in the Stillwater Range are ranked as having above-average scenery (BLM 2001). The Stillwater wetlands are well-known to birders, as this area has been designated a site of international importance by the Western Hemispheric Shorebird Reserve Network (USFWS 2008). It is also listed as a Globally Important Bird Area by the

American Bird Conservancy, and more than 280 species have been sighted in the area. These diverse wetlands attract more than a quarter million waterfowl, as well as over 20,000 other water birds, including American white pelicans, double-crested cormorants, white-faced ibis, and several species of egrets, herons, gulls, and terns.

Populated centers within the planning area include Stillwater, Fernley, and Fallon. Stillwater is the closest town to the Stillwater National Wildlife Refuge and is fringed with extensive irrigated cropland and ranches (BLM 1974). Fernley is about 27 miles northwest of Fallon. Naval Air Station Fallon is in Fallon and has runways, mixed-use development, and single- and multistory buildings. The land around the structures and facilities includes agricultural areas as well as areas of natural desert scrub vegetation.

In addition to populated centers, sensitive receptors are people recreating in the area and drivers on major roadways, such as US Highway 50 and US Highway 95. Recreation in the area is described in Section 3.18.

3.8 Cultural Resources

3.8.1 Introduction

Cultural resources are locations of human activity, occupation, or use. They include expressions of human culture and history in the physical environment, such as prehistoric or historic archaeological sites, buildings, structures, objects, districts, or other places. Cultural resources can also include natural features, plants, and animals that are considered to be important to a culture, subculture, or community, or that allow the group to continue traditional lifeways and spiritual practices.

For purposes of this document, cultural resources have been organized into prehistoric resources, ethnographic resources, and historic resources. These categories are not exclusive, and a single cultural resource may have multiple components.

Prehistoric resources are physical properties resulting from human activities that predate Euroamerican contact. These are generally identified as isolated finds or sites. Areas of intense prehistoric use, such as near freshwater or lithic sources, are particularly sensitive for such resources. Prehistoric resources can include archaeological village sites, temporary camps, lithic scatters, roasting pits/hearths, milling features, petroglyphs, rock features, and burial plots.

Ethnographic resources are sites, areas, and materials important to contemporary Native Americans for religious, spiritual, or traditional reasons. These resources can include archaeological sites, village locations, burial plots, petroglyphs, rock features, springs, and traditional cultural properties (TCPs). Fundamental to traditional religions is the belief in the sacred character of physical places, such as mountain peaks, springs, or burial plots. Traditional rituals often prescribe the use of particular native plants, animals, or minerals; therefore, activities that can affect sacred areas, their accessibility, or the availability of materials used in traditional practices are of primary concern. Although some types of ethnographic resources overlap with prehistoric and historic resources, they require separate recognition as unique cultural resources.

Historic resources consist of physical properties, structures, or other built items resulting from human activities that post-date written records. Historic resources can include archaeological remains and architectural structures. Historic archaeological sites include townsites, homesteads, agricultural or ranching features, mining features, refuse concentrations, and features or artifacts associated with early exploration or military use of the land. Historic architectural resources can include houses, cabins, barns, bridges,

local structures (such as churches, post offices, and meeting halls), and water transport features (such as dams and canals).

Regulatory Setting

The identification and management of cultural resources and the federal agency responsible for them are addressed by a number of laws, regulations, Executive Orders, and agreement documents. Selected requirements are described below and a comprehensive list and description can be found at: http://www.usbr.gov/cultural/legismandates.html (Reclamation 2012b).

The principal federal law addressing cultural resources is the *National Historic Preservation Act (NHPA) of 1966*, as amended (16 USC, Section 470), that requires all federal agencies to take into account the effects of their actions on the nation's historic properties (Section 106), and directs federal agencies to assume responsibility for the preservation of historic properties that are owned or controlled by such agencies (Section 110). The Section 106 compliance procedure for determining effects on cultural resources as described in *36 CFR 800, Protection of Historic Properties*, outlines the steps for identifying and evaluating historic properties, for assessing the effects of federal actions on historic properties, and for consulting to avoid, reduce, or minimize adverse effects. Section 110 sets inventory, nomination, protection, and preservation responsibilities for federally owned cultural properties.

The term "historic properties" refers to cultural resources that contribute significantly to history and meet the specific criteria outlined in 35 CFR Part 60.4 for listing on the National Register of Historic Places (NRHP). Historic properties include those cultural resources that are formally listed on the NRHP and those that have been determined to meet the criteria for listing. The Section 106 process does not require historic properties to be preserved but does ensure that the decisions of federal agencies concerning the treatment of these places result from meaningful consideration of cultural and historic values and the options available to protect the properties.

The *Archeological Resources Protection Act of 1979* as amended (PL 96-95; 93 Stat. 721; 16 USC 47Oaa et seq.) sets felony-level penalties for excavating, removing, damaging, altering, or defacing any archaeological resource more than 100 years of age, on public or Indian lands, unless authorized by a permit. It applies to archaeological resources regardless of NRHP status. It prohibits the sale, purchase, exchange, transportation, receipt, or offering of any archaeological resource obtained in violation of any regulation or permit under the act or under any federal, state, or local law. The Act is implemented by uniform regulations and Interior-specific regulations, both found at 43 CFR Part 7.

The *Native American Graves Protection and Repatriation Act of 1990*, as amended (PL 101-601; 104 Stat. 3048; 25 USC 3001 et seq.) establishes the rights of Native American tribes and Native Hawaiian organizations to claim ownership of certain cultural items,

including human remains, funerary objects, sacred objects, and objects of cultural patrimony, held or controlled by federal agencies and museums that receive federal funds. It requires agencies and museums to identify holdings of such remains and objects, and to work with appropriate Native Americans toward their repatriation. Permits for the excavation and/or removal of cultural items protected by the act require Native American consultation, as do discoveries of cultural items made during federal land use activities. The Secretary of the Interior's implementing regulations are at 43 CFR Part 10.

Executive Order 13700, Sacred Sites, requires agencies managing federal land to accommodate access to and ceremonial use of Native American sacred sites by Native American religious practitioners and to avoid adversely affecting the physical integrity of such sacred sites. It also requires agencies to develop procedures for reasonable notification of proposed actions or land management policies that may restrict access to, or ceremonial use of, or adversely affect sacred sites. Sacred sites are defined in the executive order as "any specific, discrete, narrowly delineated location on Federal land that is identified by a Native American tribe, or Native American individual determined to be an appropriately authoritative representative of a Native American religion, as sacred by virtue of its established religious significance to, or ceremonial use by, a Native American religion; provided that the tribe or appropriately authoritative representative of a Native American religion has informed the agency of the existence of such a site" (ACHP 2005). No sacred sites have been identified by the consulted tribes, to date, in the planning area.

Reclamation's *Cultural Resources Management (Policy LND P01)* ensures that Reclamation maintains a program that reflects the spirit and intent of federal cultural resources legislative mandates. *Cultural Resources Management (Directives and Standards LND 02-01)* ensures that Reclamation manages its cultural resources according to federal legislative mandates and in a spirit of stewardship; clarifies Reclamation's roles and responsibilities related to cultural resources; and provides direction for consistent implementation of Reclamation's cultural resources management responsibilities.

3.8.2 Cultural Context

Prehistoric Context

The Newlands Project Planning Area is in the western Great Basin. This area includes most of Nevada and parts of California, and archaeological evidence suggests that modern humans have had a presence in the region for 11,000 to 12,000 years. The region is characterized by north-south trending mountain ranges, intervening valleys, arid regions with little precipitation, and sinks of all major stream systems in the western Great Basin (Elston 1986). Prehistoric cultural chronologies within the planning area can be divided into four periods based on the area's archaeology: Pre-Archaic or Paleoindian, Early Archaic, Middle Archaic, and Late Archaic.

Pre-Archaic (8,000 to 6,000 B.C.) is typified by surface sites and a few identified buried sites. A site can be represented by a single artifact to scatters that cover a great distance. The distinctive lithic technology resembles the megafauna hunters of the Paleoindians more than the later Archaic cultures of the Great Basin. Multifunctional tools such as scrapers and gravers are common, with evidence of extensive reuse. From the artifacts found in association with Pre-Archaic sites, it is assumed that big game was hunted including megafauna (Elston 1986). There is little evidence of seed grinding, permanent structures, or stored resources associated with this culture. Recent research on this period has focused on refining ideas about the subsistence and settlement strategy employed, with more consideration given to the role of resources associated with wetlands and marshes and the use of more stable marsh-side camps rather than a high residential mobility in which Paleoindians occupied residential loci for short periods while traveling through extensive north-south foraging ranges (Smith and Kielhofer 2011).

Early Archaic Period (5,000 to 4,000 B.C.). Not much is known about this period in the western Great Basin because archaeological sites are scarce. It appears that the upland areas and the valley bottoms near streams primarily were occupied during this time. Populations were low, with small field camps used for short periods. Marine shells and obsidian were traded between groups of the area and other regions. Large game animals were hunted. However, when lakes and marshes dried up, large game animals became scarce and the diversity of ecosystems was reduced, forcing prehistoric groups to focus on other more available subsistence resources (Elston 1986).

Middle Archaic Period (2,000 B.C. to A.D. 500). The climate during this period was cool and moist. During the Middle Archaic Period, people adapted to the seasonal patterns and shifted their way of life based on the changing ecosystem in the region. The major cultural changes tended to be within settlement and life patterns and population density (Elston 1986). The size, location, and density of sites during this period show that residential bases were used long term and that people likely reoccupied camps (Pendleton and Thomas 1983). Inhabitants of the region appear to have occupied their residences for longer periods than during the Early Archaic and had elaborate, long-range hunting excursions. There was more diverse use of ecological resources within smaller areas, and food surpluses were gathered, processed, and then stored.

Late Archaic Period (500 A.D. to shortly after Euro-American contact). This period signified a dramatic change in the western Great Basin, characterized by severe drought, population increases, resource imbalances, ethnic displacements, and changes in technology. The Late Archaic was a time of transformation ecologically, and cultures appear to have changed and shifted in technological, subsistence, and settlement patterns to adapt to these changes (Elston 1986). This period saw an increase in population, which likely caused stress and change. The *atlatl* (spear-throwing device) and dart were replaced by the bow and arrow (Elston 1986), and plant processing equipment became more sophisticated, among other technological changes. There was an increase in both the

diversity of resources used and an increase in sedentism (the long-term or permanent residence of a human population in one location). Plant foods and small game were used more than the large game of the earlier periods (Elston 1986). Groups tended to forage in a smaller area, and there was an increase in settlement centralization and resource intensification. This ability to change with the changing environment was consistent until the expansion of Euro-American occupation.

Ethnographic Context

The planning area encompasses lands and landscapes traditionally used by the Northern Paiute. *Northern Paiute and Western Shoshone Land Use in Northern Nevada: A Class I Ethnographic/Ethnohistoric Overview* by Ginny Bengston (2003) provides an in-depth ethnographic account of the planning area. The following section is based primarily on that document.

Native Americans in this area traveled widely, in an essentially open range, to exploit small and large game and seasonably available flora. Their uses of natural resources and particular places are often deeply connected to sacred and religious practices and traditions that are still important and must be considered in land use planning by federal agencies.

Historically, five distinct bands of Northern Paiute lived in a few areas in northern Nevada. Today, descendants of these early Paiute bands live on reservations in California, Oregon, and Nevada. One band lived along the lower Truckee River and along the shores of Pyramid and Winnemucca Lakes. Descendants of this group now live on the Pyramid Lake Paiute Reservation. Another Paiute band lived in the Walker River and Walker Lake area, and their descendants now live on the Walker River Indian Reservation. Descendants of the Paiute band that inhabited the Humboldt River area from Humboldt Lake to what is presently Winnemucca live within the Lovelock Colony. Other bands inhabited areas that are now part of California.

Historic Context

At the time of Euro-American contact with the western Great Basin the planning area was inhabited and used mostly by Northern Paiute and Washoe Indians. Native Americans in this part of the Great Basin were largely isolated from early Euro-American settlement and exploration in other areas until the 1820s (Bengston 2003; Simonds 1996). The Northern Paiute inhabited and used the Blue Lake, Mahogany Mountain, and Tule Peak/Virginia Mountain areas (Bengston 2003). The Washoe occupied and used upland areas west of the Northern Paiute territory in the vicinity of Lake Tahoe, the eastern slope of the Sierra Nevada, and drainages of the Truckee and Carson Rivers. The discovery of gold and silver triggered an expansion of Euro-American settlers into the area. The region encompassing the planning area grew in nonnative population, and this rapid settlement often meant clashes between Native Americans and Euro-Americans. Native Americans

were relocated to reservations, and those Native Americans who did not live on reservations found themselves amidst a growing white farming settlement (Campbell 2002). Paiute women and men worked as farm laborers and domestic servants for many of these new settlers. The historic period of the Project region can be divided into three thematic categories: Early Exploration, Discovery of Gold, and Ranching and Agriculture.

Early Exploration. The first explorations by European Americans of the Newlands area occurred in the 1820s, when Jedediah Smith passed through the area just south of the Truckee Meadows, leading a party of trappers for the Rocky Mountain Fur Company. Other fur trading companies explored the region, using the California Trail and other routes. Peter Skene Ogden, of the Hudson Bay Company, explored the area in 1828. In 1844, John Fremont, a lieutenant, led a party for the US Bureau of Topographical Engineers through the area (Simonds 1996).

Discovery of Gold. The discovery of gold in 1848 at Sutter's Mill near Sacramento unleashed an interest in the western US that was unprecedented, creating an expansion period. Many of these travelers chose to take the Truckee River/Donner Pass route or the Sonora Pass, along the Carson River, to get to gold country (Simonds 1996). Settlement of the region began shortly thereafter, and by 1852 the first permanent settlement of European Americans along the Truckee River was established.

In 1859, the Comstock Lode was discovered near Virginia City, Nevada, resulting in another influx of people to the region and the first urban settlement in Virginia City. These settlers into northern Nevada came to mine silver in the region. When the Central Pacific Railroad was completed in 1868, it further increased population growth. The demands for water and lumber also increased during this period. The mining of precious metals became a large industry in the region and in Nevada in general during the 1860s and the 1870s. Lumber was used for constructing the railroads and mines, and eventually logging and milling operations in the area grew. Growth throughout the region led to an increased need for resources, such as water, thereby increasing conflict between Native Americans and Euro-Americans (Horton 1995).

Transportation. National events helped to mold the nature of historic resources in the planning area. The California Trail, initially established in 1841, became a key transportation route along the Humboldt River for emigrants traveling to California and western Oregon. With the discovery of gold at Sutter's Mill in 1848, travel along the trail exploded. Between 1849 and 1852, approximately 175,000 emigrants bound for the California goldfields traveled along the trail.

The Pony Express proved the viability of a central United States overland communication system and was a forerunner of a transcontinental telegraph and rail road. The Pony express played a vital role in aligning California with the Union in the Civil War.

In 1992, Congress designated the California Trail and the Pony Express Trail as National Historic Trails. Segments of the California Trail and the Pony Express Trail fall within the planning area. The National Park Service has prepared a Comprehensive Management and Use Plan/Final Environmental Impact Statement (EIS) for the Oregon, California, Mormon Pioneer, and Pony Express National Historic Trails (USDI]/National Park System [NPS] 1999). Two segments of the California Trail within the RMP planning area (Humboldt Sink to Fernley and Humboldt Sink to Dayton) have been identified as high potential segments or "segments of a trail which would afford a high quality recreation experience in a portion of the route having greater than average scenic values or affording an opportunity to vicariously share the experience of the original users of a historic route" (see Figure 3-7). Per the NPS EIS, high potential segments on federal land are considered federal protection components and should receive special attention by managing agencies to enhance their trail-related values.

Ranching and Agriculture. As miners and others began to pour into the region, the ranching and agriculture supporting the growth became an increasingly important part of the regional economy. Expansion of ranching and agriculture required irrigation and water control features to sustain this growth and to protect cropland. The Reclamation

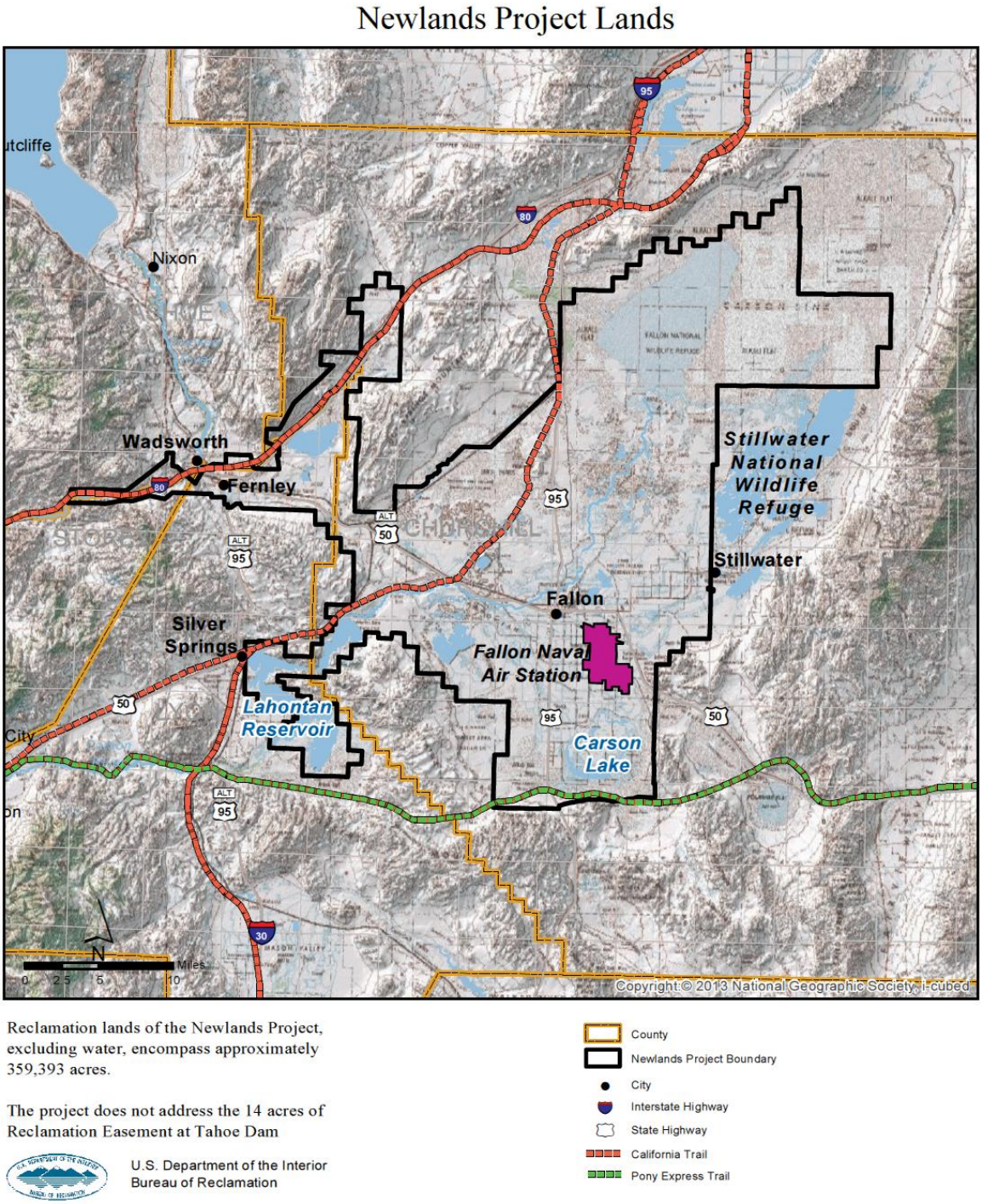

Figure 3-7 Newlands Project Planning Area Historic Trails

Act of 1902 authorized the federal government to construct irrigation systems in the arid areas throughout the west. One of the first of these was the Newlands Project (then called the Truckee-Carson Project), which began in 1903.

The Newlands Project changed the economic and settlement patterns of the area, altering the landscape with canals and other irrigation features. The initial diversion dams and canals were used to convey water from the Truckee River to the Carson River. The Derby Diversion Dam, Truckee Canal, and Carson River Diversion Dam, completed in 1905, were the first features of the Newlands Project to be constructed (Simonds 1996). Other canals and support features for the system were constructed shortly thereafter, including the V-line and A-line Canals. By the end of 1914, 696 miles of canals had been completed (US Department of the Interior 1941). The completion of Lahontan Dam in 1915 marked the end of construction of the major features of the Project, but distribution canals, laterals, and drains continued to be constructed for several years (Simonds 1996).

3.8.3 Cultural Resource Inventory

Methods for Identifying Prehistoric and Historic Resources

A cultural resource overview study of the Newlands Project lands in support of the RMP was conducted in 2010 (King 2011). It should be noted that this inventory targeted only lands managed by Reclamation and not the full planning area addressed in the RMP. However, this study provides the most thorough and representative compilation of site information in the region. With the exception of the towns and the Fallon National Wildlife Refuge, much of the noncontiguous land management by Reclamation is in a checkerboard pattern, thus assuring a good sampling of the RMP planning area. A 200-meter (approximately 1/8-mile) buffer was added to mapped features so as to include resources that may have been inaccurately or incompletely plotted on source maps, and thus may lie on Reclamation lands despite being plotted outside them.

This study compiled cultural resources information from several sources, including online databases and image archives, the Nevada State Museum (NSM), and BLM offices. Online data were obtained in February 2010; field visits to agency offices took place between April and June 2010.

The Nevada Cultural Resource Information System (NVCRIS) is a GIS database maintained by the NSM that is the principal source of information for surveys and site data relevant to the planning area. GIS data for the project area were collected, including layers depicting resources, survey boundaries, and database and attributes detailing site constituents and NRHP properties, and report citations. Cultural resources information held by BLM and other agencies was also searched. The overview also included gathering and compiling historical maps in digital format from several sources and reconciling errors and contradictory map, report and site data.

The NVCRIS and the online National Register website (NRHP 2010) were searched to determine NRHP properties in the study area. For documentation on the status of the Newlands Project itself, Hardesty and Buhr (2001) and Pfaff (2002) were consulted. Reclamation provided GIS data depicting Newlands Project features, including dams, canals, and drains that were used to prepare a concordance between these features and archaeological site designations. Many Newlands Project features have been recorded as archaeological sites, but not in any comprehensive fashion.

Present Conditions and Prehistoric and Historic Resources

In total, 199 reports and 669 archaeological sites were documented during this study in the Newlands Project area. Some sites were recorded multiple times, resulting in a total of 683 unique recording events. A total of 78 sites were recommended National Register-eligible by site recorders. There are three formally listed properties: the Grimes Point area, the Churchill/Sand Springs Toll Road, and elements of the Newlands Project itself. (King 2011). The Stillwater Marsh Archaeological District is also a listed property in the planning area but it is managed by USFWS. Table 3.9-1 summarizes these resources.

Table 3.9-1 Recorded Prehistoric, Historic and Undated Cultural Resources

	Prehistoric	**Historic**	**Prehistoric/ Historic**	**Unknown/ Undetermined**	***Total***
Resources within the Newlands Project area	528	84	33	24	*669*
NRHP-listed resources within Project Area	1	2	0	0	*3*
Recommended NRHP-eligible resources within Project area	-	-	-	-	*75*
NRHP-ineligible resources within Project area	-	-	-	-	*129*
Unevaluated resources within Project Area	-	-	-	-	*462*

NRHP-Listed Properties

Grimes Point Archaeological Site was listed on the NRHP in 1972 and is one of the largest and most accessible petroglyph (rock art) sites in the US. The Grimes Point area contains several major cave sites just outside the Project area (Hidden Cave, Burnt Cave), and it has been developed as an interpretive area by the BLM. There are hundreds of boulders in this locality, with petroglyphs inscribed (Bengston 2003).

The *Fort Churchill/Sand Springs Toll Road* is not formally mapped within the study area but likely congruent with the Pony Express/Overland Stage Route through the southernmost part of the Project area. A segment of the toll road was listed on the NRHP in 1974. Running between Dayton and the former Sand Springs Pony Express Station along US Highway 50 east of Fallon, the route provided a reliable supply route via mule train from the Comstock, Carson City, and California area to the Reese River Mining District.

The National Register status of the *Newlands Project* itself is complicated. Derby Diversion Dam was listed on the National Register in 1978; a thematic resources nomination for the project in 1981 resulted in the Carson River Diversion Dam and the Lahontan Dam and Powerhouse also being listed individually. It should be noted, however, that only the last of these is actually located on lands administered by Reclamation. A National Register significance evaluation for the entire project, with specific recommendations for which canals, drains, and other facilities are contributing elements, is provided in Hardesty and Buhr (2001). A National Register thematic nomination has also been prepared (Pfaff 2005). No formal eligibility determination with concurrence from the State Historic Preservation Office (SHPO) has been made for the Newlands Project as a whole.

The historic context and property types developed by Pfaff (2002) presents a valid discussion for the eligibility of the Newlands Project under Criterion A, as defined in 36 CFR Part 60.4, because of its association with events that have made a significant contribution to the broad patterns of history. Pfaff's context states that:

> "The Newlands Project first and foremost marks the beginning of direct Federal involvement in promoting settlement of the arid American West through the development of irrigated agriculture. With passage of the Reclamation Act of 1902, the Federal government assumed a major role in designing and constructing large-scale irrigation projects throughout the West. As one of the first five projects authorized and built under the Reclamation Act, the Newlands Project (originally known as the Truckee-Carson Project) has achieved national significance. A network of water storage, diversion, and conveyance structures provides water for irrigating about 73,000 acres of farmland in an area that receives less than 4.5 inches of annual precipitation; additionally, the Project generates hydroelectric power and controls flooding."

Therefore Reclamation considers that the Newlands Project is eligible for listing in the National Register under Criterion A with the themes of reclamation, irrigation, and the development of agriculture in the State of Nevada. The boundaries of the entire Newlands Project and identification of all the contributing and non-contributing properties associated with it are still undefined and beyond the scope of this current undertaking. Reclamation continues to consult with SHPO on its ongoing effort to clearly identify and document the historic property and associated contributing and non-contributing elements

and features as projects and resources allow. The individual properties described below that have been previously listed would likely be considered contributing properties.

The Derby Diversion Dam is a gated, concrete structure flanked on the left by an earthen embankment. Situated on the Truckee River about 20 miles east of Reno, Nevada, the dam was the first project of the US Reclamation Service (now the Bureau of Reclamation), organized under the Reclamation Act of 1902. Begun on October 2, 1903, and completed in May 1905, Derby Dam diverts water from the Truckee River basin through a canal to a reservoir on the Carson River, 32 miles to the south. It was listed on the NRHP in 1978.

The Carson River Diversion Dam was individually listed on the NRHP in 1981 as part of the thematic resource nomination for the Newlands Project. The Carson River Diversion Dam is an original feature of the Newlands Project. It is part of the network of water storage, diversion, and conveyance structures that provides water for irrigation in the planning area. Built between 1904 and 1905, the Carson River Diversion Dam is a low concrete dam that diverts water from the Carson River into two main Project canals: the Southside Main Canal (the V Line) and the Northside Main Canal (the T Line).

The Lahontan Dam and Power Station was listed on the NRHP in 1981 as part of the thematic resource nomination for the Newlands Project. It is in Churchill County, southwest of Fallon, on the Carson River. Lahontan Dam was constructed between 1911 and 1915, as part of the Newlands Project, and is part of the network of water storage, diversion, and conveyance structures that provides water for irrigation in the planning area. Following several years of water shortages after initial Project construction, Lahontan Dam was constructed on the lower end of the Carson River as a storage facility to ensure farmers a more secure water supply. The 120-foot-high earthen embankment dam features a unique pair of curved concrete spillways, one at each end of the dam. Due to the remote location of the dam, a hydroelectric power plant was built in association with the dam to provide power for construction activities.

The NRHP-listed *Stillwater Marsh Archaeological District* is partially within the Project area and the planning area, but it is managed by USFWS. Paiute populations settled along the edges of the marsh and used the abundant resources within its boundaries. The district was listed on the NRHP in 1974 after being developed for management as a wildlife area and being vandalized. Historically, the marsh has experienced changes in water flow due to local irrigation efforts and droughts. The area has been used heavily by waterfowl hunters owing to the productive habitat (USFWS 1974). Today, the area is culturally significant to the Paiute Tribes for the remains of their ancestors and as a hunting and collection area, so it is also considered an ethnographic resource.

Methods for Identifying Ethnographic Resources

The identification and significance of TCPs, traditional use areas, and sacred sites are determined primarily by consulting with the affected contemporary communities. Bengston (2003) provides a detailed account of Native American sacred resources within the planning area. Reclamation initiated consultation with the Fallon Paiute-Shoshone Tribe and the Pyramid Lake Paiute Tribe via letters dated August 22, 2007. Consultation with these groups is considered ongoing. The Fallon Paiute-Shoshone Tribe responded via a letter dated January 25, 2008, and requested formal consultations. Representatives of the Tribe have met with Reclamation staff and continue the consultation process. No response has been received from the Pyramid Lake Paiute Tribe. As appropriate, additional effort will be made to consult with the Pyramid Lake Paiute Tribe as planning proceeds.

Present Conditions/Ethnographic Resources

As a result of consultations with the Fallon Paiute-Shoshone Tribe, Reclamation has learned that the Tribe has particular interest in lands north of the Fallon Indian Reservation and would like to enter into a management agreement with Reclamation for those lands. The area includes lands that were a part of the original 31,000 acres allotted to the Tribe by the US government. Additionally the area is of cultural significance to the Tribe and represents the potential for economic and recreational development that would benefit tribal members.

Bengston (2003) identifies several categories of traditional property types in Nevada that could be considered ethnographic or Native American resources. Although no TCPs or sacred sites have been identified by the consulted tribes, the Fallon Paiute-Shoshone Tribe has expressed concern for the archaeologically sensitive area to the north of the Fallon Indian Reservation. Consultations are ongoing and additional areas of concern or TCPs may be identified by the Fallon Paiute-Shoshone Tribe or the Pyramid Lake Paiute Tribe. Possible ethnographic resources include traditional origin and historic places, ceremonial locations, historical locations, ethnohistoric habitation sites, trails, burial sites, and resource collection areas (Bengston 2003). (Note that many tribes consider archaeological sites of any kind of to be traditional resources important to their members.)

3.9 Fish and Wildlife

3.9.1 General Wildlife Species

This section is a description of the general wildlife, fishery, and migratory bird resources in the planning area. Overall, there are a variety of game and nongame species typical of

the Great Basin that may occur in the proposed planning area, which is in a major migratory bird flyway and as a result has a variety of migratory bird populations, including waterfowl and shorebirds.

Invertebrates

Many invertebrates depend on water for the larval stage of their life cycle, tying them closely with aquatic habitats. As a result, aquatic habitats within the planning area, such as streams, rivers, and creeks, contain a range of aquatic mollusk and insect species. Springs are another water source that often support endemic assemblages of invertebrates that are adapted to the constant temperatures and distinctive geothermal environments that springs provide. Thermal springs, because of their high temperatures and concentrations of dissolved minerals, subject invertebrates to a rigorous environment that precludes high diversity or abundance. Nevertheless, some species of nematodes, mites, beetles, flies, amphipods, and snails are adapted to hot springs. Several rare snails have been collected from thermal springs in the planning area.

Reptiles and Amphibians

There are 54 native reptile species in Nevada. Common reptiles inhabit the rocky, brush, and scrub habitats that are found within the planning area. Reptile species common in the planning area include western fence lizard (*Sceloporus occidentalis*), side-blotched lizard (*Uta stansburiana*), gopher snake (*Pituophis melanoleucus*), and Great Basin rattlesnake (*Crotus viridis lutosus*).

There are sixteen native amphibians known to occur in Nevada (NDCNR 2002). Due to lifecycle constraints, amphibians are restricted in their distribution to yearly and seasonally wet areas. Toads are more tolerant of dry habitats. Amphibians likely to occur within the planning area include western toad (*Bufo boreas boreas*), Pacific tree frog (*Hyla regilla*), and western leopard frog (*Rana pipiens brachycephala*).

Fish

There are 91 native fish species known to occur in Nevada, 53 of which are endemic species and subspecies (NDCNR 2002). Although not all of these species occur within the planning area, many do, along with many nonnative species that are stocked as part of game programs, such as rainbow trout (*Oncorhynchus mykiss*), brook trout (*Salvelinus fontinalis*), brown trout (*Salmo trutta*), largemouth bass (*Micropterus salmoides*), several species of catfish (family Ictaluridae), perch (family Teraponidae), walleye (*Stizostedion vitreum*), and striped bass (*Morone saxatilis*; NDCNR 2002). Fish species known to occur in the ponds within the planning area include Asiatic carp (*Cyprinus carpio*), tui chub (*Gila bicolor*), bluegill (*Lepomis macrochirus*), green sunfish (*L. cyanellus*), and mosquito fish (*Gambusia affinis*) (Rissler et al. 1991).

Birds

The planning area includes the Lahontan Valley of the Great Basin Region, which contains a diversity of habitats, such as freshwater marshes, riparian areas, alkali playas, desert shrublands, and irrigated farmlands. This area includes the Stillwater National Wildlife Refuge (140,000 acres, managed by the USFWS), Fernley Wildlife Management Area (FWMA) (7,000 acres, managed by the NDOW), Lahontan Reservoir (41,500 acres, managed by the Nevada State Park System), and Carson Lake (31,000 acres, managed by NDOW), which has been designated as a site of international importance and is part of the Western Hemispheric Shorebird Reserve Network (TCID 2006). The Lahontan Valley Wetlands is named a Globally Important Bird Area (IBA) by the American Bird Conservancy, and it is one of the largest IBAs recognized by the Lahontan Audubon Society in Nevada, encompassing about 430,000 acres (Nevada Important Bird Areas Program 2006). Each year 250,000 shorebirds migrate through this valley. The diverse wetlands attract more than a million waterfowl and over 20,000 other water birds, including pelicans (*Pelecanus* spp.), egrets and herons (family Ardeidae), ibis (family Threskiornithidae), gulls (*Larus* spp.), and terns (family Laridae). The irrigated agricultural lands provide important songbird habitat for migrants and breeding birds (US Navy 2006). In particular, six species of concern (selected based on the Nevada Partners in Flight Bird Conservation Plan and with further input from the Nevada IBA Technical Advisory Committee) include white-faced ibis (*Plegadis chihi*), bald eagle (*Haliaeetus leucocephalus*), snowy plover (*Charadrius alexandrinus*), black-necked stilt (*Himantopus mexicanus*), American avocet (*Recurvirostra americana*), and Wilson's phalarope (*Steganopus tricolor*). Four additional species congregate in the Lahontan Valley Wetlands in such large numbers that they, too, contributed to the selection of the site as an IBA. These are the eared grebe (*Podiceps nigricollis*), canvasback (*Aythya valisineria*), redhead (*A. americana*), and long-billed dowitcher (*Limnodromus scolopaceus*) (Nevada Important Bird Areas Program 2006).

Waterfowl and shorebirds begin arriving in the planning area in February and March, respectively. By April, there are thousands of American avocets, stilts (*Himantopus* spp.), sandpipers (*Calidris* spp.), dowitchers (*Limnodromus* spp.), and other shorebird species. One or more peregrine falcons (*Falco peregrinus*) may prey on the large concentration of shorebirds. Songbirds begin arriving in April, peaking in early May, when certain birds begin breeding, such as house wrens (*Troglodytes aedon*) and Bewick's wrens (*Thryomanes bewickii*), yellow-headed blackbirds (*Xanthocephalus xanthocephalus*), lazuli buntings (*Passerina amoena*), swallows (family Hirundinidae), grosbeaks (family Cardinalidae), and orioles (family Icteridae). By early May the large number of colony nesters, including herons and egrets, have reoccupied their colonies. By late summer large numbers of American white pelicans (*Pelecanus erythrorhynchos*) feed on the fish in the irrigation reservoirs and drains. The marshes support a variety of bird species, such as American bitterns (*Botaurus lentiginosus*), sora (*Porzana carolina*), marsh wrens (*Cistothorus palustris*), Virginia rails (*Rallus limicola*), and red-winged blackbirds (*Agelaius phoeniceus*).

Approximately 70 species of birds use the wetlands in the planning area during migration and as breeding habitat when surface water is present. Representative breeding species include the Canada goose (*Branta canadensis*), cinnamon teal (*Anas crecca*), mallard (*A. platyrhynchos*), gadwall (*A. strepera*), American avocet, Wilson's phalarope, and spotted sandpiper (*Actitis macularia*). Vegetation cover for nest concealment from predators and for protection from other disturbances is important during the breeding season. The planning area supports a wide variety of neotropical migrant bird species (more than 240 species) that use a variety of habitats but that are in heightened numbers in riparian, marsh, and lacustrine habitats.

Common breeding raptors that may occur within the planning area include the red-tailed hawk (*Buteo jamaicensis*), prairie falcon (*Falco mexicanus*), American kestrel (*F. sparverius*), golden eagle (*Aquila chrysaetos*), northern harrier (*Circus cyaneus*), great horned owl (*Bubo virginianus*), and long-eared owl (*Asio otus*). Other, less common breeders that may be found locally include the ferruginous hawk (*Buteo regalis*) and burrowing owl (*Athene cunicularia*). Nesting habitats are found in Utah juniper, quaking aspen, and volcanic ledges and buttes. Prey species are more likely to be available for a wide range of raptors when plant communities are structurally diverse and support mixtures of grasses, forbs, and shrubs.

Landbird migrants, including warblers (*Dendroica* spp.), flycatchers (*Empidonax* spp.), and vireos (*Vireo* spp.), start moving south from mid-August through late September. In September thousands of waterfowl stopover in the valley on their migration south. October brings large numbers of white-crowned sparrows (*Zonotrichia leucophrys*), nuthatches (*Sitta* spp.), and chickadees (*Poecile* spp.) into the valley. The planning area supports fewer wintering species, including bald eagles, rough-legged hawks (*Buteo lagopus*), and northern shrikes (*Lanius excubitor*).

Mammals

There are 128 native mammal species and subspecies recorded in the state, nine of which are endemic to Nevada (NDCNR 2002). There are many species of small mammals that are likely to occur in the habitats provided within the planning area. Black-tailed jackrabbits (*Lepus californicus*) are common to Nevada's desert and foothills, kangaroo rats (*Dipodomys ordii*) inhabit deserts and grasslands, deer mice (*Peromyscus maniculatus*) inhabit remote, rural, and urban habitats, while white-tailed antelope squirrels (*Ammospermophilus leucurus*) are adapted to a wide variety of habitats (NDOW 2005).

Sagebrush communities provide perennial habitat for larger herbivorous mammals, such as mule deer (*Odocoileus hemionus*) and pronghorn antelope (*Antelocapra americana*). Large predatory mammals, such as coyote (*Canis latrans*) and mountain lion (*Puma concolor*), are likely to occur in open and woodland habitats within the planning area. Rock complexes also provide important cover for large mammals, such as bighorn sheep

(*Ovis canadensis nelsoni*), mountain lions, and bobcats (*Lynx rufus*), and for small mammals, such as ground squirrels (*Spermophilus* spp.), wood rats (*Neotoma fuscipes*), various rabbit species, and marmots (*Marmota* spp.).

Midsized mammals, such as weasels (*Mustela* spp.), badgers (*Taxidea taxus*), striped skunks (*Mephitis mephitis*), bobcats, and kit foxes (*Vulpes macrotis*), have been observed or are likely to exist in the planning area. Bats are also known in the planning area.

Representative species found in the planning area are described below.

Mule deer is the most abundant big game species in the region. They move between various zones, from the forest edges at higher elevations to the desert floor, depending on the season (NDOW 2005). They are widespread, typically associated with complex middle to upper elevation landforms that support a variety of sagebrush, mountain shrubs, quaking aspen, juniper, and herbaceous vegetation. Mule deer also use lower elevations during years when deep snow forces them to move and are frequently associated with meadow and riparian habitat. They tend to be present yearlong where public land adjoins cultivated farmland. After a population peak in the mid-1980s, mule deer have been on the decline as wildfire has impacted winter ranges throughout the state, taking out native vegetation and facilitating the invasion of exotic grasses and weeds (Wildlife Action Plan Team [WAPT] 2006). In addition, severe winters, drought, urbanization, and other biological factors have contributed to these low numbers (NDOW 2004b).

Pronghorn antelope prefer gentle rolling to flat wide-open topography and are found primarily in the valleys between mountain ranges in northern and central Nevada (NDOW 2005).

Mountain lions are widely distributed and are found in most mountain ranges. They occupy a limited area of Nevada, mainly along the east side of the Sierra Nevada Range and in the Carson Range (NDCNR 2002).

Bighorn sheep inhabit mesic to xeric, alpine to desert grasslands or shrub-steppe in mountains, foothills, or river canyons (NatureServe 2008). Bighorn sheep require access to freestanding water during the summer, and in drought conditions they may water throughout the year (NDOW 2005). Bighorn sheep are known to occur within the planning area and historically occupied the central and southern portions of Nevada (NDCNR 2002). Since 1960 bighorn sheep have increased in numbers, but their population levels are still low when compared with the estimates of pre-European numbers and the amount of available unoccupied habitat (NatureServe 2008). They have been reintroduced in the Clan Alpine Mountain Range and also are found in the Sand Springs Mountain Range, the Lauderback Mountain Range, Chalk Mountain, the Fairview Peak/Slate Mountain Range, and the Stillwater Mountain Range. Bighorn lambing areas, which are essential to the continued existence of these populations, are known at Chalk Mountain, Bald Mountain, and the Desatoya Mountains (BLM 2000).

Pygmy rabbits (*Brachylagus idahoensis*) may occur in the planning area, as this species typically inhabits dense stands of big sagebrush growing in deep loose soils.

Bat species known to the planning area include little brown bat (*Myotis lucifugus*), pallid bat (*Antrozous pallidus*), Western small-footed myotis (Myotis ciliolabrum), Yuma myotis (Myotis Yumanensis), California myotis (Myotis californicus), western red bat (Lasiurus blossevillii), hoary bat (Lasiurus cinereus), silver-haired bat (Lasionycteris noctivagans), Western pipistrelle (Pipistrellus Hesperus), big brown bat (Eptesicus fuscus) and Brazilian free-tailed bat (Tadarida brasiliensis) (US Navy 2008). These species use various enclosed habitats for roosting, including caves, trees, bridges, and buildings. They also may use various parts of the planning area for foraging for invertebrates.

3.9.2 Federally Listed Species

Federally listed species include those regulated under the Endangered Species Act of 1973 (ESA), Public Law 93-205, 16 US Code (USC) §§ 1531-1544.

There are two federally listed species, two candidate species, and one recently delisted wildlife species that could occur within the planning area (Table 3.10-1). These are discussed below.

Table 3.10-1 Federally Listed Endangered and Threatened Species and Candidate Species

Common Name	Scientific Name	Federal
Bird		
Bald eagle	*Haliaeetus leucocephalus*	DL
Western yellow-billed cuckoo	*Coccyzus americanus*	C
Greater sage-grouse	*Centrocercus urophasianus*	C
Fish		
Cui-ui	*Chasmistes cujus*	E
Lahontan cutthroat trout	*Oncorhynchus clarki henshawi*	T
Warner sucker*	*Castostomus warnerensis*	T
Invertebrate		

Common Name	Scientific Name	Federal
Carson wandering skipper*	*Psuedocopaeodes eunus obscurus*	E

Source: USFWS 2012, 2010

*Occur in Washoe County but outside the Newlands Project Planning Area.

Federal Status:

C Candidate for listing as threatened or endangered; sufficient data on vulnerability or threats on file.

DL Taken off the list of endangered and threatened species (delisted).

E Listed Endangered; in danger of extinction in all or a significant portion of its range.

T Listed Threatened; likely to be classified as endangered in the foreseeable future if present trends continue.

Bald Eagle

The bald eagle was taken off the list of endangered and threatened species on August 8, 2007, but is protected by the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. Breeding habitat most commonly includes areas within one-half mile of rivers, lakes, or other bodies of water that reflect the general availability of primary food sources, including fish, waterfowl, and seabirds (NatureServe 2008). Conifers or other sheltered sites are their preferred winter roosting sites (NatureServe 2008). While bald eagles are primarily winter residents, breeding does occur in Nevada (WAPT 2006).

Yellow-Billed Cuckoo

The yellow-billed cuckoo is a federal candidate species and is primarily a migrant in Nevada, though breeding residents have been observed in a portion of the Carson River (Neel 1999). It is a riparian obligate species that requires dense cottonwood or willow-forested tracts of at least five acres, including a minimum of one acre of closed-canopy broadleaf forest (Neel 1999).

Greater Sage-Grouse

The greater sage-grouse is a game species of great concern in Nevada and the western US. It is a sagebrush obligate species that can be found in a variety of sagebrush habitats. An essential element is the availability of habitat to support male strutting grounds, which are known as leks. These are on relatively open sites surrounded by sagebrush, or in areas where sagebrush density is low, such as exposed ridges, knolls, or grassy swales (NDOW 2004a). These areas are open so that males are visible to females during the breeding

season but are often surrounded by taller sagebrush areas that can be used to escape predators if needed. Nesting habitat is characterized primarily by Wyoming big sagebrush communities that have 15 to 38 percent canopy cover and a grass and forb understory; residual cover of grasses is likely an important factor in suitability (NDOW 2004a). The nests are made in depressions on the ground under sagebrush. This once common species has experienced sharp population declines through its range over the last 50 years, a trend that has grown more dramatic in the last 20 years (NatureServe 2008). Population management units (PMUs) were identified by the Local Area Conservation Planning groups as part of the Governor's Nevada Sage-Grouse Conservation Strategy (NDOW 2004a). The PMUs were established to facilitate better assessment and management of sage-grouse populations. There are two PMUs that occur entirely in or overlap the planning area. However, there is no identified habitat within the planning area.

The USFWS determined that the California and Nevada population of greater sage-grouse constitutes a valid distinct population segment (DPS) and thus is a listable entity under the ESA. After evaluating all the best available scientific and commercial information regarding the greater sage-grouse, including an analysis of the threats to sage-grouse and sagebrush habitat in California and Nevada, the USFWS determined that protection under the ESA is warranted. However, listing the California-Nevada DPS of the greater sage-grouse was precluded by the need to take action on other species facing more immediate and severe extinction threats (USFWS 2010).

As a result, on March 5, 2010, the California-Nevada sage-grouse DPS was placed on the list of species that are candidates for ESA Protection. The USFWS will review the status of the sage-grouse annually, to determine whether it warrants more immediate attention (USFWS 2010). The BLM and the Forest Service are currently developing a national strategy to preserve, conserve, and restore sagebrush habitat for the greater sage-grouse. Reclamation will coordinate with these agencies per the outcome of this strategy.

Cui-ui

Cui-ui are residents only of Pyramid Lake, with spawning runs in the Truckee River. Historically the species spawned in the lower 43 miles of the Truckee River, but recent data indicate that spawners use less than 6 miles of the 12 miles now available. However, when sufficient flows exist, spawning cui-ui have been found in the lower 26.7 miles of the Truckee River. Previously, cui-ui were found in Winnemucca Lake (NatureServe 2008). The species spawns from April through mid-June over gravel beds in relatively shallow water (0.7-4.6 feet) where flow is rapid. Cui-ui are threatened by habitat alteration, such as siltation and pollution, as well as declining flow in the Truckee River (WAPT 2006). The recovery strategy for this species is to maintain adequate water levels and flow in Pyramid Lake to meet the life history needs (especially spawning), to protect and enhance spawning gravel and the shaded riparian zone in the lower Truckee River, and to maintain access to the river (WAPT 2006).

Lahontan Cutthroat Trout

Lahontan cutthroat trout (LCT) is a threatened fish species native to lakes and streams throughout the physiographic Lahontan Basin of northern Nevada, eastern California, and southern Oregon. Current populations exist in approximately 155 streams and six lakes in the region. The principal threats to the subspecies include livestock grazing, urban and mining development, water diversions, poor water quality, hybridization with nonnative trout, and competition with other species of nonnative trout. Historically, LCT populations occurred in a variety of cold water habitats, such as alpine lakes, low and moderate gradient rivers, and small headwater tributary streams. In lakes and streams, LCT require cool well-oxygenated water. In streams, the species uses rocky areas, riffles, deep pools, and areas under logs and overhanging banks. Stream-dwelling LCT are generally less than five years old, while in lakes, LCT may live as long as nine years. LCT feed on a variety of terrestrial and aquatic insects, and larger LCT may feed on fish. LCT populations in the planning area have been reduced drought and by lessening and altering stream discharge, altering stream channels and morphology, degrading water quality and riparian habitats, increasing chemical concentrations, and introducing nonnative fish. These changes are largely due to human activity. The population recovery strategy for LCT includes managing populations for genetic variation, establishing metapopulations, and increasing distribution and abundance through reproduction and reintroductions. The strategy also includes habitat management, such as providing adequate water, water quality, and cover for spawning and rearing through streamside management, monitoring, and research (WAPT 2006).

Lake-dwelling (lacustrine) LCT are found in self-sustaining populations in Pyramid and Summit Lakes and in Walker Lake through state and federal hatchery programs. Stream dwelling (fluvial) LCT occur in isolated headwater streams in the Truckee, Carson, and Walker River Basins, as well as an introduced population in the Desatoya Mountains in eastern Churchill County.

3.9.3 Federally Proposed or Designated Critical Habitat

There is no federally proposed or designated critical habitat within the planning area.

3.9.4 Invasive Species

The bullfrog (*Rana catesbeiana*), originally native to eastern North America, was accidentally introduced to the western US and is now widely distributed throughout the western states. Bullfrogs have become a dominant species in marsh and pond habitats and prey on the young of native amphibian, fish, and reptiles, including native frogs and western pond turtles (*Clemmys marmorata*) (NDCNR 2002; USGS 2008).

The Quagga mussel (*Dreissena rostriformis bugensis*) is a type of dreissenid mussel which is a small freshwater, bivalve filter feeder that can cause extensive changes in the ecosystems in which they become established. They attach to hard substrates, and through

their filter feeding remove large amounts of plankton from the water to feed. They are very efficient at removing food and nutrients from the water thus starving other freshwater mussels and driving indigenous populations to local extinction. They have the potential for great impact to the entire food chain including fish and birds. The Great Lakes have experienced impacts to fisheries as fish become less abundant and reduced in size. In addition, as the Quagga filter the water, they take in and concentrate contaminants, which harm wildlife that eat them.

The Quagga mussel adults can cause substantial economic damage by infesting the components of aquatic equipment. The mussels attach themselves to the hard substrates of pipes, dams, and piers, restricting the flow of water through the system as well as damaging the equipment by impacting component service life, system performance, and maintenance activities. Once established in a lake or water body, constant and perpetual maintenance is necessary, at great cost to operations.

Quagga mussels pose a low risk to human health. Dead and decaying mussels can wash ashore and the razor sharp shells can create a hazard on beaches due the potential for injuries to feet of humans and pets. Filter-feeding Quagga mussels accumulate toxins and ingestion could expose humans to elevated levels of heavy metals and other toxins. There are no reports, however, of humans consuming Quagga mussels.

Impacts to recreational activities may occur by the colonization of Quagga mussels in waterbodies on docks, aquatic equipment, buoys, boats, and beaches. Impacts to recreation can range from mandatory boat decontamination requirements to outright restriction. Attached mussels can increase drag on the bottom of watercraft, reducing speed, wasting fuel, and causing damage to the watercraft's hull. Mussels attached in and around the steering components can jam watercraft steering equipment, and mussels can block the cooling water system in engines, causing them to overheat. Degraded habitats and ecosystems caused by invasive mussel infestations also reduce sport-fishing opportunities. Shoreline activities such as swimming, hiking, and picnicking can be negatively impacted because of the excessive amounts of shell material that build-up along the edges of infested waterbodies. Additionally, in areas affected by Quagga mussels, boats must be washed upon removal from the water, increasing the time and money that boaters expend.

In April 2011, samples from Lahontan Reservoir, Rye Patch Reservoir, and other bodies of water in the region were tested for Quagga larvae and DNA. (With the microscopy results and subsequent DNA tests, this reservoir is classified as "positive") Lahontan Reservoir tested as "positive" and Rye Patch as "suspect" for Quagga larvae. Subsequent monthly testing through November 2011, showed no trace of Quagga larvae. No adults have been found. (In Lake Mead, adults were found, but water samples never tested positive for larvae.)

Reclamation is part of a multiagency task force to prevent and fight the infestation of Quagga. The Nevada Parks department is setting up inspection and decontamination units.

Recently, New Zealand Mud Snails (*Potamopyrgus antipodarum*) have been discovered in the Truckee River. The extent of the infestation is not known at this time.

3.9.5 Trends

Rapid urban growth and conversion of flood irrigation to pivots (i.e. sprinklers) is causing the loss of habitat for species, particularly the white-faced ibis, that rely on flood-irrigated agricultural lands. Further, wetland habitat in the Lahontan Valley has been reduced from an estimated 150,000 acres in the mid-1800s to about 10,000 acres today as a result of upstream water diversions. This has reduced habitat for the suite of species that rely on these areas.

Water quality also has been reduced by urban runoff and water used for irrigation, which leaches minerals into the water. High levels of mercury have been recorded in wetland sediments, and a health advisory has been issued on eating shoveler ducks (*Anas clypeata*) from Carson Lake Pasture because these bottom-feeding ducks may contain elevated mercury concentrations in their tissues. Further, agricultural drain water entering the Stillwater National Wildlife Refuge has been identified as containing elevated levels of arsenic, boron, selenium, lithium, and molybdenum, which may impact wildlife health (CDWR 1991).

Finally, the timing of delivery of water into the marsh systems and playa no longer mimics natural conditions. This affects regeneration of riparian systems, water quality, and ecosystem dynamics (Nevada Important Bird Areas Program 2006).

Since 1989, the State of Nevada, The Nature Conservancy, the Nevada Waterfowl Association, and the USFWS have been acquiring water rights for the protection and enhancement of the Lahontan Valley wetlands. By September 2001, approximately 30,650 acre-feet of water rights in the Carson Division of the Newlands Project had been acquired, including 21,116 acre-feet by the USFWS for the Stillwater National Wildlife Refuge and 8,150 acre-feet by the State of Nevada and Nevada Waterfowl Association for Carson Lake. The BIA acquired 1,334 acre-feet for the Fallon Paiute-Shoshone Indian Reservation wetlands (USFWS 2002).

Wetland Habitat

Wetlands within the planning area serve as important habitat for many wildlife species, most notably wintering waterfowl and other migratory birds in the Pacific Flyway. Conversion of wetlands to other uses has destroyed key habitat, seriously depressing waterfowl populations, and Reclamation previously assessed the potential opportunities

for restoring, enhancing, expanding, and developing wetlands within the planning area, shown in Table 3.11-2 (Reclamation 1993). Priority wetland sites include Mahala Sloughs, Sheckler Reservoir, Lahontan Reservoir, Old River Reservoir, Harmon Reservoir, and FWMA. Other wetland sites identified for improvement include Carson Lake Pasture, S-Line Reservoir, and Indian Lakes.

Mahala Sloughs provide habitat to various mammals, waterfowl, and other bird species. Habitat quality has been reduced by various land uses in the area which have impacted the marsh vegetation and soil structure (Reclamation 1993).

Wildlife habitat at Sheckler Reservoir is more suitable for upland species due to the limited growth of persistent wetland vegetation and invasion of upland vegetation in certain areas. Livestock grazing has lowered habitat quality at this site (Reclamation 1993).

Lahontan Reservoir provides excellent habitat diversity for waterfowl year-round. In addition, BLM's Carson City District, Sierra Front Field Office, administers the Lahontan Herd Management Area (HMA) south of Lahontan Reservoir. Most of the HMA is on BLM land, although a portion of the HMA overlaps Reclamation-administered lands. The HMA has not been assessed for conformance with Rangeland Health Standards. However the heavy utilization of vegetative resources by wild horses that has been documented within the HMA indicates that some of the standards are not being met due to the current wild horse population. A comprehensive rangeland health assessment is tentatively planned for no later than 2016 (BLM 2010). Horses from the HMA also come on to Reclamation-administered lands outside the HMA seeking water. The same impacts to land health are occurring on the Reclamation-administered lands outside the HMA. .

Old River Reservoir was drained during the field reconnaissance study in 1993, and provides limited waterfowl and wildlife habitat as a result. Signs of mammalian predators (e.g., coyote and red fox) were abundant during the site visit, which, when combined with the absence of water in the reservoir, makes waterfowl nests highly susceptible to destruction by predators. However, the reservoir historically provided diverse habitat with good vertical vegetative structure, irregular edge, and islands, all of which are valuable components of waterfowl habitat.

Harmon Reservoir provides habitat to a variety and abundance of water birds. However, some areas around the reservoir are degraded due to trampling and vegetation loss from livestock grazing (Reclamation 1993).

The FWMA has a diversity of wetland and upland vegetation, but at the time of the site visit no standing water was present. The lack of water limits the use of the site by waterfowl, and nests are susceptible to mammalian predators.

There are several nonpriority wetland sites. Carson Lake Pasture provides diverse habitats supporting a variety of waterfowl, shorebird, and other bird species. S-Line Reservoir provides habitat that supports several species of waterfowl, shore birds, and other birds and wildlife. A dike built across the middle of the reservoir has reduced the reservoir storage capacity and surface area and has thus reduced waterfowl habitat. Indian Lakes have limited wetland vegetation, are heavily grazed by livestock, and have widely fluctuating water surface elevations. As a result, they provide limited habitat for waterfowl and other wetland-dependent wildlife (Reclamation 1993).

3.10 Vegetation

Overview

This evaluation of vegetation communities within the Newlands Project Planning Area is based on GIS data from the BLM, data presented in the Integrated Natural Resource Management Plan and Environmental Assessment for Naval Air Station Fallon, Nevada (US Navy 2006), and the Nevada Wildlife Action Plan (WAPT 2006). Additional information relevant to the planning area was obtained from the Regional Bioassessment of Habitats for Species of Conservation Concern in the Great Basin Ecoregion and Nevada (Wisdom et al. 2003), and the Nevada Natural Resource Plan (NDCNR 2002).

In general, vegetation found in the planning area is typical of the Great Basin. The extremes of climate, elevation, and soil type combine to produce environments that strongly influence the plant species. Salt-tolerant shrubs and playas prevail in the lower valleys. Expanses of sagebrush (*Artemisia* spp.) and other shrub communities cover most of the higher valleys and slopes, occasionally mixed with grasses, especially at higher elevations (NDCNR 2002).

The vegetative community analyses found within this section are based on key habitats defined in the Nevada Wildlife Action Plan (WAPT 2006). The vegetative communities within the planning area are grouped into ten main categories:

- Intermountain basins playa,
- Intermountain cold desert scrub,
- Intermountain rivers and streams/riparian woodlands,
- Sand dunes and badlands,

- Agricultural lands,
- Grasslands and meadows,
- Sagebrush,
- Intermountain rivers and streams (nonriparian),
- Lakes, reservoirs, and canals (open water), and
- Developed landscapes.

The following discussion is focused on vegetative groups found within the planning area and includes type, abundance, and location of such communities. Table 3.11-1 lists vegetation types by acreage, and Figure 3-8 depicts the presence of these vegetation communities within the planning area. Intermountain rivers and streams (non-riparian) and lakes, reservoirs, and canals (open water) data are presented in miles. Wetland areas are discussed in Section 3.11.5.

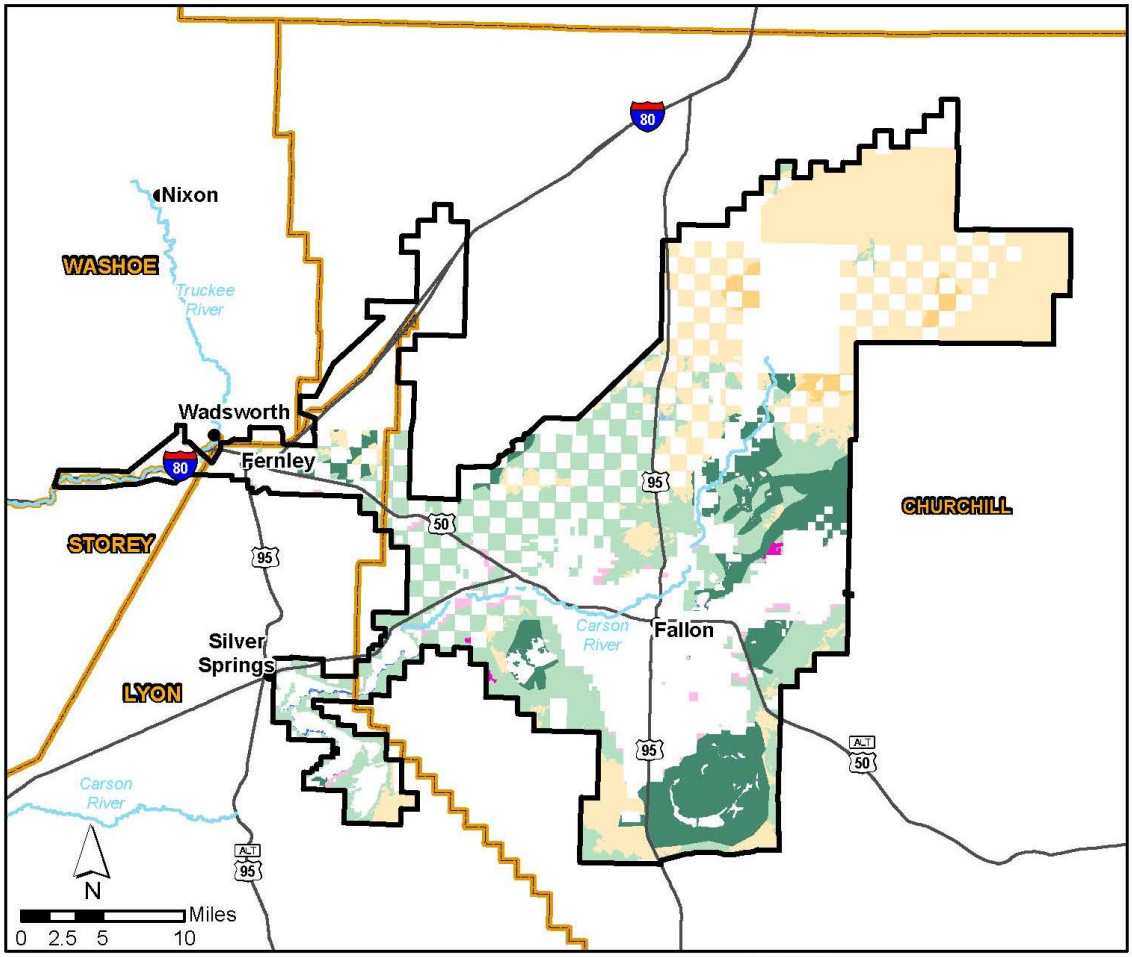

Figure 3-8 Newlands Project Planning Area Vegetation

Table 3.11-1 Vegetation Types Within the 1

Vegetation Type	Acreage/Mileage
Intermountain Basins Playa	144,280 acres
Intermountain Cold Desert Scrub	116,906 acres
Intermountain Rivers and Streams/Riparian Woodlands	66,913 acres
Sand Dunes and Badlands	8,002 acres
Agricultural Lands	72,900 acres
Grasslands and Meadows	666 acres
Sagebrush	535 acres
Intermountain Rivers and Streams (nonriparian)	50 miles
Lakes and Reservoirs/Open water	50,153 acres
Canals	407 miles
Developed Landscapes	73 acres

Sources: WAPT 2006; Reclamation 2002b; BLM National Science and Technology Center 2003

3.10.1 General Plant Species and Communities

Intermountain Basins Playa

The intermountain basins playa community is the most widespread in the planning area, covering 144,280 acres. Playas are a type of wetlands that are ephemeral, or intermittently flooded, nearly level areas in the floor of an undrained basin. Generally, playas contain accumulated salt from evaporated water and are mostly barren or sparsely vegetated (US Navy 2006; WAPT 2006).

Dry playas are often barren of vegetation from their center out to their outer margins, where saltgrass (*Distichlis spicata*), iodinebush (*Allenrolfea occidentalis*), or greasewood (*Sarcobatus vermiculatus*) maintain a foothold on the fresher soils. When soils are kept moist but short of saturation over several weeks or months, Baltic rush (*Juncus balticus*), smartweed (*Polygonum amphibium*), sedges (*Carex* spp.), and spikerushes (*Eleocharis* spp.) emerge, in progressive order of wetness. This plant community is usually less than two feet tall and can become quite dense in the absence of disturbance (WAPT 2006).

Intermountain Cold Desert Scrub

The second most abundant vegetative community in the planning area is intermountain cold desert scrub, also known as salt desert scrub, and covers 116,906 acres. Distribution of the salt desert scrub type generally follows all the valley bottoms in the state that occur within the Great Basin physiographic region. Plant communities are generally characterized by the presence of a variety of salt-tolerant shrubs of the goosefoot family (Chenopodiaceae; WAPT 2006).

Community composition is largely influenced by soil salinity and drainage. Most often, the cold desert scrub type is dominated by either shadscale (*Atriplex confertifolia*) or greasewood. Winterfat (*Krascheninnikovia lanata*), one of the more palatable mixed salt desert shrub species in the Great Basin, is locally dominant on silty soils at varying

elevations. At the lowest flats of the valleys where soil drainage is poorest and salinities are highest, the most salt-tolerant plants are found, including iodinebush and quailbush (*Atriplex lentiformis*). The cold desert scrub type generally gives way to sagebrush somewhere near the tops of the alluvial fans where the primary fault lines of the mountain range are situated. These upper soils are often gravelly and well drained and are more likely to support hopsage (*Grayia spinosa*) and associated plants. The dominant grass species in the cold desert scrub type is Indian ricegrass (*Achnatherum hymenoides*) and, to a lesser extent, needle-and-thread grass (*Hesperosipa comata*) (WAPT 2006).

Intermountain Rivers and Streams (Riparian and Nonriparian)

This habitat type includes riparian woodlands, which cover 66,913 acres, as well as rivers and streams (50 miles) within the planning area. Riparian is a term that refers to the habitat adjacent to streams, lakes, ponds, and wetlands that is influenced by the presence of water (Wisdom et al. 2003). Several riparian communities are present throughout the planning area (Figure 3-8). Common species in the riparian areas of this region include shrub and tree species, such as willows (*Salix* spp.) and Fremont cottonwoods (*Populus fremontii* ssp. *fremontii*), grass species, such as creeping wildrye (*Leymus triticoides*) and alkali sacaton (*Sporobolus airoides*), and a variety of wetland species, including sedges, rushes (*Juncus* spp.), and cattails (*Typha* spp.). Noxious weeds include saltcedar (*Tamarix* spp.) and Russian olive (Elaeagnus angustifolia).

Sand Dunes and Badlands

Sand dunes make up 8,002 acres of the planning area. This habitat type is defined as having less than five percent vegetative cover (Wisdom et al. 2003). Instead, this community is defined by substrate characteristics. It includes remnant bedrock outcrops, weathered soil patches, aeolian deposits (dunes), and other areas dominated by substrate. Sand dunes often define unique habitats and support endemic plants and animals, as well as providing habitat for generalist species (WAPT 2006).

Sand dune habitats consist of stabilized to partially stabilized sand dunes supporting populations of desert sand-verbena (*Abronia villosa* var. *villosa*), greasewood, prairie-clover (*Dalea* spp.), Indian ricegrass, fourwing saltbush (*Atriplex canescens*), and four-part horsebrush (*Tetradymia tetrameres*). Plants that are endemic to sand dunes include species such as sand cholla (*Opuntia pulchella*), dune sunflower (*Helianthus deserticola*), and Nevada dune beardtongue (*Penstemon arenarius*).

Sand dunes are constantly being eroded and reformed by the prevailing wind which results in sparse plant cover in these habitats. Water is held for long periods just under the surface, allowing shrubs to successfully root and persist through long droughts. Unlike many soils in desert basins, sand dunes are well drained and nonsaline. As a result, their vegetation differs considerably from the surrounding basin or bajada. Sand dune habitats

are dynamic and rely on large-scale patterns and ecosystem processes that include wind and sand corridors (WAPT 2006).

Agricultural Lands

Areas in cultivation or fallow lands that still show signs of cultivation make up 72,900 acres of the planning area. These may include row crops, irrigated pasture and hay fields, and dry farm crops (Wisdom et al. 2003). Typical field and specialty crops in Nevada are spring and winter wheat, barley, onions, garlic, and potatoes (WAPT 2006).

Grassland and Meadows

Grasslands and meadows cover 666 acres within the planning area. This key habitat type encompasses a wide range of grassland types occurring on xeric sites or at least drying out some part of the year. Characteristic grass and forb species in this community include Indian ricegrass, Great Basin wildrye (*Elymus cinereus*), creeping wildrye, various bluegrasses (*Poa* spp.), various wheatgrasses (*Agropyron spp.*) needle-and-thread grass, sand dropseed (*Sporobolus cryptandrus*), Idaho fescue (*Festuca idahoensis*), western yarrow (*Achillea millefolium* var. *occidentalis*), tufted hairgrass (*Deschampsia caespitosa*), and cinquefoil (*Potentilla* spp.).

Sagebrush

Sagebrush covers 535 acres within the planning area. The sagebrush/perennial grass (also known as sagebrush steppe) and Great Basin sagebrush (*Artemesia tridenta*) ecosystems are the two dominant types, with Mountain sagebrush prevalent above 6,500 feet in central and northern Nevada (NDCNR 2002). Sagebrush steppe, composed of bitterbrush (*Purshia tridentata*), rabbitbrush (*Chrysothamnus* sp.), currant (*Ribes* sp.), gooseberry (*Ribes* sp.), or cliffrose (*Purshia stansburiana*), is also prevalent, though it is found at lower elevations within the planning area. Vegetation structure and composition in sagebrush communities has changed greatly due to changes in frequency, size, and severity of wildfires; cheatgrass (*Bromus tectorum*) encroachment is widespread (Wisdom et al. 2003). The sagebrush community is very important to native wildlife, such as the greater sage-grouse (*Centrocercus urophasianus*).

Lakes, Reservoirs, and Canals (Open Water)

The lakes, reservoirs, and canals key habitat includes areas of open water, generally with less than 25 percent cover of vegetation or soil. The planning area contains 50,153 acres of water within lakes and reservoirs, which includes the Lahontan Reservoir. There are 407 miles of irrigation canals in the planning area.

Developed Landscapes

Urban areas make up 73 acres in the Newlands Project Planning Area and include the cities of Fallon and Fernley. Vegetation in these areas includes common native and nonnative ornamental species.

3.10.2 Federally Listed Species

Steamboat buckwheat is present in Washoe County. Candidate species that occur in Washoe County include; Tahoe yellowcress and Webber ivesia. Candidate species in Churchill County include Churchill narrows buckwheat. However, no federally listed plant species have been identified within the planning area.

3.10.3 Federally Proposed or Designated Critical Habitat

There is no federally proposed or designated critical habitat within the planning area.

3.10.4 Invasive Species

A noxious weed is any plant designated by a federal, state, or county government as injurious to public health, agriculture, recreation, wildlife, or property (BLM 2007a). Noxious weeds can be found throughout the planning area, including Russian knapweed (*Acroptilon repens*), hoary cress or white-top (*Cardaria draba*), perennial pepperweed or tall whitetop (*Lepidium latifolium*), salt cedar (*Tamarix*), purple loosestrife (*Lythrum salicaria*), puncture vine (*Tribulus terrestris*), and three species of thistle: musk (*Carduus nutans*), Scotch (*Onopordum acanthium*), and yellow starthistle (*Centaurea solstitialis*) (de Laureal 2002; US Navy 2000, 1991).

Invasive plants include not only noxious weeds, but also other plants that are not native to this country, generally considered invasive if they have been introduced into an environment where they did not evolve. As a result, they usually have no natural enemies to limit their reproduction and spread. Some invasive plants can produce significant changes to vegetation, composition, structure, or ecosystem function (BLM 2007a). Cheatgrass is an invasive species found in the planning area. It is a winter annual that is well adapted to fire and often dominates plant communities after fire by outcompeting native species in the area.

3.10.5 Wetlands

Wetlands are another habitat defined by the presence of water. Although there are differing regulatory definitions of wetlands, they are generally considered to be those lands that are inundated or saturated by water for at least several weeks of the year. Wetlands identified as part of this section and in Figure 3-8 do not necessarily qualify as US Army Corps of Engineers jurisdictional wetlands, which require the presence of hydric soil and hydrophytic vegetation.

Habitat types containing wetlands within the planning area include intermountain rivers and streams, lakes and reservoirs, and intermountain basins playa, totaling 211,650 acres of potential wetland. A wetland delineation has not been conducted for the planning area; however, a wetlands reconnaissance/inventory has been completed, largely within the planning area, to identify wetland sites for restoration, enhancement, expansion, and development of wetland waterfowl habitat (Reclamation 1993). The wetlands reconnaissance/inventory targeted nine wetlands within the planning area; six of these were considered "priority" and had conceptual designs developed (Table 3.11-2). Conditions of these wetlands and discussion of suitability for wildlife and waterfowl are addressed in Section 3.10.5, Wetland Habitat.

Table 3.11-2 Targeted Wetlands for Improvement Within the Planning Area

Wetland Site	Area (Acres)	Type of Wetland Improvement	Acres of Wetlands for Improvement
Mahala Sloughs*	72	Expansion/Enhancement	13
Sheckler Reservoir*	616.9	Restoration/Development	166
Lahontan Reservoir*	797.8	Enhancement	632
Old River Reservoir*	249.7	Restoration/Enhancement	165
Harmon Reservoir*	542.1	Enhancement	290
Fernley Wildlife Management Area*	234.5	Enhancement	184
Carson Lake Pasture	22,014.9	--	--
S-Line Reservoir	779.72	--	--
Indian Lakes	380	--	--

Source: Reclamation 1993

*Priority site for which conceptual design was developed

3.11 Indian Trust Assets

Indian Trust Assets (ITAs) are legal interests in assets held in trust by the federal government for federally recognized Native American tribes or nations or for individual Native Americans. Assets are anything owned that has monetary value. A legal interest

refers to a property interest for which a legal remedy, such as compensation or injunction, may be obtained if there is improper interference. A trust has three components: the trustee, the beneficiary, and the trust asset. The beneficiary is also sometimes referred to as the beneficial owner of the trust asset. In the Indian trust relationship, the US is the trustee and holds title to these assets for the benefit of a Native American tribe or nation or for an individual Native American. These assets can be real property, physical assets, or intangible property rights. Examples include lands, minerals, water rights, hunting and fishing rights, other natural resources, money, or claims. They need not be owned outright but can include other types of property interest, such as a lease or a right to use something. ITAs cannot be sold, leased, or otherwise alienated without federal approval. While many ITAs are often associated with tribal lands, they can be off reservations as well. ITAs do not include commodities in which a tribe has no legal interest.

3.11.1 Present Conditions

In support of the Truckee River Operating Agreement EIS/EIR, ITAs were assessed in consultation with the following tribes:

- Pyramid Lake Paiute Tribe—Pyramid Lake Indian Reservation (which includes Pyramid Lake) in Nevada;
- Reno-Sparks Indian Colony—Reno and Hungry Valley, in Nevada;
- Fallon Paiute-Shoshone Tribes—Fallon Paiute-Shoshone Reservation and Fallon Colony in Nevada; and
- Washoe Tribe of Nevada and California.

Trust resources of these Tribes include land, water rights, and fish and wildlife; and incomes are derived from these resources. The Tribes are concerned with regional water quality and quantity, water distribution and maintaining reservation fisheries, wildlife and wetlands. The scope of that study was broader, but focused on issues of water rights and Newlands Project water deliveries outside of the planning area for the RMP/EIS. This RMP/EIS does not address any changes in water rights or deliveries that support tribal fisheries, wildlife issues, irrigation or trust income (DOI and DWR 2008).

There is only one reservation within the planning area, the Fallon Paiute-Shoshone Reservation and Colony. Reclamation initiated consultation with the Fallon Paiute-Shoshone Tribe and the Pyramid Lake Paiute Tribe in August 2007, and consultation is ongoing. In addition, Reclamation will contact offices of the BIA, informing them of the consultation and requesting any feedback that the agency might have regarding the RMP and possible environmental effects, including the potential to affect trust assets. Although the consulted tribes have identified no trust assets relevant to the scope of the RMP/EIS, the Fallon Paiute-Shoshone Tribe has expressed concern and a desire to manage the

archaeologically sensitive area to the north of the Fallon Indian Reservation and Colony. These lands were also part of earlier tribal allotments. This is not a specific implementation action evaluated in the RMP/EIS but the potential for land tenure adjustments is addressed in each of the action alternatives. Consultations are considered ongoing until the RMP is implemented, and the Fallon Paiute-Shoshone Tribe or the Pyramid Lake Paiute Tribe may identify additional areas of concern or trust assets.

3.12 Land Ownership and Use

This section describes the general land ownership and uses within the planning area. Land uses include facilities maintained and operated in association with the Project, grazing, energy and minerals development and recreation. Recreation is addressed in a separate section that is further divided in to specific types of recreation.

3.12.1 Land Ownership

General Setting

The Newlands Project, formerly the Truckee-Carson Project, provides full service irrigation water from the Truckee and Carson Rivers for about 55,000 acres of cropland in the Lahontan Valley near Fallon and bench lands near Fernley in western Nevada. In addition, water from about 6,000 acres of Project land has been transferred to the Lahontan Valley wetlands near Fallon. The drainage basins contain nearly 3,400 square miles with a combined average annual runoff of about 850,000 acre-feet of water.

Approximately two-thirds of the planning area lands are federally owned. Reclamation manages Newlands Project withdrawn lands and has entered into several partnerships and agreements with other agencies to manage the lands subordinate to the primary purpose of irrigation and agriculture. The rest is used mainly for farming, ranching, urban development, industrial enterprises, and transportation. Livestock grazing on native grasses and shrubs is the principal agricultural enterprise. Land is irrigated mainly for the production of hay, grain, and other agricultural products (NRCS 2006).

Most of the planning area is in Churchill County, Nevada. The planning area in Churchill County is roughly between the Fernley Sink, Stillwater National Wildlife Refuge, Carson Lake Pasture, and Lahontan Reservoir. Smaller portions of the planning area are also in Washoe, Storey, and Lyon Counties. The planning area in Washoe and Storey Counties is near the Truckee River. The planning area in Lyon County is around Lahontan Reservoir. The Railroad Act of 1862 has influenced part of the ownership pattern in the planning area. Under the Railroad Act, the government gave the railroad company ten square miles of land for each mile of track that was completed (National Parks Service [NPS] 2005). The Railroad Act granted to the railroad every other square-mile section in twenty miles

each side of the railroad centerline. This Act created a "checkerboard" ownership pattern of alternating private and federal land parallel to the railroad right-of-way. This pattern, which still exists, has made managing single sections of public land difficult for both Reclamation and other agencies with concerns regarding access and trespass. Figure 3-9 and Table 3.13-1 identify land ownership within the planning area.

Tribal Lands

The Fallon Paiute-Shoshone Reservation is within the planning area and the Pyramid Lake Paiute Tribe Reservation lies adjacent to the planning area. Both Tribes have been consulted with and are discussed further in the Indian Trust Assets section above.

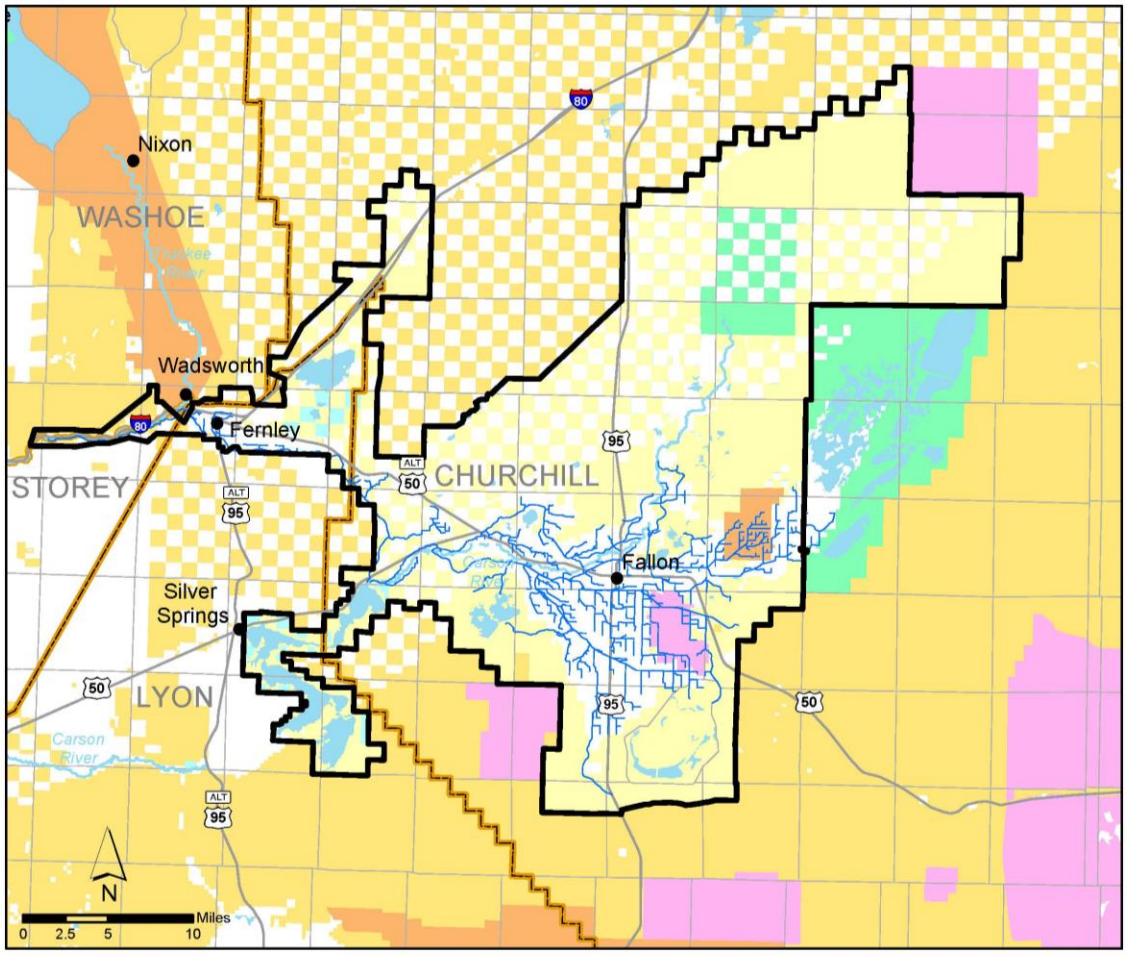

Figure 3-9 Newlands Project Planning Area Land Status

Table 3.13-1 Land Ownership within the Planning Area

Landowner	Acres
Bureau of Reclamation	359,393
Tribal lands	8,443
US Fish and Wildlife	84,725
State of Nevada	59,301
Private	247,848
Regional park	0
Department of Defense	16,933
Total	776,643

Source: Reclamation 2002b; BLM National Science and Technology Center 2003

US Fish and Wildlife

The Stillwater National Wildlife Refuge is in the Lahontan Valley, near the city of Fallon, adjacent to the Newlands RMP planning area. The Stillwater wetlands are well known to birders as this area and has been designated a Site of International Importance by the Western Hemispheric Shorebird Reserve Network due to the hundreds of thousands of shorebirds (such as long-billed dowitchers, black-necked stilts, and American avocets) that migrate through (USFWS 2008). The Fallon National Wildlife Refuge was established in 1931 as a refuge and breeding ground for birds and wild animals. It is located in the Lahontan Valley of western Nevada, at the terminus of the Carson River. The refuge comprises over 15,000 acres of playa and wetland habitat in the Carson Sink (Nevada Division of State Parks 2008). The refuge lands are located within the RMP planning boundary, but are not located on Reclamation-administered lands. Even though refuge lands are not part of this RMP, Reclamation will coordinate with USFWS for input into the process.

State of Nevada

1. Fernley Wildlife Management Area

FWMA is east of the city of Fernley, with the Truckee River canal on the west. The State of Nevada has managed the FWMA since 1952. The primary management emphasis on the FWMA is the protection of wetlands and waterfowl, including the use of the areas as public hunting grounds. Hunting opportunities for sportsmen on this WMA include migratory game bird, upland game bird, furbearer, and big game hunting.

On May 3, 2008, Reclamation entered into an agreement with NDOW to continue managing Reclamation's withdrawn lands as part of the FWMA (US et al. 2008).

2. Carson Lake Pasture

The Carson Lake Pasture is approximately 30,000 acres of pasture and wetlands eight miles southeast of Fallon, Nevada. The Carson Lake Pasture has been recognized as an

important area for wildlife, especially shorebirds and waterfowl, and has been designated a component of the Western Hemisphere Shorebird Reserve Network. On March 13, 2007, Reclamation and NDOW signed an agreement to manage Reclamation withdrawn lands in Carson Lake Pasture (Reclamation and NDOW 2004). The agreement allowed NDOW to manage the wildlife, habitat, and public use of those lands in order to preserve the wildlife characteristics. Reclamation also maintains an annual contract with TCID to manage grazing in the Carson Lake Pasture. The contract states that Reclamation has the authority to issue leases and receive grazing revenues while TCID will manage and maintain the grazing operations (Reclamation 2009b). Reclamation is working towards officially transferring ownership of Carson Lake Pasture to NDOW. In May 2009, a draft environmental assessment was issued that evaluates the transfer. When the transfer is complete, NDOW will have all management responsibilities for the Carson Lake Pasture area (Reclamation 2009b).

Department of Defense

The Naval Air Station Fallon Main Station is in Churchill County, Nevada (US Navy 2006), in the central portion of the Carson Desert, commonly referred to as the Lahontan Valley.

The Naval Air Station Fallon Main Station, occupying 8,670 acres, is similar to a small city (US Navy 2006). It includes an airfield (airport) with control towers, radar, and runways; industrial facilities for maintaining aircraft and support equipment; business facilities for everyday operations; retail and recreation facilities; housing facilities for the military personnel and their families; and utility support facilities (e.g., water and sewer). Surrounding this infrastructure are agricultural fields and vacant desert lands that serve as noise and safety buffers. There are approximately 930 active duty personnel, 420 civilians, and 1400+ contractors or 2,800 civilian and military personnel and 70 aircraft permanently stationed at Naval Air Station Fallon. During training, these numbers can increase by up to an additional 2,000 personnel and 90 aircraft.

The Navy allows public access to Naval Air Station Fallon for nature studies, wildlife viewing, and photography on lands not closed for security or public safety (US Navy 2006). Naval Air Station Fallon security and the Public Affairs Officer must be contacted for organized recreation events on the Main Station.

Surrounding Lands

Most of the federally managed land surrounding the planning area is managed by the Carson City District, Stillwater Field Office and Winnemucca District, Humboldt River Field Office of the BLM.

3.12.2 Grazing

The primary guidance that governs grazing on Reclamation-administered lands are the Reclamation Manual/Directive and Standards LND 08-01 and 43 CFR 429, titled *Procedure to Process and Recover the Value of Rights-of-Use and Administrative Costs Incurred in Permitting Such Use*.

Truckee Carson Irrigation District managed the grazing program on all the Newlands Project lands since the 1920s, with the exception of Stillwater Wildlife Management Area (SWMA) and FWMA. Responsibility for management was given to Reclamation from TCID in 1997, when the Operations and Maintenance (O&M) contract was renegotiated. Since then, Reclamation has not changed how it assesses fees or how it administers grazing. Currently grazing fees are not returned to the LBAO to help recover costs and instead go to offset costs of the Project as a front-end credit. The Fact Finders Act of 1924, Subsection I, pertaining to the application of front-end credits from activities on Reclamation-administered lands, applies to the Newlands Project.

An evaluation of current procedures indicated that the existing grazing management program is neither in compliance with Reclamation directives and standards (LND08-01) nor with federal laws, including NEPA and the NHPA, and consequently must be modified in many aspects.

LBAO manages livestock grazing on Newlands Project lands in Churchill and Lyon Counties. In 1998, LBAO assumed the administration and management of the grazing leases on 35 lease areas within the Newlands Project. Before this, TCID managed grazing leases. In 2004, LBAO also assumed management of the grazing lease area at Carson Lake Pasture. The 38leased grazing areas including the Carson Lake Pasture, consist of over 189,600 acres of Reclamation-administered land, with the largest lease area averaging over 71,400 acres and the smallest area averaging just a few acres. The smaller lease areas are leased to individual livestock owners; the large lease areas provide community pastures for several lesees. Cow/calf pairs and bulls are the predominant class of cattle grazing the Newlands Project. Horses and donkeys are the only other kind of livestock leased on Project land.

Table 1 of the Grazing Management Plan for the Lahontan Basin Area Office (Appendix A), contains updated information as to pasture size, proposed disposition, and current usage. Figure 1 in the Plan is a map of the grazing pastures.

The Bureau of Reclamation Standards Determination for individual pastures in the Newlands Project was compiled by the TEAMS Enterprise Unit in 2009. It evaluated 28 of the 38 total pasture areas for soil cover, plant composition, forage production, and achievement of land health standards. Nine pastures, with 10 or fewer acres were not assessed. The Carson Lake Pasture was not included due to its anticipated transfer.

The five conditions evaluated to measure land health were soils, riparian and wetland areas, water quality, plant and animal habitat, and special status species habitat (Resource Advisory Council RAC Standards and Guidelines for Rangeland Health, Sierra Front-Northwestern Great Basin Area 1997 [BLM 2007b]). Pasture land that had riparian areas was also assessed for proper functioning condition. These standards describe the physical and biological conditions required for sustaining rangelands for multiple uses, and the guidelines identify livestock grazing management actions for achieving the standards.

The TEAMS group assessed achievement of standards using rangeland monitoring data, professional observations, and photographs. Existing conditions were compared to site-specific reference conditions (representing relatively undisturbed states) for a given soil and plant community type to determine the level of departure from the potential natural community. Range health was evaluated at key areas selected for consistency with current livestock grazing use. Ecological decline was indicated by an increase in proportion or dominance of secondary species as compared to primary species (TEAMS Enterprise Unit 2009).

All of the 28 pastures evaluated were described as having damage from livestock. The soils and plant and animal habitat standards were the most common ones that were not met. In most cases the studies recommended at least a temporary rest of damaged pasture land or seasonal restrictions to grazing to promote recovery. Restricted stocking rates and carrying capacities were suggested for Harmon Area, Hillsboro Boulevard, Mahala Slough East, Mahala Slough West, Pasture Road, Shaffner Drain, and Sheckler pastures. These pastures and several others had damaged areas that were recommended for long-term rest over several years to promote the return of primary vegetation and to restore habitat (TEAMS Enterprise Unit 2009).

3.12.3 Energy and Mineral Development

BLM manages the exploration and development of subsurface minerals on Newlands Project lands. BLM coordinates with Reclamation on the associated surface disturbance. Energy resources include renewable energy (solar power, wind, biomass, hydroelectric power, and geothermal resources) and oil and gas. Geothermal resources and oil and gas are managed as leasable minerals. The potential for renewable energy resources on DOI, BIA, and US Forest Service lands in the West was assessed in a 2003 report "Assessing the Potential for Renewable Energy on Public Lands in the Western United States" produced by BLM in cooperation with the National Renewable Energy Laboratory. The potential for wind power on BLM lands surrounding the planning area was evaluated in an additional report, Programmatic Environmental Impact Statement on Wind Energy Development on BLM Lands in the Western United States, for which the Record of Decision was completed in December 2005. Although these documents primarily address BLM lands, the area investigated includes the Newlands Project Planning Area. This RMP assumes that many of the renewable energy characteristics of adjacent BLM lands would be applicable to the Newlands Project area.

Wind power classes range from 1 (lowest) to 7 (highest), based on the steadiness, duration, and power of the wind. The Wind Energy Development Final Programmatic EIS for BLM-Administered Lands in the Western United States (BLM 2005) identifies the area covered by the Carson City District Office area, which surrounds most of the Newlands Project Planning Area, and the Winnemucca District Office area, which is to the north of the Newlands Project, as planning units with the highest wind energy potential (Class 5 and higher) (BLM and US Department of Energy [USDOE] 2003). Important physical characteristics, in addition to wind power class that give an area high wind energy potential, include proximity to a city, transmission lines, and major roads and rail lines.

Both the BLM Carson City and Winnemucca District Office areas are among the top 25 BLM planning units in the US with the highest concentrating solar power and photovoltaic energy potential. The land characteristics for a high solar resource potential include the presence of a solar resource of six kilowatt-hours or greater per square meter per day on a slope of less than or equal to one percent (BLM and DOE 2003). Based on mapping provided in the BLM/National Renewable Energy Laboratory study, none of the photovoltaic resources are near the Newlands Project Planning Area.

The BLM/National Renewable Energy Laboratory study evaluated the long-term sustainability to support biomass plants using the monthly Normalized Difference Vegetation Index (NDVI) computed from the National Aeronautics and Space Administration's (NASA's) Advanced Very High Resolution Radiometer Land Pathfinder satellite program. For an area to have biomass development potential, it had to meet the following physical criteria: an NDVI of 0.4 for at least four months between April and September, a slope of less than 12 percent, and no more than 50 miles from a town with at least 100 people. Neither the Carson City District Office area nor the Winnemucca District Office area had the highest potential for biomass development (BLM and DOE 2003).

The Newlands Project Planning Area is in the Great Basin, where there are two types of recognized geothermal systems: magmatically induced systems and extensional fault systems associated with regionally high heat flow and active faulting (BLM 2006). Groundwater circulating at depth in rocks heated by either of these systems can be used as a medium to transfer heat to the surface to be used either directly for heating buildings or by converting it into electricity.

Geothermal resources occur most often in areas where there is anomalously high heat flow caused by volcanism or near-surface magma or by some other exceptionally hot subsurface body. They often occur along fault or fracture zones, where fracturing allows groundwater to circulate to depths for warming before it circulates back to the surface. Geothermal resources have been identified underlying Reclamation-managed lands. During the 1970s, two geothermal plants were constructed in the Lahontan Valley to produce commercial electricity that could be sold into the grid. These plants at Soda Lake

and Stillwater are still producing power. Exploratory wells have been successfully completed at Naval Air Station Fallon Main Station, and the Navy has plans to develop a 30-megawatt production facility at this site on the southern boundary of the Main Station (US Navy 2006).

The Paleozoic and Mesozoic rocks in the western portion of the Great Basin province, which includes the Newlands Project Planning Area, in general are believed to have little or no potential as oil and gas source rocks. This is because high regional heat flow and faulting have destroyed any large stratigraphic or structural traps that may have formed before basin and range faulting. Triassic carbonate rocks in the Stillwater, Clan Alpine, and Augusta Ranges have shown evidence of hydrocarbons. Most of the hydrocarbon source potential is in the Cenozoic river and lakebed deposits, but most of these deposits are considered marginally mature, except in areas of high heat flow (Barker et al. 1995). All of the major playas have been explored by drilling. The principal trapping mechanisms are fault truncation of source rocks and stratigraphic traps, such as mudstone overlying lenticular sandstone bodies, or interbedded lakebed and alluvial deposits bounded by faulting and overlain by evaporates.

3.13 Fire Management

Evaluation of Fire Management and Protection within the Newlands Project area is based on the BLM Carson City Fire Management Plan (BLM 2004). The Newlands Project area is surrounded by BLM Fire Management Unit (FMU) NV-030-09, Lahontan Basin. Although Reclamation and the Carson City District Office do not have a formal memorandum of understanding documenting fire management responsibilities between the agencies, the BLM is the primary agency assisting in wildland fire initial attack and suppression on Reclamation-administered lands. Lyon County and Churchill County fire departments also respond from stations in Silver Springs and Fallon, respectively.

Reclamation manages approximately 340,000 vegetated acres. Nearly 76 percent of the area is dominated by Intermountain Basin Playa and Intermountain Cold Desert Scrub vegetation communities (Section 3.11, Vegetation). Both of these communities are characterized by drought- and salt-tolerant shrubs and grasses with low canopy cover, effectively creating a fire break. As a result, fire is not believed to play a significant role in the development of these communities, and large fires are relatively rare in the area but have occurred under extreme fire conditions. Historically, one moderately sized fire of approximately 850 acres burns annually.

The vegetation communities with greatest fire risk in the Newlands Project area are found at higher elevations in the grassland, meadow, and sagebrush communities, which make up less than one percent of the planning area. Introduction and establishment of the winter annual cheatgrass has altered the fire regime in sagebrush/grass communities, increasing

the fire risk hazard in these communities. Increases in cheatgrass cover have also altered fire return intervals and community species composition.

3.13.1 Wildland Fire

Fires that historically would occur in sage-perennial grass at a return interval of 35 to 70 years (Howard 1999) and in the salt desert shrub at a return interval of 35 to less than 100 years (Simonin 2001) have shown a trend downward, burning several times within 10 years (Boltz 1992). The invasion of cheatgrass, which generates enough fine fuel to carry fire through sparsely vegetated communities, has altered historic fire regimes and in some cases has removed the shrub component, effectively converting sites to annual grasslands. This has resulted in more aggressive suppression efforts by local agencies in an attempt to keep the remaining intact communities from burning. Fire size and intensity correlate directly to conditions occurring during dry thunderstorms that produce many of the wildfires in the area. Strong gusty winds will carry fire through cheatgrass monotypes that have spread onto past burned areas, shadscale-cheatgrass, Wyoming big sage-cheatgrass, or Great Basin big sage-cheatgrass. Noxious and invasive weed species will continue to colonize disturbed sites. This trend will likely accelerate if fire severity and size increase, providing a means for the cheatgrass to become established, which supplements fine fuel buildup in desert scrub stands.

A natural fire regime is a general classification of the role fire would play across a landscape in the absence of modern human mechanical intervention but including the influence of Native American burning practices. The fire regimes within the BLM Lahontan Basin FMU are classified based on the average number of years between fires (fire frequency) combined with the severity (amount of replacement) of the fire on the dominant overstory vegetation. The dominant fire regime on BLM lands surrounding the Newlands Project area is Fire Regime III. This is characterized by a 35 to 100-year fire return interval and mixed severity fire pattern, in which less than 75 percent of the overstory vegetation is replaced.

A fire regime condition class (FRCC) is a classification of the amount of departure from the natural regime (Hann and Bunnell 2001). Coarse-scale FRCC classes have been defined and mapped by Hardy et al. (2001) and Schmidt et al. (2001) and include three condition classes for each fire regime. The classification is based on a relative measure describing the degree of departure from the natural (historical) fire regime. This departure results in changes to one (or more) of the following ecological components:

- Vegetation characteristics, such as species composition and structural stages;
- Fuel composition;
- Fire frequency, severity, and pattern; and

- Other associated disturbances, such as insect-induced and diseased mortality, grazing, and drought.

The three condition classes are based on low (FRCC1), moderate (FRCC2), and high (FRCC3) departure from the central tendency of the natural (historical) regime. Low departure is considered to be within the natural range of variability, while moderate and high departures are outside it. FRCC distribution within the Lahontan Basin FMU is 61 percent Class II and 39 percent Class III communities. No communities were rated in Class I condition.

Although fire regime and condition class assessments have not occurred in the Newland Project area, Reclamation-administered lands have fire indices similar to adjacent BLM land within the Lahontan FMU, based on dominant vegetation communities, development and disturbance history, and proximity to the BLM FMU.

3.13.2 Fuels Management

The 2001 Federal Wildland Fire Management Policy established principles for managing wildland fire on federal lands. Ensuring firefighter safety and public safety is the first priority principle; another is protecting human communities, infrastructure, and natural and cultural resources. These principles also recognize the role of wildland fire as an ecological process and natural change agent.

Wildland Fire Use

Wildland fire use recognizes the role of fire to protect, maintain, and enhance resources to improve ecological conditions. Wildland fires may be managed for resource benefit only if an approved Fire Management Plan and Wildland Fire Implementation Plan are in place. These plans identify specific resource and fire management objectives, a defined geographic area, and prescriptive criteria that must be met. Currently there are no approved wildland fire use areas within the Newlands Project area.

Emergency Stabilization and Rehabilitation (ES&R)

Emergency stabilization and rehabilitation activities are planned actions taken to stabilize and prevent degradation of natural and cultural resources and to minimize threats to life and property resulting from the effects of fire. Reclamation currently has no ES&R plans to implement in the event of wildland fire.

Fire rehabilitation are efforts undertaken within three years of containment of a wildland fire to repair or improve fire-damaged land unlikely to recover naturally to management-approved conditions or to repair or replace minor facilities damaged by fire. Two objectives of fire rehabilitation are to:

1. Evaluate actual and potential long-term post-fire impacts on critical cultural and natural resources and identify those areas unlikely to recover naturally form severe wildland fire damage; and

2. Develop and implement cost-effective plans to emulate historical or prefire ecosystem structure, function, diversity, and dynamics consistent with approved land management plans, or, if that is infeasible, restore or establish a healthy stable ecosystem in which native species are well represented.

Prescribed Fire

Prescribed fire and nonfire fuel breaks (mechanical, chemical, and biological) are strategically situated to protect human communities and resource values, to aid in fire suppression, to restore ecosystem health, and to aid suppression operations by reducing fire intensity or providing "anchor points" for fire suppression tactical operations. Fuel treatments may be seeded wherever residual vegetation is not adequately abundant to revegetate the sites to prevent establishment and spread of invasive weed species or meet ecosystem health restoration objectives.

Opportunities to use prescribed fire as a fuel treatment method are limited by social, political, and resource concerns. Smoke management and associated air quality concerns may increase as resource users and residences increase in and around the planning area, potentially limiting prescribed burning. Mechanical and chemical treatments are the preferred alternative for fuel treatment when necessary.

Fire Mitigation, Education, and Prevention

The primary goals of the prevention program are to educate the public about wildland fire and to further reduce human-caused fires. Community education and prevention programs are a priority. Reclamation does not currently participate in any community fire education programs.

3.13.3 Wildland-Urban Interface

The wildland-urban interface (WUI) is the area where houses meet or intermingle with undeveloped wildland vegetation (Radeloff et al. 2005). WUI is continually increasing as populations grow and development spreads. Wildland fire suppression in WUI areas is typically expensive and dangerous, adding a disproportionate demand on fire suppression resources. As the WUI continues to grow, it will become more of a driving factor on fire suppression and fuel management in the future. As the number of people, homes, and structures increases, so does the risk of wildfire ignitions and threats to lives and structures.

Areas around Fallon are surrounded by irrigated agriculture and are relatively safe from wildland fire. WUI areas bordering tribal, Department of Defense, and state lands are likely at risk from wildland fire. Reclamation has not identified or prioritized WUI areas within the Project area.

3.14 Transportation

The road system serving the planning area consists of one interstate highway, US and State highways, state roads, and county, local, and private roads.

Interstate Highways. Only one interstate highway serves the planning area: Interstate 80 (I-80). It passes through the northwest portion of the planning area in Washoe, Storey, Lyon, and Churchill Counties in an east-west direction. Fernley is the primary community within the planning area served by I-80 (Delorme 2003).

US Highways. Two US highways serve the planning area. US Highway 50 traverses the area in an east-west direction and US Highway 95 runs north-south. Both highways also have alternate routes, which provide additional access within the planning area (Delorme 2003).

US Highway 50 runs east-west through Lyon and Churchill Counties. The highway is a major access route for the city of Fallon and Fallon Naval Air Station (Delorme 2003). US Highway 50 is also a primary access route for Lahontan State Recreation Area, particularly for the Churchill Beach Complex, Lahontan Dam, and the North Shore Marina. Several other minor entrances to the recreation area are also located off US Highway 50, including the Overlook, Drum Point, and Blackbird Point (Reclamation 1991). US Highway 50 is called "The Loneliest Road in America" because it traverses large desolate areas with very few motorist services. It follows a historic corridor, which was first used for the Pony Express and then later for the Lincoln Highway. The Loneliest Road in America designation ends at Fernley, which is at the west end of the planning area (Nevada Commission on Tourism 2008).

Alternate Route 50 branches off US Highway 50, approximately 10 miles northwest of Fallon in Churchill County. It continues on to Fernley, where it intersects with I-80.

Alternate Route 95 runs south from Fernley through the planning area in Lyon County, and is a primary access route for the Silver Springs Beach Complex at the Lahontan State Recreation Area. Alternate Route 95 continues south through Lyon County and out of the planning area (Delorme 2003).

US Highway 95 runs north-south through the planning area and Churchill County. It is a major access route for the city of Fallon. County and local roads off US Highway 95

provide access to the Stillwater National Wildlife Refuge, Fallon National Wildlife Refuge, and Fallon Naval Air Station (Delorme 2003).

State Highways. State Highways 117, 118, and 119 serve the planning area near the city of Fallon. State Highway 117 is southwest of Fallon and intersects with both Alternate Route 50 and US Highway 95. State Highway 118 begins at US Highway 95 about one mile south of Fallon and runs east and then south a total of about four miles before ending at the boundary of Fallon Naval Air Station. State Highway 119 begins about five miles south of Fallon and connects US Highway 95 to US Highway 50. State Highway 119 primarily provides access to county and local roads, some of which provide access to Carson Lake (Delorme 2003).

State Roads. The Lahontan State Recreation Area contains 40 miles of roads, both paved and unpaved. About 17.5 miles are paved or graded. Primary paved or graded routes within the recreation area include a graded gravel road that provides access from US Highway 50 to the recreation area's entrance station, a paved road from the entrance station to Beaches 1 and 5, and a graded gravel road from Beach 5 to Beach 11. Other improved routes include a paved route providing access to the Silver Springs Beach Complex, the boat ramp, Beaches 3 and 7, and the campground at Beach 7. Direct access to the North Shore Marina is via a paved road from US Highway 50. Unimproved dirt roads provide access to Virginia Beach, Blackbird Point, Drum Point, and other undeveloped beaches. A number of other unpaved roads in varying degrees of improvement also serve the Lahontan State Recreation Area (Reclamation 1991).

County, Local, and Private Roads. A number of county, local, and private roads exist within the planning area. These roads provide access to and within communities, the Stillwater and Fallon National Wildlife Refuges, Fallon NAS, Lahontan State Recreation Area, and other points within the planning area (Delorme 2003).

3.15 Utilities

Water

The sources of surface water for the Carson Desert and western Churchill County are direct precipitation, Carson River and Humboldt River inflow, and importation from the Truckee River (Churchill County 2005). Surface water is the necessary and sole source for irrigating farmlands, recharging the aquifers that provide domestic water supplies, and maintaining the wetlands at Carson Lake Pasture and Stillwater and Fallon National Wildlife Refuges.

The most important contributor to the water supply system is the combined flow from the Truckee and Carson Rivers (Churchill County 2005). About 95 percent of groundwater

recharge is provided by the Newlands Project surface irrigation system. This water supply is used for maintaining the community's agricultural industry and domestic water.

The Update to the Final Churchill County Water Resource Plan provides a comprehensive overview of surface and groundwater resources (Churchill County 2007).

Section 3.7, Hydrology, contains more information about water resources in the area.

Electricity

The five geothermal power plants within or near the Newlands Project boundary are Desert Peak, Soda Lake, Bradys, Salt Wells, and Stillwater. Transmission lines greater than or equal to 55kV crisscross the area, with some of them following major roadways and some of them passing through Fernley and Fallon.

The Old Lahontan Power Plant, immediately below Lahontan Dam, has a capacity of 1,920 kilowatts and facilities to use water from either Lahontan Reservoir or the Truckee Canal. There are 73 miles of 33-kilovolt transmission lines to convey power from the Old Lahontan Power Plant to the city of Fallon, the towns of Fernley, Wadsworth, Hazen, and Stillwater, Native American reservations, and most of the rural areas within the Newlands Project Planning Area. TCID also constructed and operates the New Lahontan Power Plant, separate from the Newlands Project. This powerhouse was constructed for a single 4,000 kilowatt generator. TCID controls operation of the Lahontan plants, and in 1999 signed a 30-year lease agreement with the NV Energy for the distribution of electricity (Reclamation 2007b, Nevada Energy 2009).

The Tracy Power Generation Station, adjacent to the planning area, is approximately 15 miles east of Reno along I-80 and the Truckee River. The last generating unit at Tracy went on line in 1963. NV Energy operates the Tracy Power Generation Station, whose generating capacity is 505 megawatts, with all units operating on natural gas, and some units having the ability to also operate on diesel and or heavy fuel oil.

3.16 Public Health and Safety

This section is a discussion of public health and safety concerns within Reclamation-administered lands, in addition to public health and safety concerns adjacent to Reclamation-administered lands that affect management of those lands.

Illegal Activities

The Bureau of Reclamation enforces policies related to illegal activities associated with the land and water in its jurisdiction. Unauthorized uses deprive the public of rightful use and enjoyment of federal lands. It is the general policy of Reclamation to facilitate and

ensure the proper use of resources. Benefits to the public as a whole resulting from nonexclusive uses of federal lands is the primary management emphasis.

Prohibited acts on federal land include grazing or watering livestock without a Reclamation-issued lease, trespassing into areas specified as off-limits to public access (e.g., operations facilities and areas with sensitive ecological or cultural resources), using motorized vehicles in any areas other than on paved or specified roads, building, placing, and maintaining any kind of road, trail, structure, fence, enclosure, communication equipment, pump, well, or other improvement without a lease. Because Newland Project lands span such a great area and are not centered in one place, managing prohibited acts can be a difficult process. Trespassing/squatting, illegal dumping, off-road vehicle (ORV)use, and vandalism are common problems within Newlands Project Area lands.

Trespass is defined as follows (43 CFR, Part 423):

- Unauthorized possession or occupancy of Reclamation facilities, lands, or waterbodies;
- Entry, presence, or occupancy on or in any portion or area of Reclamation facilities, lands, or waterbodies that have been closed to public use, pursuant to Subpart B of Part 423;
- Unauthorized extraction or disturbance of natural or cultural resources located Reclamation facilities, lands, or waterbodies;
- Unauthorized conduct of commercial activities on Reclamation facilities, lands, or waterbodies;
- Holding unauthorized public gatherings on Reclamation facilities, lands, or waterbodies; or
- Unauthorized dumping or abandonment of personal property on Reclamation facilities, lands, or waterbodies.

Illegally dumped wastes are primarily nonhazardous materials that are dumped either to avoid disposal fees or the time and effort required for proper disposal (EPA 1998).

Illegal waste dump sites usually contain the following materials:

- Construction and demolition waste, such as drywall, roofing shingles, lumber, bricks, concrete, and siding;
- Abandoned automobiles, auto parts, and scrap tires;
- Appliances;

- Furniture;
- Yard waste;
- Household trash; and
- Medical waste.

If not addressed, illegal dumps often attract more waste, potentially including hazardous wastes, such as asbestos, household chemicals and paints, and automotive fluids, and commercial or industrial wastes.

The health risks associated with illegal dumping are significant (EPA 1998). Areas used for dumping may be easily accessible to people, especially children, who are vulnerable to public health and safety issues that include the following:

- Physical hazards (protruding nails or sharp edges) and chemical hazards (harmful fluids or dust);
- Rodents, insects, and other vermin. Dump sites with scrap tires provide a breeding ground for mosquitoes, which can multiply 100 times faster than normal in the warm stagnant water standing in scrap tire casings. Severe illnesses, such as encephalitis and dengue fever, have been attributed to disease-carrying mosquitoes originating from scrap tire piles;
- Dump sites can catch fire, either by spontaneous combustion or, more commonly, by arson;
- Illegal dumping can affect proper drainage, making areas more susceptible to flooding when wastes block ravines, creeks, culverts, and drainage basins. In rural areas, open burning at dump sites can cause forest fires and severe erosion as fires burn away trees and undergrowth;
- Dump site runoff containing chemicals may contaminate wells and surface water used for drinking water; and
- Dump sites serve as magnets for additional dumping and other criminal activities.

Abandoned Mines

The Nevada Division of Minerals, a part of the Commission on Mineral Resources, administers programs and activities to promote, advance, and protect mining and the development and production of petroleum and geothermal resources in Nevada (Durbin et al. 2005). The Division of Minerals focuses its efforts on three main areas: industry

relations and public affairs; regulation of oil, gas, and geothermal drilling activities and well operations; and abandoned mine lands. The Division of Mineral's abandoned mine lands program provides for public safety by identifying and ranking dangerous conditions at mines that are no longer operating and by securing dangerous orphaned mine openings. The program continually urges the public to recognize and avoid hazardous abandoned mines. A 34-year history of known incidents related to abandoned or idle mines for the four counties that are part of the planning area is presented in Table 3.17-1.

Table 3.17-1 Reported Abandoned Mine Lands Incidents Through 2004

Date	Incident	County
4/1979	Two teenagers killed in fall down Oest Mine shaft.	Lyon
9/1988	Body of elderly male found at bottom of mine shaft.	Lyon
5/1991	Male juvenile with minor injuries in fall down 20-foot mine shaft.	Washoe
12/1991	Male adult (44) killed in fall down internal mine winze (steep passage).	Lyon
11/1993	Dog rescued from 30-foot mine shaft.	Storey
9/1996	Two male adults (35) killed in mine adit near Virginia City by suffocation.	Storey
11/2000	Dog rescued from fall down 40-foot mine shaft. Moderate injury to hip.	Storey
7/2002	41-year-old male drowned swimming in open pit lake.	Storey

Source: Durbin et al. 2005

Hazardous Materials

Hazardous material sites are locations where hazardous or regulated materials are used, stored, or disposed of. Air, soil, surface water, and groundwater contamination are typically found at hazardous material sites. A Superfund site is an uncontrolled or abandoned place where hazardous waste is located, possibly affecting local ecosystems or people. Superfund sites are listed on the National Priorities List, one of which is in Nevada. The Carson River Mercury Site consists of sediments in an approximately 50-mile stretch of the Carson River in Lyon and Churchill Counties, beginning between Carson City and Dayton, Nevada, and extending downstream through the Lahontan Reservoir to Stillwater National Wildlife Refuge. This site also includes tailing piles associated with the river (EPA 2007). Approximately 1,200 acres of food and forage crops are irrigated by the Carson River between Dayton, approximately 22 miles southwest of the reservoir, and the Lahontan Reservoir, on the west side of the planning area.

Household dumps around ranches, burn sites, lab chemical dumps, and illegal dumps can also be hazardous materials sites. Although sites may appear to remain in the same condition year after year, unseen deterioration is probably occurring.

3.17 Recreation Resources

Reclamation is responsible for recreation planning, development, and management of Reclamation withdrawn lands (Reclamation and BLM 1982). In many cases, Reclamation has set up agreements with state and other federal agencies to manage land and related recreation.

3.17.1 Aquatic-Based Recreation

There are several lakes and reservoirs within the planning area, including Lahontan Reservoir, Fernley Sink, Sheckler Reservoir, and Carson Lake. The State of Nevada manages the Lahontan Reservoir, Fernley Sink, and Carson Lake. In the Management Agreement among the United States of America, the Truckee-Carson Irrigation District, and the State of Nevada for the Development, Administration, Operation, and Maintenance of Recreation at Lahontan Reservoir, Newlands Project, Nevada (US et al. 1976), the State of Nevada accepted "responsibility for the site-planning, development, construction, administration, operation and maintenance, and replacement of public recreation facilities, and other related purposes," including surface water. The agreement called for Nevada to produce a recreation development plan to outline operating procedures for the recreation area.

The Lahontan State Recreation Area is administered by the Nevada Division of State Parks. Aquatic recreation at the Lahontan State Recreation Area includes 69 miles of shoreline when full, fishing, boating, water skiing, and swimming. Non-water-based recreation includes horseback riding, wildlife viewing, and camping. Facilities include flush restrooms, showers, recreation vehicle dump station, and a boat launch (Nevada Division of State Parks 2012).

The Fernley Sink falls within the FWMA, which is managed by the State of Nevada under the Management Agreement among the United States of America, Truckee-Carson Irrigation District, and the State of Nevada for the Development, Administration, Operations and Maintenance of Bureau of Reclamation Withdrawn Land, Fernley Wildlife Management Area, Newlands Project, Nevada (US et al. 2008).

The Carson Lake Pasture Wildlife Refuge is operated by NDOW. The 30,000 acre refuge provides opportunities for bird watching and water fowl hunting. Public Law 101-618 has mandated that the Carson Lake Pasture be transferred to the State of Nevada to be operated and maintained as a Wildlife Refuge. That transfer process is ongoing and

nearing completion. Once transferred, Reclamation will no longer process an interest in, or authority over, recreation at the Carson Lake Pasture Wildlife Refuge.

Fish found in the area include rainbow trout, brown trout, bullhead catfish, channel catfish, white catfish, green sunfish, yellow perch, walleye, crappie, largemouth bass, white bass, spotted bass, and wiper. While fishing is allowed on the Carson River, NDOW recommends that fish caught in this area not be consumed due to elevated mercury levels found in game fish and carp (NDOW 2007). Quagga mussels, which can be transported on recreational boats coming from infested waters, have been detected in Lahontan Reservoir.

3.17.2 Land-Based Recreation

Land-based recreation that occurs within the planning area includes walking/hiking, horseback riding, picnicking, camping, hunting, ORV use, and wildlife viewing. ORV use is restricted on all Reclamation-administered lands but exists illegally. There are other ad hoc dirt bike tracks throughout the planning area, including near residential development.

Recreational facilities at Lahontan State Recreation area consist of two developed picnic sites with restrooms, tables, and grills. Camping at developed and undeveloped sites is also offered (State of Nevada 2007b).

Hunting is permitted at the FWMA, Lahontan State Recreation Area, and Carson Lake Pasture area.

The Grimes Point Archeological Site, managed by the BLM, provides an opportunity to view examples of prehistoric rock art created by early Great Basin inhabitants. The BLM has constructed picnic and restroom facilities at the site. The Grimes Point site is on withdrawn lands that have been designated to be returned to the BLM through the withdrawal relinquishment process. Once the relinquishment is completed, Reclamation will not have any authority over the recreation management of this site.

Dispersed throughout the Newlands Project are such recreational opportunities as hunting, fishing, camping, hiking, biking, and other outdoor activities. However, the Project is not managed for these recreational activities. Oftentimes these recreational activities come in conflict with the primary purpose of Project, which is to provide irrigation water to end users. To this end, the small regulating reservoirs are not sustained as water recreation facilities and are often allowed to dry up.

3.17.3 Commercial Services

The Management Agreement among the United States of America, the Truckee-Carson Irrigation District, and the State of Nevada for the Development, Administration, Operation, and Maintenance of Recreation at Lahontan Reservoir, Newlands Project,

Nevada (US et al. 1976) permits the State of Nevada to issue and administer concession contracts for services, goods, and facilities for use by the public. Concession areas at Lahontan Reservoir do not exist.

3.18 Socioeconomics and Environmental Justice

This section is a discussion of the socioeconomic resources and environmental justice issues within the planning area, which encompasses about 360,000 acres of Reclamation-managed land in west-central Nevada. These lands are primarily within Churchill County but a small portion of the planning area is in Lyon, Storey, and Washoe Counties. Since most of the effects on the population and economy would occur within this local region, these counties were identified as the region of influence for socioeconomic analysis. Data for Nevada is presented for comparison and to analyze the possible broader effects of the proposed project. Socioeconomic conditions addressed include population and housing, employment and income, schools, and the protection of children. Also addressed is environmental justice, and that section identifies minority or low-income communities that could be affected by the proposed project.

- Population is the number of residents in the area and the recent change in population growth;
- Employment data take into account labor sectors, labor force, and unemployment;
- Income information is provided as an annual total by county and as per capita income;
- Housing includes numbers of units, ownership, and vacancy rate; and
- School enrollment and capacity are important considerations in assessing the effects of potential growth.

3.18.1 Population and Housing

Table 3.19-1 presents population figures for Nevada and the four planning area counties from 1990 to 2010, during which the populations in all counties increased. Lyon County experienced the largest increase in population (72.5 percent between 1990 and 2000 and 50.7 percent between 2000 and 2010), while Washoe County was the most populous in 1990, 2000, and 2010 (US Census Bureau 1990, 2000 and 2010a). As a whole, the population of Nevada increased by nearly 66.3 percent between 1990 and 2000 and by 35.1 percent between 2000 and 2010, to over two million people.

Table 3.19-1 County Population 1990-2010

County	1990	2000	2010	% Change 1990-2000	% Change 2000-2010
Churchill	17,938	23,982	24,877	33.7%	3.7%
Lyon	20,001	34,501	51,980	72.5%	50.7%
Storey	2,526	3,339	4,010	32.3%	20.1%
Washoe	254,667	339,486	421,407	33.3%	24.1%
Nevada	1,201,833	1,998,257	2,700,551	66.3%	35.1%

US Census Bureau 2000, 2010a

Table 3.19-2 presents population estimates for 2009 and projections for the four counties of the planning area and Nevada from 2015 to 2030. Between 2000 and 2009 the percentage of growth in Lyon County was estimated to be the highest of the four planning area counties, while growth in Storey County was the lowest. From 2000 to 2009, only the growth in Lyon County exceeded the state average; growth in the other three planning area counties was below the state average (Nevada State Demographer's Office 2010 and 2011; US Census Bureau 2000).

Lyon County is projected to continue to experience the highest percentage population growth from 2009 to 2030 and to continue to be above the state average by 2030. Storey County is projected to continue to have the lowest level of growth between 2009 and 2030. The percentage growth in Washoe County is expected to be below the state average and that of Lyon and Churchill Counties, and it is projected to have the highest absolute population decrease by 2030, losing 4,442 people after 2009 (Nevada State Demographer's Office 2010 and 2011; US Census Bureau 2000).

The population centers in the planning area are concentrated along the I-80 and US Highway 95 and 50 corridors and include the cities of Fernley and Silver Springs in Lyon County, Fallon in Churchill County, and Wadsworth in Washoe County. In general these counties are rural, with areas of rapid urbanization and population growth. Fallon and Fernley are the only two incorporated communities. Between 1990 and 2000, the percentage of the county population living in Fallon declined, from 35.8 percent to 30.0 percent, and the population grew by 16.3 percent. No data are available for Fernley until 1996, and the community did not incorporate until 2001. Between 2000 and 2009, the proportion of the population living in Fallon increased to 33.4 percent, while the population of Fallon increased by 22.2 percent, as compared to Fernley, in which the proportion of county residents increased from 24.8 percent to 35.2 percent and the population grew by 121.3 percent (Nevada State Demographer's Office 2011; US Census Bureau 2000).

Table 3.19-3 presents 1990, 2000, and 2010 housing data for the four planning area counties, as well as for Nevada. Lyon County had the greatest increase, at 57.9 percent, in the number of housing units added between 2000 and 2010 and is the only county with a housing increase greater than the state average. As a whole, from 2000 to 2010, Nevada increased its housing supply by 346,357 units. Data for persons per household in 2010 are not yet available from the US Census Bureau, but data for 1990 and 2000 show that, despite the growth in the number of housing units in most of the planning area counties between 1990 and 2000, the average number of persons per household increased in Churchill, Lyon, and Washoe Counties, as well as statewide.

In each of the population centers in the planning area, the increase in the number of housing units exceeded the county average, except for Wadsworth and Silver Springs. Vacancy rates in the population centers in the planning area were much higher than those of their counties in both 2000 and 2010, except for Fernley, which had a lower vacancy rate than Lyon County in 2010. Between those years, the vacancy rates increased in each of the county population centers, as well as in most counties and the state. The number of persons per household increased in each of these population centers between 1990 and 2000, except Fernley.

Table 3.19-2 County Population Estimates for 2006 and Projections for 2010-2025

County	2009	2000-2009 Percent Change	2015	2020	2025	2030	2009-2030 Change	2009-2030 Percent Change
Churchill	26,859	12.0	26,715	26,648	26,522	27,085	226	0.8
Lyon	53,825	56.0	52,269	51,610	52,720	55,076	1,251	2.3
Storey	4,317	27.0	4,063	4,008	4,090	4,240	-77	-1.8
Washoe*	416,632	22.7	399,936	392,543	399,513	412,190	-4,442	-1.1
Nevada*	2,711,205	35.7	2,656,987	2,627,407	2,659,161	2,725,233	14,028	0.5

Sources: Nevada State Demographer's Office 2010 and 2011; US Census Bureau 2000
*These population values are based on low job growth projections in order to provide a conservative estimate.

Table 3.19-3 County Housing Estimates 1990-2010

	1990			2000			2010	
County-City	Persons per Household	Housing Units	Vacancy Rate	Persons per Household	Housing Units	Vacancy Rate	Housing Units Percent Change	
Churchill	2.62	9,732	2.6%	2.64	10,826	10.7%	11.2	
-Fallon	2.39	3,336	9.95%	2.45	3,979	11.7%	19.3	
Lyon	2.58	14,279	3.1%	2.61	22,547	12.1%	57.9	
-Fernley	2.75	3,432	8.19%	2.71	7,975	11.6%	132.4	

-Silver -Springs	2.48	1,935	8.73%	2.59	2,456	13.4%	26.9
Storey	2.44	1,596	4.1%	2.32	1,990	12.5%	24.7
Washoe	2.43	143,908	2.0%	2.53	184,841	11.6%	28.4
-Wadsworth	2.42	360	8.89%	2.69	350	35.4%	-2.8
Nevada	2.52	827,457	2.3%	2.64	1,173,814	14.3%	41.9

Source: US Census Bureau 1990, 2000, 2010a

As shown in Table 3.19-4, between 1990 and 2000, median housing values in Lyon County and its population centers increased by more than the state average. However, only Washoe County's median housing value of $161,600 in 2000 was higher than the state average of $142,000. Churchill County had the lowest county housing value, but Wadsworth in Washoe County was the population center with the lowest housing value, followed by Fallon. Five-year estimates from 2005 to 2009 indicated more recent further increases in housing values, with the greatest increases statewide and in Washoe and Storey Counties.

Table 3.19-4 Median Housing Values 1990-200

County	1990	2000	Percent Change 1990-2000	2005-2009 Estimates	Percent Change 2000-2005/2009 Estimates
Churchill	$84,500	$117,100	38.58	$189,800	62.08
Fallon	$72,900	$96,000	31.69	$159,400	66.04
Lyon	$74,900	$119,200	59.15	$198,200	66.28
Fernley	$75,400	$123,200	63.40	$214,700	74.27
Silver Springs	$65,200	$103,400	58.59	$125,100	20.99
Storey	$99,500	$134,800	35.48	$236,600	75.52
Washoe	$111,200	$161,600	45.32	$319,500	97.71
Wadsworth	$64,600	$92,500	43.19	$139,100	50.38
Nevada	$95,700	$142,000	48.38	$275,300	93.87

Source: US Census Bureau 1990, 2000, 2009

According to the Churchill County Master Plan, housing affordability has not changed substantially, with approximately 24.6 percent of renters and 16.5 percent of owners paying more than 30 percent of their income on housing, which is lower than the state average. The percentage of owner occupancy is higher in unincorporated Churchill County than in Fallon. Housing in the city of Fallon is mostly renter occupied due to the high percentage of military households and a lack of infrastructure in more rural areas to support high-density residential development. Churchill County anticipates that there would be enough land to support 20-year population growth forecasts but that planning will be required to ensure that growth occurs in concert with the county's rural character (Churchill County 2010).

Lyon County is grappling with accommodating rapid population growth while preserving small town and rural settings. The provision of adequate infrastructure, services, and water also are issues that are affecting Lyon County (Lyon County 2007).

In Storey County, factors that could influence population growth and housing demand include industrial growth along US Highway 50 and I-80 and in-migration from Washoe County, Carson City, and California, as these areas continue to grow. A major limiting factor of increased residential development is water availability (Storey County, undated).

At the time of the Washoe County Comprehensive Plan, unincorporated Washoe County had a higher number of persons per household than the major population center of Reno-Sparks and the lowest occupancy rate, and single-family housing was the most common housing type. Although water availability also is a constraint to intense residential development in many areas of Washoe County, the plan anticipates that sufficient land would be available to accommodate future population growth and housing demand (Washoe County 1999).

3.18.2 Schools

This section identifies school and student enrollment within the planning area, which is an indicator of the location of children within the planning area.

The school districts of all four counties provided K-12 education for 80,124 students during the 2008-2009 school year, most of which were from Washoe County (82.9 percent). Storey County had the lowest percentage of the total planning area enrollment (0.5 percent; National Center for Education Statistics [NCES] 2011). US Census estimates from 2005 to 2009 of school enrollment indicate that Washoe County had the greatest population aged three years and older enrolled in school (104,074), while Storey County had the highest percentage of the age groups between 5 and 17 years enrolled (100 percent). Because of its small populations, Storey County also had the fewest people over the age of three years enrolled in school (899). In all four of the planning area counties, the age group between 10 and 14 years had the highest enrollment (US Census 2009).

3.18.3 Employment

Table 3.19-5 provides basic data on employment in the four planning area counties. Total employment for all of the counties in 2010 was estimated at 221,408 jobs, with an average unemployment rate of 14.5 percent, which is slightly lower than the state average. Of the planning area counties, Lyon County had the highest unemployment rate (19.7 percent), while Washoe County had the lowest unemployment rate (14.1 percent; Bureau of Labor Statistics [BLS] 2011).

Table 3.19-5 County Employment Statistics (2010)

County	Employed	Unemployed	Unemployment Rate
Churchill	11,627	1,526	11.6%
Lyon	18,330	4,485	19.7%
Storey	2,101	355	14.5%
Washoe	189,350	31,189	14.1%
Total Planning Area	221,408	37,555	14.5%
Nevada	1,149,537	200,772	14.9%

Source: BLS 2011

Table 3.19-6 provides a breakdown of the planning area counties' employment by sector and average sector growth between 2001 and 2009. On average, the categories with the largest number of jobs included government and government services, manufacturing, construction, retail trade, and other services. The largest overall growth sectors included finance and insurance, real estate and rental and leasing, and other services. Some industries that saw anomalous increases were transportation and warehousing in Churchill County, forestry, fishing, related activities and other in Lyon County, and manufacturing in Storey County. Some of the largest percentage declines in employment occurred in manufacturing in Churchill County; construction, utilities, and wholesale trade in Lyon County; and utilities, construction, forestry, and information in Washoe County. On average, in the planning area, most employment was in manufacturing in Churchill County; construction, utilities, and wholesale trade in Lyon County; and utilities, construction, forestry, and information in Washoe County. On average in the planning area, most employment occurred in government and government services, transportation and warehousing, and retail trade; however, the data for several industry sectors are not shown to avoid disclosing confidential information or because a sector provides fewer than 10 jobs (Bureau of Economic Analysis [BEA] 2011a).

As of the third quarter of 2010, the largest employers in Churchill County were the Churchill County School District, Churchill Community Hospital, Wal-Mart Supercenter, Churchill County, L-3 Vertex Aerospace, and the Department of Defense. Major Lyon County employers were Lyon County School District, Amazon.Com, NVDC, Inc., Lyon County, Wal-Mart Supercenter, and MSC Industrial Supply Company. (Nevada Department of Employment, Training, and Rehabilitation [DETR] 2011). Occupational data are not available for Churchill and Lyon Counties, so the DETR has compiled data for the Balance of State Metropolitan Statistical Areas (MSA), which is not associated with a particular business center, as a proxy for Churchill and Lyon Counties. The fastest growing occupations in the balance of state MSA are woodworkers, physical therapist assistants and physical therapists, roofers, and pest control workers (DETR 2008).

The major employers in Storey County are Wal-Mart Stores, Inc., Petsmart, Inc., First National Collection Bureau, Kal Kan Foods, Inc., James Hardie Building Products, Inc., and Storey County. The major employers in Washoe County are the Washoe County School District, University of Nevada-Reno, Washoe County, Renown Regional Medical Center, Peppermill Hotel Casino Reno, and International Game Technology (DETR 2011). Occupational data are not available for Storey and Washoe Counties, so the DETR has used data from the Reno MSA to approximate conditions in these two counties. Cabinet makers and bench carpenters, network systems and data communications analysts, physician assistants, tile and marble setters, and home health aides are the fastest growing occupations in the Reno MSA (DETR 2008).

3.18.4 Payment in Lieu of Taxes

Reclamation provides payment in lieu of taxes (PILT) to local governments to help offset losses in property taxes due to nontaxable federal lands. Taxes, including PILT, are the primary revenue for local police and fire protection, roads, and other infrastructure. The formula used to compute the payments is based on population, receipt sharing payments,

Table 3.19-6 Employment by Sector and Average Sector Growth (2001-2009)

Sector (Total Percent Change)	Churchill		Lyon		Storey		Washoe	
	Percent Employed 2009	Percent Change 2001-2009	Percent Employed 2009	Percent Change 2001-2009	Percent Employed 2009	Percent Change 2001-2009	Percent Employed 2009	Percent Change 2001-2009
Total employment		35.3		20.7		118.3		9.0
Wage and salary employment	43.3	-1.6	70.7	11.0	83.5	142.1	76.3	-2.0
Proprietors employment	56.7	89.7	29.3	53.2	16.5	45.9	23.7	70.3
Farm employment	3.2	-10.6	4.1	0.4	0.0	0.0	0.2	-20.8
Nonfarm employment	96.8	37.6	95.9	21.7	100.0	118.3	99.8	9.0
Private employment	83.5	48.8	81.7	19.6	92.3	128.6	88.6	7.9
Forestry, fishing, related activities, and other	(D)	(D)	1.2	105.1	(D)	(D)	0.1	-21.4
Mining	(D)	(D)	1.2	25.0	(D)	(D)	0.6	68.7
Utilities	0.5	27.7	0.4	-20.8	(D)	(D)	0.2	-41.1
Construction	6.1	58.2	5.7	-28.2	3.5	(D)	5.6	-23.0
Manufacturing	2.2	-30.9	12.6	0.1	9.8	104.8	4.7	-15.9
Wholesale trade	1.8	29.8	3.6	-14.8	(D)	(D)	4.1	-11.2
Retail trade	7.5	-5.3	14.0	8.5	(D)	(D)	10.5	7.8
Transportation and warehousing	4.4	145.9	2.5	24.7	41.4	(D)	4.5	13.4

Sector (Total Percent Change)	Churchill		Lyon		Storey		Washoe	
	Percent Employed 2009	Percent Change 2001-2009	Percent Employed 2009	Percent Change 2001-2009	Percent Employed 2009	Percent Change 2001-2009	Percent Employed 2009	Percent Change 2001-2009
Information	1.3	81.1	0.5	50.9	(D)	(D)	1.3	-17.5
Finance and insurance	8.9	136.3	3.3	140.7	(D)	(D)	6.7	55.5
Real estate and rental and leasing	10.8	113.7	5.7	103.8	(D)	(D)	6.6	80.1
Professional and technical services	6.1	(D)	4.4	(D)	2.8	56.5	6.4	20.8
Management of companies and enterprises	0.2	(D)	0.4	(D)	(D)	(D)	1.5	86.4
Administrative and waste services	5.8	-6.7	4.2	64.6	(D)	(D)	6.0	15.0
Educational services	1.1	(D)	(D)	(D)	(D)	(D)	1.1	81.1
Health care and social assistance	7.0	(D)	(D)	(D)	(D)	(D)	9.0	26.5
Arts, entertainment, and recreation	6.4	42.7	5.7	51.4	3.2	54.9	3.3	0.5
Accommodation and food services	4.4	38.1	4.4	64.1	4.2	2.1	11.6	-18.6
Other services, except public administration	7.2	84.1	6.2	10.0	6.2	154.8	4.6	21.5

Sector (Total Percent Change)	Churchill		Lyon		Storey		Washoe	
	Percent Employed 2009	Percent Change 2001-2009	Percent Employed 2009	Percent Change 2001-2009	Percent Employed 2009	Percent Change 2001-2009	Percent Employed 2009	Percent Change 2001-2009
Government and government enterprises	13.3	-6.2	14.2	35.6	7.7	42.2	11.2	18.7
Federal, civilian	2.7	-11.6	0.5	14.1	(D)	(D)	1.4	13.8
Military	4.1	-14.6	0.7	74.6	0.3	(D)	0.4	39.9
State and local	6.6	2.6	13.0	34.8	7.3	42.9	9.4	18.7
State government	0.5	(D)	0.5	(D)	(D)	(D)	3.2	29.3
Local government	6.0	(D)	12.5	(D)	(D)	(D)	6.2	13.9

Source: BEA 2011a
D = Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.
L = Fewer than 10 jobs, but the estimates for this item are included in the totals.

Table 3.19-7 Bureau of Reclamation PILT 1

County	2000 PILT Acres	2000 PILT Payments (All Agencies)	2010 PILT Acres	2010 PILT Payments (All Agencies)	Percent Change in Reclamation PILT Acres 2000-2010	Percent Change in PILT Payments (All Agencies) 2000-2010
Churchill	8,346	$649,397	8,339	$2,088,531	-0.08	221.61
Lyon	24,894	$680,934	24,894	$1,896,456	0.00	178.51
Storey	428	$10,095	399	$34,790	-6.78	244.63
Washoe	406	$1,054,639	406	$3,197,884	0.00	203.22

Total	34,074	$2,395,065	34,038	$7,217,661	-0.11	201.36
Nevada	88,075	$7,604,840	108,599	$22,753,204	23.30	199.19

Source: US Department of Interior 2011

and the amount of federal land in an affected county. Table 3.19-7 shows the acres on which Reclamation's PILT is based and the total dollar value of PILT from all agencies in the planning area.

In the planning area, Lyon County had the greatest area subject to PILT by the Bureau of Reclamation. Between 2000 and 2010, Reclamation PILT acres decreased in Churchill and Storey Counties, whereas total PILT payments from all agencies increased for all of the planning area counties. Most PILT are derived from the BLM in Nevada, and federal land in the planning area increased by 0.38 percent (22,624 acres) between 2000 and 2010 (US Department of Interior 2011).

3.18.5 Environmental Justice

The most current data (not projected) for race (white, black, American Indian, Eskimo, or Aleutian Islander, and Asian or Pacific Islander) and ethnicity (Hispanic) are available for 2010 from the US Census Bureau (Table 3.19-8). According to the US Census data, the white population was the highest in all four planning area counties. The largest minority in these counties was Hispanic, and the largest percentage racial minority was Asian, followed by black. In absolute terms, the Asian population in Washoe County was the largest racial minority group in the planning area. The smallest minority group represented in the planning area was the Native Hawaiian and Other Pacific Islander population, which, on average, constituted 0.5 percent of planning area population (US Census Bureau 2010a).

Table 3.19-8 Total Percentage of Population by Race/Ethnicity (2010)

Location	White, not of Hispanic Origin	Black, not of Hispanic Origin	American Indian, and Alaska Native, not of Hispanic Origin	Asian, not of Hispanic Origin	Native Hawaiian and Other Pacific Islander, not of Hispanic Origin	Other Race or Two or More Races, not of Hispanic Origin	Hispanic Origin, Any Race
State of Nevada	54.14	7.70	0.87	7.07	0.57	3.11	26.53
Churchill County	76.50	1.47	3.98	2.54	0.16	3.24	12.10
Lyon County	78.17	0.70	2.04	1.35	0.24	2.74	14.76
Storey County	88.08	1.00	1.42	1.65	0.30	1.87	5.69
Washoe County	66.02	2.16	1.37	5.05	0.56	2.60	22.24

Average of Counties	67.97	1.96	1.57	4.52	0.50	2.64	20.83

Source: US Census Bureau 2010a

Table 3.19-9 provides income statistics for the planning area counties and for Nevada in 2009. The planning area's average median household income of $52,622, as well as the median household incomes for Storey and Washoe Counties, was slightly lower than that of the state, at $53,310. Only Storey County's median household income exceeded the state average. However, per capita personal income in both Churchill and Washoe Counties was above the average for the state. The poverty level for a family with two children for 2009 was established as an income of $21,756 or less (US Census Bureau 2010b). Poverty levels throughout the planning area, except for Washoe County (at 13.2 percent), were lower than the state average of 12.4 percent. Storey County's percentage in poverty (9.1 percent) was the lowest in the planning area (BEA 2011b; US Census Bureau 2010b).

Table 3.19-1 Income and Poverty Statistics (2009)

County	Median Household Income	Per Capita Income	Percentage of Population Living in Poverty
Nevada	$53,310	$37,670	12.4
Churchill	$52,055	$38,032	10.0
Lyon	$51,151	$27,300	10.2
Storey	$54,246	$32,245	9.1
Washoe	$53,036	$42,499	13.2
Average Total	$52,622	$35,019	10.6

Sources: BEA 2011b; US Census Bureau 2010b