Chapter 8 Air Quality

Chapter 8 Air Quality

Introduction

This section describes the affected environment for air quality and the potential impacts on air quality that would result from the acquisition alternatives and the No Action Alternative.

The major air quality issue related to the acquisition alternatives and No Action Alternative would be fugitive dust generated from winds over the exposed lakebed of Walker Lake and newly retired farmland in the Walker River Basin. Windblown dust in Mineral County from the No Action Alternative and Lyon County from the implementation of the acquisition alternatives would represent an adverse impact on regional air quality. The degree of impact for each alternative depends on the level of funding for acquisitions and subsequent amount of land retired from agriculture and amount of water delivered to the lake.

Sources of Information

The key sources of data and information used in the preparation of this chapter are listed below. Full references can be found in Chapter 17, References.

- EPA, Region 9 Air Plan Actions (U.S. Environmental Protection Agency 2009)
- EPA Monitor Value Reports—Criteria Air Pollutants (U.S. Environmental Protection Agency 2008)
- Nevada Bureau of Air Quality Planning (2003)
- Great Basin Unified Air Pollution Control District (2008)

Affected Environment

This section describes the environmental setting related to air quality in the study area. Although the project area is the entire Nevada portion of the Walker River Basin (Chapter 1), the study area for the analysis of air quality impacts includes only Lyon and Mineral Counties in Nevada. However, because air pollution may cross county lines and there is no pollutant monitoring within the study area, background information is obtained from beyond the study area.

Nevada Bureau of Air Quality Planning (BAQP) has jurisdiction over air quality issues in Nevada. It administers air quality regulations developed at the federal, state, and local levels. Applicable federal, state, and local air quality regulations are described in Appendix 1D.

Local Meteorology and Climate Conditions

Climate and weather affect air quality conditions. In particular, precipitation, temperature, and wind influence the potential formation of dust storms. According to historic climate information from the National Weather Service, there are weather monitoring stations in the study area, in Yerington and Hawthorne (Figure 8-1). There is also a weather monitoring station at Bridgeport, California. Precipitation and temperature data for the study area are presented in Chapter 15, Climate and Climate Change. Wind data are presented below.

Wind Patterns

Walker River Basin topography has a dominating effect on wind patterns. Winds tend to blow somewhat parallel to the valley and mountain range orientation. In spring and early summer, thermal low-pressure systems develop over the interior basins east of the Sierra Nevada, and the Pacific high pressure cells move northward. These developments and the study area topography produce the high incidence of relatively strong northwesterly winds in the spring and early summer (Lopes et al. 2007).

Wind speed and direction data indicate that, during the summer, winds usually originate at the north end of the basin and flow southeasterly through the valleys. Wind speed and direction data indicate that, during the winter, winds occasionally originate from the west end of the basin and flow in a west-northwesterly direction. Steady winds are typical in the mountainous area.

National Weather Service operates wind monitoring stations in Hawthorne and Yerington. The prevailing wind directions at Hawthorne are from the west-northwest and north, although the station does experience southerly winds during the spring and summer. The prevailing wind direction at Yerington is from the west-southwest. The average annual wind speeds at the Yerington and Hawthorne stations are 2.9 and 7.4 mph, respectively (Western Regional Climate Center 2008). Thermal inversions are a regular occurrence in the desert southwest. Inversions can occur on any given day but are most common in the winter, evenings, and mornings. Inversions are affected by dry weather, changing air temperature, and changing ground temperature.

During 2008, the highest sustained wind speed at the Hawthorne Monitoring Station was recorded at 50 mph from the southwest, and the highest instantaneous wind gust speed of 71 mph was recorded from the west-southwest (Weather Underground 2009a). During 2008, the highest sustained wind speed at the Yerington Monitoring Station was 38.6 mph from the south-southeast, with a wind gust of 52.5 mph from the south. The prevailing wind direction over the entire year was from the west-northwest for Hawthorne and from the southwest for Yerington. Wind speeds are typically light, with most of the measurements below 10 mph. Data from the Yerington Mine site indicate that winds tend to

Note: The Mason Valley Wildlife Management Area (WMA) has increased in size since this figure was created, but the additional acres are not included in the USGS database that was used to create this figure. See Figure 7-2 for a more accurate depiction of the WMA boundaries.

In addition, the number of acres in agriculture changes from year to year, and the acreages shown here are a snapshot in time for general reference only.

SHOE

STOREY

CHURCHILL

LYON

CARSON CITY

Walker River

Yerington

Mason Valley

Walker River Indian Reservation

Schurz

DOUGLAS

Smith Valley

East Walker River

West Walker River

Smith

MINERAL

Walker Lake

Antelope Valley

Hawthorne Army Depot

Hawthorne

NEVADA

CALIFORNIA

ESMERALDA

Legend

- Weather Monitoring Stations
- Cities / Towns
- Rivers
- Study Area
- County Boundaries
- Project Area
- Toiyabe National Forest Boundary

Owner

- Bureau of Land Management
- Lakes / Reservoirs
- U.S. Department of Defense
- Tribal Land
- State of Nevada Lands
- Private
- U.S. Forest Service

Source: ICF Jones & Stokes 2008

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Miles

Figure 8-1
Weather Monitoring Stations within the Study Area

blow from the southwest or northeast, with a predominant southwest wind during high wind episodes (Atlantic Richfield Company 2008).

Table 8-1 presents a summary of wind speed and wind direction during 2008 for both the Walker Lake-Hawthorne Monitoring Site, located in Hawthorne at U.S. Highway 95 and operated by MesoWest under contract with the State of Nevada Department of Transportation; and the Yerington Monitoring Site, located north of U.S. Highway 95 on the Alpaca Mining Company property. Table 8-2 presents the summary of wind speed occurrence at both sites (Weather Underground 2009b).

Table 8-1. Wind Speeds and Direction in Study Area for 2008

Location	Maximum Wind Speed (mph) (Wind Direction)	Maximum Wind Gust (mph) (Wind Direction)	Average Wind Speed (mph)	Prevailing Wind Direction
Hawthorne	50.0 (SW)	71.0 (WSW)	6.8	WNW
Yerington	38.6 (SSE)	52.5 (S)	2.9	SW

Source: Weather Station Histories for MWLKNV station (Weather Underground 2009a) and KNVYERIN2 station (Weather Underground 2009b).

Table 8-2. Wind Speed Frequencies in Study Area

	Walker Lake – Hawthorne	Yerington – Lyon County	
Wind Speed Value Category (mph)	2008 Data (days)	2007 Data (days)	2008 Data (days)
≤ 10	148	81	56
11–15	100	124	120
16–21	60	67	118
22–29	45	27	44
30–49	9	13	18
≥ 50	3	1	1

Source: Weather Station Histories for MWLKNV station (Weather Underground 2009a) and KNVYERIN2 station (Weather Underground 2009b).

Note: Walker Lake-Hawthorne wind data only available for 2008.

Windblown dust in the Great Basin area is a significant air pollution concern. Long-term water diversions have led the alkaline, and now almost dry, Owens Lake to become the largest single source of windblown dust in the United States. Winds in the area often exceed 40 mph at a 33-foot height, which has led to particulate matter greater than 10 microns in size (PM10) concentrations often 80 times higher than National Ambient Air Quality Standards [NAAQS]), and the highest concentrations are up to 133 times the NAAQS. Annual PM10 emissions caused by wind erosion of the Owens Lake bed are estimated at 76,000 tons per year (Great Basin Unified Air Pollution Control District 2008). Similarly, water diversion has led to similar wind erosion problems from Mono Lake, which has had 33 PM10 violations since 2005 (California Air Resources Board 2008).

Walker Lake elevations have declined approximately 150 feet over the past 126 years, and the receding lake elevation has exposed outer portions of the lakebed making them susceptible to windblown dust. The drying of the shoreline at Walker Lake mimics the wind erosion and dust emissions conditions described above for Owens and Mono Lakes.

Soil Conditions

Because of the relatively low precipitation in the Walker River Basin, particularly in the lower elevations, direct precipitation contributes only sporadically to soil moisture. Groundwater conditions, agricultural irrigation, and proximity to surface water are the dominant influences on soil and sediment moisture conditions. The generally warm to hot air temperatures, along with low humidity and moderate winds, mean that soil surfaces are typically dry.

Soils determine the susceptibility of land to wind erosion (Western Regional Air Partnership 2006). For Lyon County, Table 8-3 shows the major soil associations that occur on irrigated lands in Mason Valley, Smith Valley, and East Walker Valley. Figure 8-2 shows the distribution of soil associations in the area. Most of the soil associations in Lyon County contain at least one soil series with high susceptibility to wind erosion.

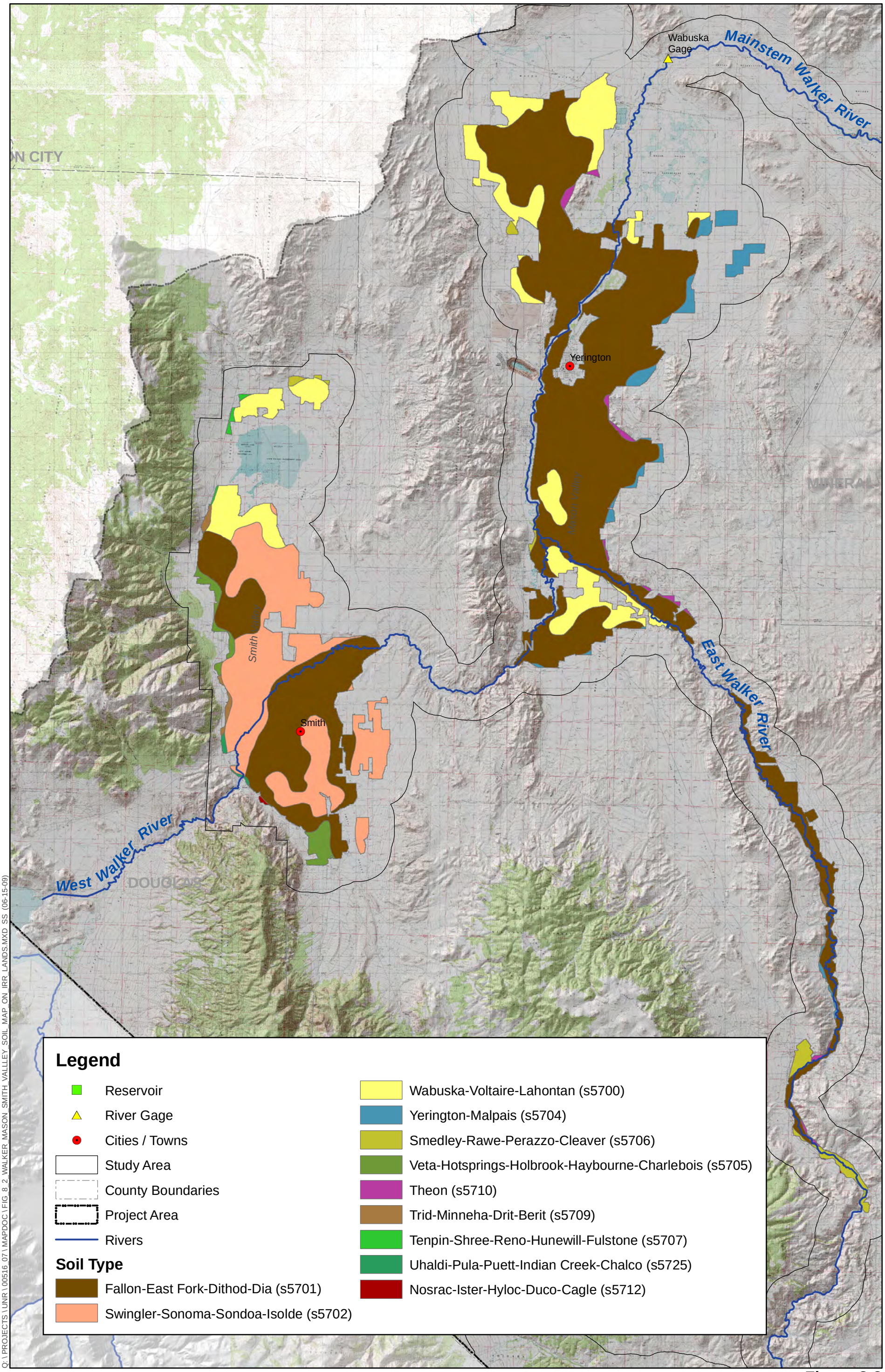

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Figure 8-2
Major Soil Associations Occuring on Irrigated Land in Lyon County Portion of Study Area

Table 8-3. Major Soil Associations of Irrigated Land in Lyon County Portion of Study Area

Soil Association	Predominant Soils	Drainage Class	Permeability	Wind Erodibility Group[a]
Fallon-East Fork-Dithod-Dia (s5701)	East Fork, Dithod, Fallon, Appian	Primarily somewhat poorly drained	Moderately slow to moderately rapid	Primarily 5–6, but Fallon and Appian soils are more erodible (1–3)
Swingler-Sonoma-Sondoa-Isolde (s5702)[c]	Sondoa, Sonoma, Isolde, Swingler	Varied	Primarily moderately slow	1–4[b]
Wabuska-Voltaire-Lahontan (s5700)	Lahontan, Voltaire, Wabuska	Poorly drained	Slow	Primarily 4[b]
Yerington-Malpais (s5704)	Yerington, Malpais	Well drained	Moderately rapid	2–4
Smedley-Rawe-Perazzo-Cleaver (s5706)	Cleaver, Rawe, Perazzo, Smedley	Well drained	Slow	Greatly varied[b]
Veta-Hotsprings-Holbrook-Haybourne-Charlebois (s5705)	Veta, Holbrook, Hotsprings, Haybourne, Charlebois	Well drained	Moderate to rapid	Varied but mainly 4–6

Notes: Data based on compilation of information in Archer 1984, McKay pers. comm. 2008, and Natural Resources Conservation Service (2006b—g) data.

Map units listed according to relative extent in the study area.
Descriptions based on average characteristics.

[a] Wind erodibility groups are soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. Group 1 is most susceptible to wind erosion and Group 8 least.

[b] Data not found for some units.

[c] Natural Resources Conservation Service 2006 data unavailable.

In Mineral County, the main soil of interest is Typic Torriorthents, 4 to 15% slopes, because of its exposure to wind erosion caused by the receding Walker Lake elevation. This soil is in Wind Erodibility Group 3 and therefore is susceptible to wind erosion (Natural Resource Conservation Service 2006a).

Existing Air Quality Conditions

Douglas, Lyon, and Mineral Counties in Nevada are each currently in attainment or are unclassified for air quality. However, dust and sand storms occur on a regular basis throughout the year within the study area (Atlantic Richfield Company 2008). While outside of the study area, portions of Mono County, within the Great Basin Valleys Air Basin of California, are included for comparative purposes because these areas illustrate the impact of increasing the amount of erodible soils in a windy landscape. Portions of the Great Basin Valley

are considered nonattainment areas for PM10, largely as a result of windblown dust from the exposed lakebeds of Mono and Owens Lake during high wind events. The Owens Lake, Mono Basin, Coco Junction, and Mammoth Lakes areas have PM10 attainment plans in place.

Nevada operates a series of air quality monitoring stations near large population centers. In addition, air quality monitoring occurs at and adjacent to the Anaconda Mine site, located just west of the town of Yerington, in Weed Heights, and operated by the Atlantic Richfield Company. There are PM10 air pollutant monitoring stations at Mono Lake and Lee Vining, in Mono County, California, south of the study area. These stations are operated by the California Air Resources Board (CARB). There are air pollutant monitoring stations in Reno and Sparks, in Washoe County, north of the study area, operated by BAQP. Air pollution monitoring also occurred in the town of Fallon from 1993 to 1998 (Nevada Bureau of Air Quality Planning 2003).

Table 8-4 provides an indication of ambient air quality conditions in the vicinity of the study area. Only the Yerington Mine site is within the actual study area boundaries. Air monitoring data from outside of the study area, but within the Great Basin vicinity, is presented to provide an indication of the background air quality in the region. For example, air monitoring data from Mono Lake is representative of the potential fugitive dust (PM10) consequences of a drying lake bed. Air pollutant monitoring data collected at these nearby monitoring stations is presented for the years 2005 through 2008.

Table 8-4. Ambient Air Pollutant Concentrations Monitored in the Vicinity of Study Area

Pollutant Standards	**2005**	**2006**	**2007**	**2008**
Ozone—Carson City E. Long Street				
Maximum 1-hour concentration (ppm)	0.072	0.086	0.080	0.106[1]
Maximum 8-hour concentration (ppm)	0.066	0.075	0.072	0.079
Number of Days Standard Exceeded				
AAQS (1-hour) > 0.12 ppm	8	0	0	0
AAQS (8-hour) > 0.075 ppm	5	0	0	3
Particulate Matter (PM10) – Yerington Mine Site[3]				
Maximum 24-hour concentration ($\mu g/m^3$)	60.8	38.25	165.6	NA
Maximum 1-hour concentration ($\mu g/m^3$)	435[2]	918[2]	1,200	NA
Number of Days Standard Exceeded				
AAQS (24-hour) > 150 $\mu g/m^3$	0	0	1	NA
Particulate Matter (PM10) –Mono Lake North Shore				
Maximum 24-hour concentration ($\mu g/m^3$)	2,108	4,300	10,020	2,769

Pollutant Standards	2005	2006	2007	2008
Second-highest 24-hour concentration	1,245	1,915	2,736	2,563
Annual average concentration (μg/m^3)	83.5	93.2	137.0	69.0
Number of Days Standard Exceeded				
AAQS (24-hour) > 150 μg/m^3	14	16	14	7
Particulate Matter (PM10) –Lee Vining				
Maximum 24-hour concentration (μg/m^3)	30	95	46	78
Second-highest 24-hour concentration	30	44	35	66
Annual average concentration (μg/m^3)	11.1	11.1	11.5	15
Number of Days Standard Exceeded				
AAQS (24-hour) > 150 μg/m^3	0	0	0	0
Particulate Matter (PM2.5) –Reno- A Street				
Maximum 24-hour concentration (μg/m^3)	64	29	27	115
Annual average concentration (μg/m^3)	9.0	7.7	8.0	10.5
Number of Days Standard Exceeded				
AAQS (24-hour) > 35 μg/m^3	0	0	0	1
AAQS (annual) > 15 μg/m^3 exceeded?	No	No	No	No
Carbon Monoxide (CO)—Reno A Street				
Maximum 8-hour concentration (ppm)	3.0	2.9	2.2	1.3
Maximum 1-hour concentration (ppm)	4.3	3.6	3.7	2.1
Number of Days Standard Exceeded				
Carbon Monoxide (CO)—Sparks 4th Street				
Maximum 8-hour concentration (ppm)	3.3	3.5	3.2	2.1
Maximum 1-hour concentration (ppm)	4.5	4.9	4.7	4.2
Number of Days Standard Exceeded				
National AAQS (1-hour) ≥ 35 ppm	0	0	0	0
Nevada AAQS (8-hour) ≥ 9.0 ppm	0	0	0	0
Nevada AAQS (1-hour) ≥ 20 ppm	0	0	0	0

Pollutant Standards	2005	2006	2007	2008
[1] 2008 Ozone monitoring data is from Carson City—3300 East Fifth St (City Yard)				
[2] 2005 and 2006 1-hour Yerington Mine Site PM data was adjusted from 24-hour data				
[3] Air pollution monitoring was conducted by the Atlantic Richfield Company				
ppm parts per million				
AAQS ambient air quality standards				
$\mu g/m^3$ micrograms per cubic meter				
mg/m^3 milligrams per cubic meter				
> greater than				
$\geq$ equal to or greater than				
Sources: U.S. Environmental Protection Agency 2009 and Atlantic Richfield Company 2008.				

Air pollution monitoring at the Fallon – West End School monitoring station indicate that from 1993 through1998, PM10 did not exceed NAAQS, which led EPA to discontinue monitoring at this site (Churchill County 2005). Air pollution monitoring from the Yerington Mine site indicate that from 2005 to 2007, only once did the maximum 24-hour PM10 concentration exceed NAAQS. However, residents in the vicinity of the site have reported approximately five episodes per year of significant amounts of airborne dust. The primary mechanism for these dust events is wind erosion. However, not every high wind episode resulted in a dust event, suggesting that other factors also contribute to dust in the area (Atlantic Richfield Company 2008).

Particulate Matter

Suspended particulate matter represents a diverse mixture of solid and liquid material having size, shape, and density characteristics that allow the material to remain suspended in the air for meaningful time periods. The physical and chemical composition of suspended particulate matter is highly variable, resulting in a wide range of public health concerns. Many components of suspended particulate matter are respiratory irritants. Some components (such as crystalline or fibrous minerals) are primarily physical irritants. Other components are chemical irritants (e.g., sulfates, nitrates, and various organic chemicals). Suspended particulate matter also can contain compounds (such as heavy metals and various organic compounds) that are systemic toxins or necrotic agents. Suspended particulate matter or compounds adsorbed on the surface of particles also can be carcinogenic or mutagenic chemicals.

Current federal and state air quality standards for suspended particulate matter generally are designated as PM10 standards (for inhalable particulate matter) and particulate matter smaller than 2.5 microns in size (PM2.5) standards (for fine particulate matter). Public health concerns focus on the particle size ranges likely

to reach the lower respiratory tract or the lungs. Inhalable particulate matter (PM10) is likely to reach either the lower respiratory tract or the lungs after being inhaled; fine particulate matter (PM2.5) is likely to penetrate to the lungs. Particles larger than 2.5 microns are referred to as the coarse fraction and those 2.5 microns and smaller are referred to as the fine fraction. Coarse particles (10 microns and less) come from a variety of sources, including geological (e.g., windblown fugitive dust), general mechanical operations (e.g., automobile tire wear), industrial processes (e.g., cutting and grinding), and the resuspension of particles from the ground or road surfaces by wind and human activities.

In contrast, particles smaller than 2.5 microns are derived mostly from fuel combustion sources, such as automobiles, trucks, and other vehicle exhaust, and from stationary combustion sources, such as power plants. These fine particulates are directly emitted or are formed in the atmosphere from gases that are emitted.

Particulate matter, in the form of fugitive dust, is the air pollutant of greatest concern in the Walker River Basin. Because most of the available surface water is diverted for human and agricultural uses in most years, Walker Lake elevation is expected to continue to decline and increase the windblown fugitive dust storms that already occur during periods of high winds. As upstream surface water diversions continue, land surfaces that previously were wet or stabilized by vegetation will become increasingly susceptible to deflation (erosion by wind), resulting in more desertification and dust storms at the lake.

Air monitoring at the Yerington Mine site indicates that dust storms are an infrequent by not uncommon occurrence within the area. These dust events primarily occur during high wind episodes, but not every high wind episode results in a dust event. This suggests that other factors, including soil moisture and seasonality, are also factors in producing dust events in the area. Since the Air Pollution Monitoring Program began in 2005, only once has 24-hour PM10 concentration exceeded the NAAQS (Atlantic Richfield Company 2008).

PM10 and fugitive dust sources within the area include mining activities, exposed soils, agricultural activities, and both paved and unpaved road dust.

Health Effects

PM10 and PM2.5 particles are small enough—about one-seventh the thickness of a human hair, or smaller—to be inhaled into and lodge in the deepest parts of the lung, evading the respiratory system's natural defenses. PM10 and PM2.5 can aggravate respiratory disease, and cause lung damage, cancer, and premature death (U.S. Environmental Protection Agency 2003).

Other Effects

In addition to public health effects, suspended particulate matter causes a variety of material damage and nuisance effects: abrasion; corrosion, pitting, and other

chemical reactions on material surfaces; soiling; and transportation hazards resulting from visibility impairment. Non-health-related effects include reduced visibility and soiling of buildings.

Effects on the Environment

The fine particles that are linked to serious health effects are also a major cause of visibility impairment (regional haze) in many national parks. The term regional haze means haze that impairs visibility in all directions over a large area. Regional haze consists of sufficient smoke, dust, moisture, and vapor suspended in air to impair visibility. In the west, haze currently reduces natural visibility from approximately 140 miles to between 33 and 90 miles (U.S. Environmental Protection Agency 2007).

Environmental Consequences

This section describes the impact analysis relating to air quality for the acquisition alternatives and the No Action Alternative. It lists the criteria used to conclude whether an impact would be adverse or beneficial.

Assessment Methods

Impacts were determined by evaluating expected future conditions with each alternative versus the baseline of existing conditions and trends. An alternative's impact is the future direction and magnitude of change from baseline conditions that is attributable to the alternative.

The primary pollutant-generating sources associated with the alternatives analyzed are:

- windblown fugitive dust,
- exhaust emissions from construction equipment and work vehicles, and
- fugitive dust emissions from construction activities for efficiency measures.

The approach to evaluating impacts for each of these sources is described below. Because all acquisitions would occur in the State of Nevada, the impact evaluation did not consider air quality standards specific to California. Only discussions of the impact methodology and significance criteria that are relevant within the State of Nevada are provided below.

Windblown Fugitive Dust

The potential for air quality problems associated with soils exposed on affected agricultural lands and from areas exposed by lowered Walker Lake water

elevation were evaluated qualitatively. This evaluation was based on factors important to wind erosion processes:

- wind speed and wind direction patterns, and
- other meteorological data such as seasonal temperature patterns, seasonal precipitation patterns, and seasonal evaporation rate patterns.

The wind velocity necessary to initiate wind erosion processes depends on the characteristics of exposed soil and sediment materials and the surface moisture content of those materials. Where the surface material is dry and there is no cementing or crusting of the materials, threshold wind velocities depend primarily on particle size and density characteristics. Typical threshold wind speeds are in the range of 15 to 20 mph. Serious dust storm events generally require wind speeds above 20 mph. The World Meteorological Organization (1983) suggests 16 mph as a typical threshold wind speed for "everyday wind erosion" and 22 mph as a typical threshold wind speed for dust storm events. Those thresholds were adopted for this analysis.

Windblown fugitive dust can cause a variety of respiratory health problems, reduce visibility on roadways, add nutrients and sediments to waterways, and damage property.

Vehicle Exhaust Emissions

The potential exists for exhaust emissions from vehicles and construction equipment associated with efficiency measures. The magnitude of these emissions is not known because the extent of future construction activities is not yet known. Therefore, potential air quality impacts from on- and off-road exhaust emission sources are discussed in a qualitative manner.

Construction Fugitive Dust Emissions

Construction activities associated with any efficiency or conservation measures have the potential to result in fugitive dust emissions. The magnitude of construction activities is not yet known. Therefore, potential fugitive dust emissions are discussed in a qualitative manner.

Construction-related dust emissions would vary depending on the level of activity, length of the construction period, specific construction operations, types of equipment, number of personnel, wind and precipitation conditions, and soil moisture content. Despite this variability in construction emissions, a number of feasible control measures can be reasonably implemented to reduce PM10 and PM2.5 emissions during construction. These standard control measures include:

- watering active construction areas as needed or apply a nontoxic soil stabilizer,

- covering trucks hauling loose materials or maintain 2 feet of freeboard,
- applying soil stabilizers to or reclaim or revegetate inactive construction areas that will not undergo further activity for an extended period of time,
- covering or applying soil stabilizers to exposed stock piles, and
- limiting traffic speeds in the construction area and along access roads (Western Regional Air Partnership 2006).

The implementation of standard dust control measures would help to minimize fugitive dust from construction activities. It is assumed that these dust control measures would be implemented as part of any construction activity.

Impact Criteria

For the purposes of this air quality, actions that violate federal standards for criteria pollutants (i.e., primary standards designed to safeguard the health of people considered to be sensitive receptors while outdoors and secondary standards designed to safeguard human welfare) are considered adverse impacts. Additionally, actions that violate state standards developed by BAQP or criteria of EPA General Conformity Rules, including thresholds for criteria pollutants, are considered adverse impacts. Because the study area is currently in attainment and/or unclassified under the EPA, no quantifiable thresholds were established for the alternatives. Impacts are discussed in a qualitative manner.

Impacts on air quality would be considered adverse if the alternative would directly or indirectly:

- produce emissions that would cause or measurably contribute to a violation of state or federal ambient air quality standards, or
- produce fugitive dust emissions that would reduce visibility and may cause human health effects.

Impacts

No Action Alternative

Impact AIR-1: Change in Fugitive Dust Emissions from Declining Lake Elevation and Exposed Walker Lake Bed (Adverse Impact)
The No Action Alternative would allow the Walker Lake elevation to decline further, exposing more submerged lake bed and increasing already occurring windblown dust compared to the acquisition alternatives.

Dust storms and poor visibility events already occur in the study area. High winds combined with periods of dry weather can lead to dust storm events. The prevalence of high winds in Mineral County (Tables 8-1 and 8-2) in combination with little precipitation and the dry lakebed suggests that serious dust storm and

poor visibility events already occur in the Walker Lake area. As mentioned above, soils in the Walker Lake area are susceptible to wind erosion (Wind Erodibility Group 3), and increasing the acreage of exposed erodible lakebed soils would increase the wind erosion during high wind events. In 2008, winds exceeded the threshold for both everyday wind erosion (16 mph) and dust storms (22 mph) 117 and 57 times, respectively (Table 8-2). Given this data for 2008, there is the potential for dust events to occur up to 117 times per year. This, combined with the background dust that already exists in the area during high wind events, could produce emissions that would lead to an exceedance of air quality standards and/or reduce visibility. This would represent an adverse air quality impact.

Under the No Action Alternative there would be no expected direct increase in dust emissions from retired farmland in Lyon County because current levels of irrigation would be expected to persist. However, as noted in Chapter 7, Land Use and Agriculture, agricultural land may be converted to nonagricultural uses in the future. This could result in a short-term increase in fugitive dust emissions from construction activities, and a net decrease in long-term fugitive dust emissions from agricultural operations.

Alternative 1 (Purchase Alternative)

Water rights acquired under Alternative 1 are expected to add an average of 50,000 af/yr of water to Walker Lake. It is possible, however, that less than the average 50,000 af/yr would be provided to the lake either because of funding issues or because there would not be enough willing sellers. With funding of $56 million, it is estimated that the average inflow to the lake would increase by only 7,300 af/yr.

This analysis of Alternative 1 assumes that the Purchase Alternative would be fully funded and that water rights acquired would increase the average inflow to the lake by 50,000 af/yr. Unless otherwise noted, if acquisitions were limited to those achievable only with the funding of $56 million, the impacts would be similar in nature but of lesser magnitude.

Direct Impacts

Impact AIR-1: Change in Fugitive Dust Emissions from Declining Lake Elevations and Exposed Walker Lake Bed (Beneficial Impact with Full Funding / No Impact with Funding of $56 Million)

The Purchase Alternative would change the amount of water that flows into Walker Lake. However, the degree of change would depend on the amount of funding. Full funding to deliver an average of 50,000 af/yr of increased inflow to Walker Lake would increase future lake elevations between an estimated 30 to 35 feet, which would decrease the potential for windblown dust from the exposed lake bed. (See Chapter 3, Water Resources, for details on lake elevations.) This would be a beneficial impact.

With funding of $56 million, inflows to Walker Lake would increase by an average of 7,300 af/yr. In this case, lake elevations would continue to decline, although less than under the No Action Alternative. The amount of exposed lake bed would continue to increase as would the potential for more windblown dust emissions. With funding of $56 million, there would be no benefit to air quality in comparison to current conditions at Walker Lake.

Impact AIR-2: Increase Fugitive Dust as a Result of Reduced Irrigation (Adverse Impact)

The Purchase Alternative would reduce the amount of water applied to irrigated land, which could cause a drying of the land and, potentially, associated canals and drains. Permanently retired lands would increase the amount of vacant land, which could become a potential fugitive dust source during high wind events (Western Regional Air Partnership 2006). Existing crop cover would provide some temporary erosion stabilization, but as the vegetation decomposes the soil protection would cease.

Lands that are left vacant and not converted to other uses could become fugitive dust sources. The wind erosion potential of these vacant lands would depend on the degree of disturbance, as the susceptibility to wind erosion increases as disturbance increases (Western Regional Air Partnership 2006). Windblown fugitive dust can cause a variety of respiratory health problems, reduce visibility on roadways, add nutrients and sediments to waterways, and damage property. As discussed in Chapter 4, Biological Resources—Vegetation and Wetlands, reduced irrigation could also lead to the spread of noxious weeds, which could lead to increased soil erosion and windblown dust erosion.

Current agricultural activities result in the release of fugitive dust as a result of planting, plowing, burning, and off-road vehicle travel (e.g., tractors). Fugitive dust also is related to dirt roads throughout the farmland areas, and to land fallowing that currently occurs in the agricultural areas. However, irrigated crops also tend to suppress dust erosion in wind erosion-prone high desert areas, such as the Walker River Basin (Putnam et al. 2007). Periods of fugitive dust related to agricultural lands vary based on what phase of production the agricultural fields are in.

At this point, it is unknown which lands would be retired. Windblown dust emissions from open (vacant) land can vary depending on the climatic and physical characteristics of the site. There exists the potential for windblown dust emissions from retired lands if they become vacant and are not converted to other nonagricultural uses. The extent of these emissions is not known at this time, but the potential exists if conditions (i.e., disturbed and highly erodible soils) are present. Wind data for the previous 2 years indicate that winds exceeded everyday wind erosion potential on average 145 times per year and exceeded serious dust storm potential on average 52 times per year. Soils in the Mason and Smith Valleys are susceptible to erosion (Figure 8-2 and Table 8-4). Therefore, there is

a potential for dust storm events to occur up to 145 times per year. This could lead to an exceedance of NAAQS and reduce visibility in the area. This would represent an adverse air quality impact.

Alternative 2 (Leasing Alternative)

Because Alternative 2 involves the recurring acquisition of water leases, the actions of Alternative 2 would last only until the funding is exhausted. Assuming that sufficient water is leased to increase inflow to Walker Lake by an average 50,000 af/yr, the funding of $56 million would last an estimated 3 years, while full funding would last an estimated 20 years.

While the air quality impacts associated with Alternative 1 would exist in perpetuity, the air quality impacts associated with Alternative 2 would be temporary and only exist for the period of the leasing program.

Direct Impacts

Impact AIR-1: Change in Fugitive Dust Emissions from Declining Lake Elevation and Exposed Walker Lake Bed (Beneficial Impact with Full Funding / No Impact with Funding of $56 Million)
With full funding of Alternative 2, Walker Lake's surface elevation would increase by approximately 10 to 13 feet and the area of exposed lake bed would decrease accordingly, decreasing the potential for windblown dust. This would be a beneficial impact. After the leasing activity ceases, however, the lake would again decline and environmental benefits would dissipate.

Under Alternative 2 with funding of $56 million for acquisitions, Walker Lake's surface elevation, volume, and surface area would increase only slightly, yielding no substantial benefit compared to existing conditions. Compared to the No Action Alternative, this would temporarily avoid the creation of new wind erosion problem areas at Walker Lake. After approximately 3 years, however, the lake elevation would begin to decline again, exposing additional lake bed to the wind. Similar to the No Action Alternative, this would increase the likelihood of exceeding NAAQS and reducing visibility, but of less magnitude. Therefore, with funding of $56 million there would be no impact.

Impact AIR-2: Increase Fugitive Dust as a Result of Reduced Irrigation (Minor Impact)
Under Alternative 2 with full funding, the impact on air quality from reduced irrigation would be similar to that from Alternative 1, but temporary and of less magnitude. The specific leased lands would vary from year to year, and temporarily fallowed land would be returned to production at the end of the lease. Over a 20-year period this would result in the development of less sparsely vegetated land than under Alternative 1 and the exposure of less bare surface to wind. Further, temporarily fallowing land would act as a dust control measure because reduced agricultural practices would produce less dust emissions and

existing crop cover would provide some temporary erosion stabilization (Western Regional Air Partnership 2006).

Under Alternative 2 with funding of $56 million, the leasing program would last about 3 years. This alternative would result in the creation of little if any sparsely vegetated land. Current vegetation would still act as a dust suppressant. As discussed under Alternative 1, soils in Mason and Smith Valleys are erodible, and any decrease in vegetation and soil moisture as a result of reduced irrigation could lead to increased wind erosion during high wind events on exposed and disturbed soils. This could increase the potential for wind erosion up to 145 times per year (based on 2007 and 2008 data). However, the potential for increased fugitive dust emissions would be temporary and would exist only while the leasing program exists. Therefore, this would most likely be a minor short-term impact under either scenario, and there would be no long-term adverse impact.

Alternative 3 (Efficiency Alternative)

Full implementation of Alternative 3 would yield an average of 32,300 af/yr of new inflow to Walker Lake, and would increase the lake elevation by about 4 to 13 feet.

Unless otherwise noted, the impacts of Alternative 3 would be similar in nature to those of Alternative 1 but of less magnitude. Impacts of Alternative 3 that differ from those of Alternative 1 are discussed below, as are impacts not previously discussed.

Direct Impacts

Impact AIR-1: Change in Fugitive Dust Emissions from Declining Lake Elevations and Exposed Walker Lake Bed (Beneficial Impact)
Impact AIR-2: Increase Fugitive Dust as a Result of Reduced Irrigation (No Impact)
There would be no increase in windblown dust emissions from farmland because no farmland would be retired or fallowed under this alternative. There would be no impact on air quality.

Impact AIR-3: Short-Term Increase in Vehicle Exhaust Emissions as a Result of Construction (No Impact)
Constructing and operating water efficiency structures would result in temporary exhaust emissions from equipment used for grading, trenching, concrete paving of waterways, pipeline installation, weed removal from water channels, and field leveling. Emissions would vary daily based on the type of equipment used, duration of construction, and type of efficiency operations.

Construction activities would result in a short-term increase in exhaust emissions, which could result in temporary or intermittent health and nuisance air quality impacts on individuals in the immediate vicinity of construction sites. It is

anticipated that these emissions would be negligible and intermittent in nature. Therefore, no adverse air quality impact would occur.

Impact AIR-4: Short-Term Increase in Fugitive Dust as a Result of Construction and Vegetation Removal (No Impact)
Fugitive dust would result from construction activities that disturb the ground, such as grading and excavation, canal construction, and other water-related construction. Fugitive dust could create temporary or intermittent health and nuisance air quality impacts on individuals in the immediate vicinity of construction sites. Air quality impacts associated with individual construction projects are temporary and short-term in nature, but the magnitude depends on their scale and duration. However, these emissions would be negligible and intermittent in nature. The grading and altering of the land is anticipated to be a minimal air quality impact. With implementation of standard control measures, no adverse air quality impact from construction activities is anticipated.

Fugitive dust also could be generated by vehicles traveling on paved and unpaved roads during activities associated with conservation and efficiency measures. However, these vehicle emissions would be negligible and intermittent in nature. Therefore, no adverse impact is anticipated.

Removing vegetation from ditches and canals would increase the likelihood of loose soil particles along the banks becoming windblown dust. However, vegetation in canals and drains is already routinely controlled under existing practices and not all riparian vegetation would be removed. Therefore, this operational activity is anticipated to have no adverse impact on air quality.

Chapter 9 Cultural Resources

Chapter 9 Cultural Resources

Introduction

This chapter describes the affected environment for cultural resources in the study area and the potential impacts on cultural resources that would result from the acquisition alternatives and the No Action Alternative.

Cultural resources customarily include archaeological resources, ethnographic resources, and those of the historic built environment (architectural resources). Cultural resources include those aspects of the physical environment that pertain to the material culture of prehistoric, ethnographic, and historic period human culture. These resources include archaeological resources, as well as the locations of traditional cultural or religious importance to Native Americans.

Sources of Information

The key sources of data and information used in the preparation of this chapter are listed below. Full references can be found in Chapter 17, References.

- The prehistoric context is condensed from Bowers (2008) and is based on research by Elston (1982, 1986) and Thomas (1971, 1981, 1983) about the Great Basin in general and specifically the prehistory of western Nevada.
- The ethnographic context is based on the Smithsonian Institution's (1986) *Handbook of North American Indians Volume 11: Great Basin*. In particular, information on the Northern Paiute Indian Tribe is based on Fowler and Liljeblad's chapter, and the information on the Washoe Indian Tribe is based on D'Azevedo's chapter. Additional ethnographic information was obtained from Bengston's (2003) ethnographic and ethnohistoric overview of the Paiute and Shoshone in Nevada, written for BLM.
- The historic period context is adapted from contextual research on Nevada history by ICF Jones & Stokes (2008). Important secondary sources consulted for specific topics in western Nevada history were obtained from the State Historic Preservation Officer (SHPO) context on exploration and early settlement in Nevada (McBride 2002), from Hulse's history of Nevada (1991, 2004), and from the Nevada Department of Conservation and Natural Resources, Division of Water Resources (2008) website about the history of the Walker River.
- Information about previously recorded cultural resources in the vicinity of Walker River and Walker Lake is based on an electronic records search of the Nevada Cultural Resources Information System (NVCRIS), and on

ethnographic data of Northern Paiute traditional cultural properties (TCPs) compiled by Bengston (2003).

Affected Environment

This section describes the environmental setting related to cultural resources in the study area. Although the project area is the entire Nevada portion of the Walker River Basin (Chapter 1), the study area for cultural resources was determined in consultation with Reclamation and consists of the Walker River, all irrigated lands where land, water appurtenant to the land, and related interests may be acquired as part of the acquisition alternatives, the current shoreline of Walker Lake, and a 1-mile perimeter around these areas. The study area is large enough to provide sufficient information to characterize the cultural resources in the study area, to determine the likelihood that they may be affected by the alternatives, and to describe potential impacts on historic properties (significant cultural resources).

The actual area of impact would likely be much smaller than the cultural resources study area. The areas most likely to be affected are areas of future inundation or exposure at Walker Lake, and areas potentially affected by construction-related ground disturbance under Alternative 3.

Prehistoric Context

Archaeological evidence indicates that people have been using the western Great Basin region, including the Walker River watershed, for the past 11,000 years (Schmitt et al. 2006). The prehistory of the Great Basin is divided here into two major periods: the Pre-Archaic (11,500-7,500 BP [Before Present]) and Archaic (the last 7,500 years). The Archaic Period is further subdivided into Early, Middle, and Late periods (Elston 1982, 1986; Grayson 1993).

Pre-Archaic (11,500 – 7,500 BP)

Archaeological evidence of Pre-Archaic peoples is sparse and current understanding of the mobility and subsistence patterns of Pre-Archaic peoples in the western Great Basin is limited. The most current data indicate that populations were low, sparsely distributed, highly mobile, and organized as small groups that travelled together. This inference is based in large part on the paucity of milling equipment found in Pre-Archaic sites. Pre-Archaic sites are primarily found in lowland settings, on gravel bars or benches that, when occupied, would have been near shoreline deltas of Pleistocene lakes or valley marshes. The low elevation locations of most known Pre-Archaic sites have lead to the inference that Pre-Archaic peoples were adapted to lacustrine resources (Jones et al. 2003; Elston 1986; Thomas 1981. The diagnostic artifacts associated with the Pre-Archaic Period are large lanceolate and stemmed projectile points, and possibly fluted points similar to those of the Clovis Period. The toolstone resources of this

period were probably of higher quality and required less processing than those used by later groups.

Archaic (7,500 BP – Contact)

The Archaic Period is further divided into the Early (7500-4000 BP), Middle (4000-1500 BP), and Late (1500 BP-Contact) Archaic Periods. The dominant behavioral trend during the Archaic was a greater diversity of food resources in the diet and a higher degree of sedentism from the Early to the Late Archaic Period (Elston 1982, 1986; Elston and Budy 1990; Thomas 1983).

Early Archaic (7500-4000 BP) adaptations are inferred to have been a response to middle Holocene climatic warming and drying (Elston 1986). The large pluvial lakes that Pre-Archaic peoples lived near had dried up and pinyon-juniper woodlands reached their modern distribution by 6000 BP (Elston 1986). Temporal markers of this period include Gypsum, Pinto, Northern Side-Notched, and Gatecliff projectile points (Elston 1986; Thomas 1981, 1983).

Middle Archaic (4000-1500 BP) settlement patterns focused on residential camps along the pinyon ecotone (Thomas 1971). "These habitation settlements were located in stands of Pinyon and Juniper trees, often on long, low ridges which fingered out onto the valley floor" (Thomas 1971). In addition, seasonal shifts in habitation types are apparent. Both summer and winter camps can be defined and appear to be occupied on a recurrent basis (Elston 1986; Elston and Budy 1990; Thomas 1971, 1983). Winter sites include storage pits, house pits with internal hearths, and burials (Elston 1986). In the western Great Basin, starting around 4,000 years ago, the dry conditions of the early Holocene began to shift to conditions of higher precipitation and lower temperatures, resulting in a greater abundance of food. At that time, the Walker River was flowing into Walker Lake Basin, rejuvenating the lake. Subsistence strategies during the Middle Archaic appear to have increased in variety. Upland resources were more intensively exploited, as were small mammals, although large mammals were still a significant portion of the diet (Elston 1986, Elston and Budy 1990). In general, settlement systems during this period took on a character similar to that described for ethnographic populations by Steward (1938) (see below). Temporal markers of the Middle Archaic include Elko Series projectile points. In addition, groundstone and other food processing tools became more common (Thomas 1981, 1983).

Late Archaic (1500 BP-Contact) settlement patterns continued to become more logistically oriented. Seasonal habitation sites continued to be definable but tool assemblages became more diverse, indicating increased reliance on a diverse set of resources. There was also a shift in hunting technology with the bow and arrow replacing the atlatl and dart. Two series of projectile points are diagnostic of this period: Rosegate and Desert Series. At the end of the Late Archaic, during the contact period with Euro-Americans, mobility patterns became severely constricted geographically as a result of pressures from white settlements. Two

types of habitation sites are recognized in the archaeological record of the Late Archaic (Elston 1986). One type consists of substantial shelters and storage facilities. These sites can have multiple house structures and debris patterns suggesting either long-term stays or repeated use of the site (Elston 1986, Elston and Budy 1990, Thomas 1983). The other habitation type is more ephemeral, consisting of hearth features and compacted floors (Elston and Budy 1990). The larger, more formal habitation sites resemble winter camps described by ethnographers; the smaller sites resemble summer camps. Other site types noted include hunting facilities (blinds and drive walls), specialized processing and procurement facilities, and caches (Elston 1986).

The appearance of Desert Series projectile points around 800 years ago is believed by some to be indicative of a migration of Numic-speaking peoples into the area. First formalized by Lamb (1958), and later by Bettinger and Baumhoff (1982), the idea that Numic-speaking peoples spread from the southwest Great Basin to the northeast Great Basin and beyond has continued to be a hotly contested research subject (e.g., Aikens 1994, Bettinger 1994).

Ethnographic Context

The majority of the study area is comprised of the ethnographic territory of the Northern Paiute Tribe. The far western portion of Nevada, from Antelope Valley north to the Honey Lake Region in California, is the ethnographic territory of the Washoe Tribe. A small portion of Washoe territory overlaps with that of the Northern Paiute, in the vicinity of the West Walker River in Antelope Valley (D'Azevedo 1986, Fowler and Liljeblad 1986).

The Northern Paiute

The Northern Paiute territory encompassed a large area including portions of Nevada, California, Oregon, and a segment of Idaho along the Oregon border. The Northern Paiute consist of many groups with distinct cultural and political units but with a shared common language, the Northern Paiute language. Northern and Southern Paiute languages (Northern Paiute and Mono) constitute the Western Numic language, an offshoot of the Uto-Aztecan linguistic family (Fowler and Liljeblad 1986).

Traditionally, the Northern Paiute were semi-nomadic groups who travelled seasonally to take advantage of hunting, gathering, and fishing grounds. They lived in small family units that fluctuated in size and among generations and kin members. Their winter villages constituted several families camping together, most of whom would have kinship ties. The houses were dome-shaped and covered with vegetation mat. The Northern Paiute did not recognize private land ownership; rather, the first family to arrive at a seasonal hunting or gathering territory was viewed by others as having priority. Their political organization consisted of groups of families with a headman who did not control the people but who gave advice and occasionally led communal activities such as rabbit drives.

They did not have formal marriages; once the parents found suitable matches, the boy showed interest in the girl and when she was ready, he moved in with her. Intrafamilial or sibling exchange marriages were common, with matches between two brothers/sisters of one household with two sisters/brothers of another household, strengthening group and family ties (Fowler and Liljeblad 1986).

Hunting could be an individual or a group activity. The Northern Paiute sought out large game animals such as deer, antelope, and desert bighorn sheep; typical small game animals were rabbits, hare, marmots, porcupines, and burrowing mammals. Mammals were hunted for their meat as well as their fur, and many items were fashioned out of the pelts of coyote, desert fox, bobcat, deer, mountain lion, antelope, or bear. Small animals were hunted individually and were caught with noose snares and deadfalls, or shot. The bow and arrow, traps, and corrals were the most common means of hunting large mammals, individually or in groups. In the Walker River region ground squirrel trapping may have been private property inheritable from father to son. Birds and waterfowl were an important resource for the Walker River area. Tule boats were used to collect duck eggs, hunting and fishing (Fowler and Liljeblad 1986).

In lacustrine environments, the Northern Paiute had a more specialized subsistence strategy focusing on abundant fish stocks. Walker Lake, fed from the Walker River, was a prime location for seasonal settlement where groups gathered for fishing, trading, feasting, and dancing. Fishing was a year-round activity in the Walker River and Walker Lake areas, with a focus on fishing for those species that were in season. Fishing platforms and weirs were considered private property, and fishing was conducted with nets, hooks, harpoons, or spears. On lake areas, fishing was conducted with lines and hooks, or with a spear or harpoon in shallow waters. Women also fished using their winnowing trays (Fowler and Liljeblad 1986).

Plant gathering was an important activity for the Northern Paiute. Several varieties of seeds, nuts, fruits, and roots were gathered with particular attention to the pinyon resources of the Great Basin. Several tool types were used for this activity, including conical baskets, twined trays, manos, metates, mullers, twined cooking baskets, twined seed beaters, straight sticks, stone or bone knives, and spoons, dishes, storage bags, stirring sticks, and hot rock lifters. Seeds and cakes were stored in grass- or bark-lined pits (Fowler and Liljeblad 1986).

The Northern Paiute were a culturally diverse group with many subgroups. Four of these are known to have inhabited the Walker River and Lake region: *Pakwidokado* (fish eaters), located on the southern area of Walker Lake, *Aga'idokado* (also referred to as *Agai-Dicutta* or Trout Eaters) on the north and eastern region of Walker Lake and River, *Tovusidokado* (grass-nut eaters) on the East Walker Valley, and *Kamodokado* (jackrabbit eaters) and *Poo-zi Ticutta* (bulb eaters) in the vicinity of the Yerington Indian Reservation (Bengston 2003, Fowler and Liljeblad 1986).

Ghost Dance

Noted in historical accounts as the Ghost Dance of 1890, the Ghost Dance was a religious movement incorporated into numerous Native American belief systems. The traditional ritual used in the Ghost Dance, the circle dance, has been used by many Native Americans since prehistoric times but was first performed in accordance with Jack Wilson's teachings among the Nevada Paiute in 1889. The practice swept throughout much of the American West, quickly reaching areas of California and Oklahoma. As the Ghost Dance spread from its original source, Native American tribes synthesized selective aspects of the ritual with their own beliefs, often creating change in both the society that integrated it and the ritual itself.

At the core of the movement was the prophet of peace Jack Wilson, known as Wovoka among the Paiute, who prophesied a peaceful end to white American expansion while preaching messages of clean living, an honest life, and cross-cultural cooperation.

The Washoe

The Washoe territory consists of a narrow stretch of land measuring approximately 120 miles long and 40 miles wide. The territory lies along the present central Nevada-California border with Lake Tahoe at its center. The southern portion of the Washoe territory includes the west Walker River area in Antelope Valley. The Washoe language is derived from the Hokan linguistic stock. Even though the Washoe are geographically included within the Great Basin population, they are the only people who do not speak the Numic language and share more cultural traditions and subsistence strategies with California tribes than with Great Basin tribes (D'Azevedo 1986).

Contrary to the Northern Paiute, the Washoe were a homogeneous group who inhabited a small territory and negotiated with neighbors over travel passages and hunting and gathering territories. The Washoe territory was self-contained and abundant in resources. The Washoe lived in semi-permanent settlements and procured diverse seasonal resources. The basic unit was the family, and families could live singly in seasonal camps or aggregate into villages that might have a hereditary chief (D'Azevedo 1986).

Fishing was the most reliable and consistent food source among the Washoe. The southern Washoe shared the Walker River and Walker Lake fishing areas with permission of the local Northern Paiute. Washoe groups gathered at the end of the year and fished in winter; in harsh winters they used ice-holes for fishing. The archaeological record of the Washoe contains several tools associated with these activities such as bone fishhooks, harpoons, spears, dams, nets and basketry, weirs, fish traps, and rafts of cedar bark or tule bundles. Fishing was done individually or in groups, and the surplus was taken back to camp and dried to be eaten throughout the winter (D'Azevedo 1986).

Early spring and late fall were occupied with the gathering of seeds, bulbs, roots, fruits and plants for food and medicinal use. In the south, the Washoe gathered pine nuts within proprietary territories. Each family had its own traditional plot and sharing was allowed by permission only, based on friendship or kinship (D'Azevedo 1986).

The Washoe hunted primarily for mule deer, pronghorn antelope, and mountain sheep. The most abundant animal foods were hares and rabbits that could be caught by the thousands during organized group rabbit drives in the autumn (D'Azevedo 1986).

Federally Recognized Tribes in the Walker River Region

There are two federally recognized tribes in the study area: the Walker River Paiute Tribe (WRPT) and the Yerington Paiute Tribe (YPT). Both are under federal government jurisdiction but are self governing and are associated with the Northern Paiute Tribe.

Yerington Paiute Tribe

YPT has historically and prehistorically occupied the entire Walker River Basin and areas beyond, such as Mono Lake, Bodie, Sweetwater, the Desert Creek area, and Aurora. During the early 20th century, many Northern Paiute settled and established a colony near Yerington. The YPT Indian Reservation was set aside in 1916. YPT was recognized under the Indian Reorganization Act of June 1934, and the bylaws and constitution were approved in 1936 recognizing the tribal government (Sharpe et al. 2008). In 1939, the federal government granted land to the Colony under the Indian Reorganization Act of 1935, recognizing the Colony as an independent tribe (Fowler and Liljeblad 1986).

YPT's lands consist of YPT Indian Colony and YPT Indian Reservation (also known as Campbell Ranch). The Colony occupies 13.7 acres within the city limits of Yerington, Nevada. Land uses at the Colony are a mix of residential and commercial. The Colony has 46 homes, 12 apartments, and four tribal elders' apartments. Commercial uses include a tribal smoke shop, the Tribal Elder Center, Head Start, a three-office building that houses the EPA/General Assistance Program, the Law Enforcement Substations, and an education tutoring center. YPT leases 1.5 acres to a Subway sandwich franchise at 198 Goldfield Avenue; this property is not held in trust for YPT. YPT also owns Arrowhead Market, a gas station and mini-market located on Campbell Lane, off the reservation (Emm pers. comm.).

Campbell Ranch encompasses 1,162 acres 10 miles north of Yerington. Land uses at Campbell Ranch are primarily agricultural and residential. Nine assignees farm on private land on the ranch and grow primarily alfalfa and onions. YPT grows alfalfa on 900 acres. Campbell Ranch also has 84 homes, including nine

tribal ranch assignees' residences. YPT leases 21.2 acres of ranch land to Rite of Passage, a school for troubled youth (Emm pers. comm.).

The final Walker River Decree (Decree C-125) provides water rights for the YPT Reservation and Colony, which are primarily used for agricultural purposes. YPT's current decreed water right in a year with a full water supply is approximately 3,958 af with priority dates from 1864 to 1905 (Wilson pers. comm.). Some water rights for the Colony have been transferred to Campbell Ranch for irrigation (Emm pers. comm.). YPT also has permits to use approximately 1,200 af/yr of groundwater (Wilson pers. comm.).

Walker River Paiute Tribe

WRPT refers to itself as Agai-Dicutta (Trout Eaters) Band of Northern Paiute Nation (Walker River Paiute Tribe 2008a). The Walker River Indian Reservation is located on 325,000 acres between the northeast end of Mason Valley and Walker Lake and has a population of approximately 1,200. The reservation was set aside by federal action on November 29, 1859, and later affirmed by Executive Order in 1874. Over time the boundaries of the reservation were greatly altered by government policy changes (Hulse 2004). While the reservation accepted allotment and surrendered most of their land to the government in 1906, it later obtained other lands in the 1930s along the Walker River that were suitable for agriculture (Hulse 2004). The reservation's main community is Schurz, located along the Walker River. Water rights and the decline in fish supplies have been major points of contention between the reservation and non-Indians (Knack and Stewart 1984). Most of the land is held in trust by the United States for the benefit of WRPT (Miller Ecological Consultants 2005).

Approximately 10,000 acres of reservation land were divided into 20-acre allotments and distributed to individual WRPT members. These allotments are also held in trust by the United States, but are for the benefit of the individuals (Miller Ecological Consultants 2005).

Agriculture production on the reservation represents Mineral County's major farming district (Mineral County 2008). Grazing is the primary land use, as well as some ranching (Walker River Paiute Tribe 2008a), but agricultural crops are also an important part of the economic base. Alfalfa is the primary crop grown, mainly along formerly riparian areas (Walker River Paiute Tribe 2008b).). Approximately 2,800 acres have been used at various times for agricultural production. Of this, approximately 2,100 acres are irrigated allotments, mainly supporting alfalfa and grass hay production. WRPT had previously irrigated tribal trust land with five center pivots. Weber Dam and Reservoir provides storage and regulates the delivery of the reservation's direct flow water rights under Decree C-125 for irrigation water used on the Walker River Indian Irrigation Project. In 2007, 2008 and 2009, all the allotments on the reservation were part of a fallowing program funded by a Reclamation Desert Terminal Lakes

grant with the purpose of providing inflow to Walker Lake. The WRPT fallowing program allowed the unused agricultural water rights to be delivered to Walker Lake, providing freshwater inflow to the lake.

The unincorporated town of Schurz is located on the reservation at the intersection of U.S. Highways 95 and 95-A. Land uses in Schurz include commercial uses, such as a gas station with a convenience store, a smoke shop, and a fireworks outlet (Walker River Paiute Tribe 2008a and 2008c).

Community resources include the tribal administrative offices, health clinic, and police office; a volunteer fire department; and a school for kindergarten through 8th grade (Miller Ecological Consultants 2005).

Most housing on the reservation is single-family, detached houses (Miller Ecological Consultants 2005). Some of these houses are built on allotments and others on tribal land. WRPT's housing department administers two programs to help tribal members: a modified lease purchase program called the mutual help program and a rental program for the members with the lowest income. The department also operates programs to renovate existing homes. The department has built more than 280 housing units and operates a rental assistance program for low-income tribal members attending certain institutions of higher learning (Walker River Paiute Tribe 2008d).

Trust assets include, but are not limited to, the reservation, irrigated and unirrigated trust allotment lands, water rights, Weber Dam and Reservoir, and the fish, wildlife, and riparian vegetation in and along mainstem Walker River and Weber Reservoir (Miller Ecological Consultants 2005).

WRPT's water rights, which are provided under Decree C-125, are held in trust by BIA (Strekal pers. comm.). Decree C-125 adjudicated to the United States a continuous flow right of 26.25 cfs with an 1859 priority date (the most senior water right in the system) for the irrigation of 2,100 acres of land within the Walker River Indian Reservation. This water may be diverted from the Walker River on or above the reservation over a 180-day irrigation season each year (*United States* v. *Walker River Irrigation District,* 104 F2d 334, 340, 9th Cir 1939).

WRPT asserts exclusive jurisdiction over groundwater in the Walker River Indian Reservation (Yardas 2007). In pending litigation (*United States* v. *WRID*, Case in Equity, C-125B), the United States and WRPT are claiming a federal reserved water right to groundwater, among other claims (Yardas pers. comm.).

Historic Context

Historically, the region has provided a natural route for travel from the east through the Great Basin to the west coast of the United States (Scrugham 1935). Although Europeans and Americans explored the region in the late 18th and early 19th Centuries, the harsh terrain did not welcome settlement; consequently the

region remained largely uninhabited by Euro-Americans until the latter half of the 1800s following emigration to California and subsequent mining booms in the region. During that time, several towns developed in the region, including Wellington and Smith in Smith Valley, Yerington in Mason Valley, and Schurz in the Walker River Valley. Today, the vast majority of land within or directly adjacent to the study area is sparsely populated with ranching, agriculture, mining, recreation, and military as primary economic activities. For a more detailed discussion on the history of the region please see Paher 1970, Hulse 1991, McBride 2002, and Kolvet and Ford 2006.

Early Exploration and Settlement

The Spanish were the first Europeans to explore and settle the southwest; Euro-American exploration of the Nevada region began in the early 1800s (Hulse 1991). In 1821, Mexico won its independence from Spain; this event helped open a significant portion of the West to exploration. Soon thereafter, rival Canadian, British, and American fur companies, competing for Great Basin resources in the West on behalf of their respective governments, began searching for North American beaver habitats in hopes of extracting pelts for the lucrative Atlantic fur trade. Exploring on behalf of the Rocky Mountain Fur Company in 1826, Jedediah Strong Smith became the most prominent American fur trader to cross into the southeastern Nevada region. In addition to searching for beaver-rich areas Smith also traveled north to establish a new route to the Pacific Ocean from Cache Valley, north of the Great Salt Lake. Beginning in August 1826, his group blazed a trail to Los Angeles that would eventually be incorporated into the Old Spanish Trail to San Bernardino, later known as the Mormon Road. During the venture Smith was detained in California by Mexican government officials; after his release he disregarded the government's order to return by the same route and took his party northward into the San Joaquin Valley. Concerns over crossing the snow-covered Sierra Nevada led Smith to leave most of his party in California and proceed directly toward the Great Salt Lake with only two men. While the trail of this 1827 route is unknown in its entirety, it is generally accepted that Smith and his men crossed the Sierra Nevada approximately on the route of present-day U.S. Highway 89, followed West Walker River, and saw Walker Lake on their way toward the center of the Great Basin (Hulse 1991, 2004; McBride 2002).

At the time of Smith's first trek the leading trapper of the Hudson's Bay Company in this region was Peter Skene Ogden. He made six expeditions into the so-called Snake River Country between 1825 and 1831. Three of Ogden's trips penetrated Nevada, including the lower Humboldt River, lower Carson River, Walker Lake area, and the desert between Walker Lake and the Colorado River on his way toward the eastern edge of the southern Sierra Nevada (Hulse 2004).

In 1833, Joseph Walker, chief lieutenant for Captain Benjamin Louis Eulale de Bonneville, both of whom were in the employ of the Hudson's Bay Company, led a party of explorers and trappers along Ogden's "Unknown River" (the Humboldt)

all the way to California via the Humboldt Sink, the Carson Sink, and then up into the Sierra Nevada by either the Carson River or the Walker River (Nevada Division of Water Planning 2008).

Exploration routes and trapping trails in Nevada eventually became overland trade routes, the first being the Old Spanish Trail, opened by Antonio Armijo between Santa Fe and Los Angeles, passing through southern Nevada, in 1829. By 1830, the Old Spanish Trail became a major thoroughfare for organized caravans participating in extensive trade (Vlasich 1975). The next major expeditions into Nevada were under sponsorship of the United States government.

Between 1834 and 1871, the United States government sponsored expeditions to explore the geography and known trails of the western Great Basin. The government's philosophy of expansion, which came to be regarded as Manifest Destiny, was a motivating factor in exploring and mapping the western region of North America. Eventually, expansionism culminated in the annexation of Texas and participation in the Mexican-American War (1846-1848). At the conclusion of the war, the United States gained control of western territories, including all of present-day California, Utah, and Nevada, and parts of Colorado, Wyoming, New Mexico, and Arizona.

During the 1840s, John C. Fremont became a significant American explorer, being the first to scientifically map and describe the Great Basin. Fremont made three surveys of the American West for the U.S. Topographic Engineers. Fremont documented the Great Basin during his second and third surveys between 1843–1844 and 1845. Fremont traveled through northern portions of Nevada on his way to the Oregon Territory. His 1845 expedition included examination of the Great Salt Lake region in Utah, and a foray through northern and western Nevada. Fremont's men re-mapped the Walker River Basin, among others. In order to more fully understand the nature of Great Basin physiography, the expedition split up, with Joseph Walker guiding one team along Ogden's 1829 route down the Humboldt River, and meeting up with Fremont's team at Walker Lake in November 1845 (McBride 2002).

In-depth, federally sponsored exploration of Nevada did not begin until the 1850s. The combined events of the signing of the Treaty of Guadalupe Hidalgo in 1848, which signified the end of the war with Mexico, and the discovery of gold in California that same year led to more federal exploration of the far west. A key motivating factor of far west exploration was the need to determine transportation routes, specifically a possible route for the transcontinental railroad. Among a number of more well-known railroad surveys, a minor survey was led by John Ebbetts in 1854. Although the survey did not identify a practical railroad route, the party was able to further explore the area around Walker Lake (McBride 2002). More successful expeditions and surveys resulted in the establishment of important routes for future stage, freight, mail, and telegraph service between Utah and California (James 1981, Summit Envirosolutions 2001). However, none of these routes passed through the Walker River Basin because

shorter and easily traversed routes were established north and south of the Walker River region.

After the discovery of gold in California a number of established trails were used increasingly for emigrant groups travelling from the east. During this period the main emigration routes were the Old Spanish Trail through southeastern Nevada, and the Humboldt and California Trails, which initially brought California-bound travelers across northern Nevada along the Humboldt River and through the Carson Valley. From 1848 through the 1850s, a number of branches, cut-offs, and alternate routes were developed along the California Trail, in an attempt to shorten the trip to California (McBride 2002).

Emigrants, noting the economic possibilities of the lush Carson Valley, and recognizing the opportunity to sell provisions to California-bound travelers, first began settling there in 1850. By this time the emigrant trails were well established, and the 1850s saw the development of a network of smaller roads into lesser-known areas, ushering in a period of settlement across western Nevada (Hulse 2004, McBride 2002). By the late 1850s, farmers and cattlemen settled Mason Valley, with its fertile valley soil and grazing lands, and other inhabitants of the Walker River area engaged in small-scale placer mining (McBride 2002). After the mining boom commenced following the discovery of the Comstock Lode in 1859, these areas became stable agricultural communities supporting the mining boomtowns, eventually supplying produce to mining towns such as Aurora and Bodie and others (Hulse 1991).

Environmental Consequences

This section describes the impact analysis relating to cultural resources for the acquisition alternatives and the No Action Alternative. It lists criteria used to determine whether an impact would be adverse or beneficial.

Assessment Methods

As described above, information was gathered about cultural resources in the study area. Archaeological resources were identified and eligibility for inclusion in the National Register of Historic Places (NRHP) was determined.

Impact Criteria

NEPA and the National Historic Preservation Act (NHPA) require federal agencies to consider the effect of their actions on cultural resources. Resources determined to be eligible for inclusion in the NRHP are known as historic properties. The significance of an archaeological site or an architectural resource is defined by the NRHP. These criteria, defined in 36 CFR Part 60.4, state that a resource must be at least 50 years old (unless meeting exceptional criteria) and possess a quality of significance in American history, architecture, archaeology,

engineering, or culture. The quality of significance is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, as defined by the National Park Service (1997). These sites meet one or more of the following criteria.

A. The site is associated with events that have made a significant contribution to the broad patterns of history.

B. The site is associated with the lives of persons significant in the past.

C. The site embodies the distinctive characteristics of a type, period, or method of construction, represents the work of a master, possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual distinction.

D. The site has yielded, or may be likely to yield, information important in prehistory or history.

If a particular resource meets any one of these criteria and retains integrity, it is considered NRHP-eligible and, therefore, a historic property.

Application of the Criteria of Adverse Effect

To comply with Section 106 of NHPA, any effects of the proposed undertaking on properties listed in or determined eligible for inclusion in NRHP must be analyzed by applying the Criteria of Adverse Effect [36 CFR Part 800.5(a)(1)(2)], as follows:

An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of an historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of an historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative.

Adverse effects on historic properties include, but are not limited to:

(i) physical destruction of or damage to all or part of the property;

(ii) alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation and provision of handicapped access, that is not consistent with the Secretary's Standards for the Treatment of Historic Properties and applicable guidelines;

(iii) removal of the property from its historic location;

(iv) change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance;

(v) introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features;

(vi) neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and

(vii) transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long term preservation of the property's historic significance.

Impacts

Impacts on cultural resources that were considered and dismissed from analysis include potential erosional and depositional impacts in the Walker River that might arise from increased flow resulting from acquisitions. Flow is expected to remain within the historic range of existing variation. Consequently, the impacts of sediment erosion and deposition along the Walker River are similarly expected to remain within the range of existing conditions. There would, therefore, be no impacts on cultural resources within the Walker River channel compared to existing conditions.

Additionally, projected changes in the elevation of Walker Lake would not be outside the recent historic range. As described in Chapter 3, Water Resources, in the last 3,400 years Walker Lake elevation may have fluctuated between a shallow saline lake less than 3 feet deep and a deep lake with a surface elevation of approximately and 4,120 feet (approximately 190 feet higher than the elevation in November 2009). In the late 1800s, the elevation of Walker Lake started to decline primarily because of upstream diversions to support agricultural production. In 1882, the lake elevation was estimated to be 4,083 feet whereas in November 2009, the lake elevation was at approximately 3,927 feet. The projected best case scenario of additional inflow to the lake under Alternatives 1 and 2 is an average of 50,000 af/yr, which would cause the lake elevation to rise a maximum of 43 feet from its November 2009 elevation. This would return Walker Lake to an elevation last recorded in the in the mid 1980s. No cultural resources that were not previously inundated would be covered by the change in lake elevations under this scenario; therefore, there would be no impact on cultural resources as a result of implementing Alternatives 1 and 2.

Impacts on cultural resources would be determined on a site-specific basis under Alternative 3. Some activities have a greater potential to adversely affect cultural resources than other activities. Earthmoving activities (i.e., digging, grading, and dredging) have the highest potential to directly affect significant cultural

resources through disturbance or destruction. Additionally, pedestrian traffic, vehicular traffic, and earthmoving activities may have an indirect impact on cultural resources by promoting earth compaction or erosion. These activities would not occur under Alternatives 1 and 2, but could occur under Alternative 3.

In this section, the activities that could potentially affect cultural resources are described for each alternative.

No Action Alternative

Under the No Action Alternative, future conditions indicate the elevation of Walker Lake would continue to drop to an estimated 3,898 to 3,906 feet by 2200. Cultural resources would remain relatively unchanged from present conditions.

Alternative 1 (Purchase Alternative)

This analysis of impacts under Alternative 1 assumes that the acquisitions would be fully funded and that water rights acquired would increase the average inflow to the lake by 50,000 af/yr. Unless otherwise noted, if the full amount of water rights were not acquired, the impacts would be similar in nature (i.e. adverse, minor, beneficial, or no impact), but of less magnitude.

Under Alternative 1, no ground disturbance, increased vehicular and pedestrian traffic, increased soil erosion, or changes to viewshed beyond existing conditions or recent history are anticipated. Any water stored at Topaz Lake Reservoir or Bridgeport Reservoir is expected to be managed in a manner consistent with existing operating criteria. Projected flow would be within historic ranges for the Walker River; therefore, no new impacts on any cultural resources within the river corridor are anticipated. Projected lake elevations under Alternative 1 (see Chapter 3, Water Resources) would not exceed those recorded in the early 1960s. Under the best case acquisition scenario, lake elevation is projected to reach 3,965 to 3, 970 feet. No cultural resources that were not previously inundated by the lake would be inundated under Alternative 1. There would be no direct or indirect impacts on cultural resources.

Alternative 2 (Leasing Alternative)

Under Alternative 2, no ground disturbance, increased vehicular and pedestrian traffic, increased soil erosion, permanent abandonment of a water conveyance system, or changes to viewshed beyond existing conditions are anticipated. Any water stored at Topaz Lake Reservoir or Bridgeport Reservoir is expected to be managed in a manner consistent with existing operating criteria. Projected flow would be within historic ranges for the Walker River; therefore, no new impacts on any cultural resources within the river corridor are anticipated. Like Alternative 1, projected lake elevations would not exceed those recorded in the early 1960s. No cultural resources that were not previously inundated by the lake would be inundated under this alternative. There would be no direct or indirect impacts on cultural resources.

Alternative 3 (Efficiency Alternative)

As discussed in Chapter 3, Water Resources, full implementation of Alternative 3 would yield only an additional 32,300 af/yr. Under the best case acquisition scenario for this alternative, projected lake elevations would not exceed those recorded in the early 1990s. No cultural resources that were not previously inundated by the lake would be inundated under Alternative 3. Projected flow would be within historic ranges for the Walker River; therefore, no new impacts on any cultural resources within the river corridor are anticipated. Any water stored at Topaz Lake Reservoir or Bridgeport Reservoir would be managed in a manner consistent with existing operating criteria.

Alternative 3 differs from the other action alternatives in that its implementation may require the following activities: water control system improvements, ditch lining or piping installation, utility realignments, or construction of access roads, storage areas, borrow sites, and disposal sites; however, at this time no specific activities or locations have been identified. Specific project activities and locations would be determined after conservation agreements are made with private landowners. Such activities could have direct or indirect impacts on cultural resources.

To fulfill Section 106 compliance, Reclamation cultural resources staff will review conservation activities on a case-by-case basis to determine if these activities have the potential to affect historic properties should they be present. If it is determined that the proposed conservation activity is the type of activity that has the potential to affect historic properties, Reclamation cultural resources staff will determine what steps the agency will take to comply with Section 106 of the NHPA. If it is determined that there will be adverse impacts on historic properties, Reclamation will consult with the SHPO to resolve adverse impacts pursuant to 36 CFR Part 800.6 and follow any agreed upon measures. Compliance efforts will be completed before NFWF issues funds to applicants to implement any projects identified under Alternative 3.

The NHPA applies on private lands, but the Native American Protection and Graves Repatriation Act and the Archaeological Resources Protection Act do not. Section 106 of NHPA will be a requirement for this alternative and an agreement to comply with NHPA has been entered into between NFWF and Reclamation. Inadvertent discoveries (e.g., archaeological features.) will be handled pursuant to 36 CFR Part 800.13. Any human remains discoveries will be handled in compliance with Nevada State law.

Chapter 10 Socioeconomics

Chapter 10 Socioeconomics

Introduction

This chapter describes the affected environment for socioeconomics in the study area and the potential impacts on socioeconomics that would result from the acquisition alternatives and the No Action Alternative.

The focus of this assessment is to identify potential changes in employment, income, and tax revenues as a result of:

- a decrease in agricultural production, and
- an increase in recreation opportunities associated with increase in water inflow to Walker Lake.

Sources of Information

The key sources of data and information used in the preparation of this chapter are listed below. Full references may be found in Chapter 17, References.

- Population data reported by the U.S. Census Bureau (2008a)
- Income and employment data reported by the U.S. Department of Commerce, Bureau of Economic Analysis (2008a–f)
- Agricultural production data reported by the U.S. Department of Agriculture, National Agricultural Statistics Service (2002)
- Per acre employment estimates for agricultural activities and per acre crop production value within the study area reported by the University of Nevada, Reno (Bartholet et al. 2009)
- Population and employment in Mason and Smith Valleys as reported by the University of Nevada, Reno (Bonnenfant et al. 2009)

Affected Environment

This section describes the environmental setting related to social and economic conditions in the study area. Although the project area is the entire Nevada portion of the Walker River Basin (Chapter 1), the study area for socioeconomics consists of Lyon and Mineral Counties, Nevada. Walker Lake is located in Mineral County. It is expected that acquisitions would be made from Mason Valley, Smith Valley, and the East Walker area, all of which are located in Lyon County. Lyon County is the leading agricultural county in Nevada, mostly a result of the water delivered from Walker River (Lesperance 2009).

This section provides an overview of employment, income, and agricultural production, with a focus on Mason and Smith Valleys, the primary areas from which water rights would be expected to be purchased or leased. Population in Mason Valley totaled 8,583 in 2007 (Bonnenfant et al. 2009), of which 3,319 were in Yerington (Nevada Department of Taxation 2008). Population in Smith Valley totaled 1,840 in 2007 (Bonnenfant et al. 2009). A broader discussion of population characteristics is included in Chapter 7, Land Use and Agriculture.

Employment

Lyon County

Full- and part-time employment in Lyon County totaled 18,048 jobs in 2006, an increase of approximately 3,200 jobs from 2001(this shows a 5-year trend). Nonfarm employment represented about 96% of total employment in 2006, and farm employment accounted for the remaining 4%, or 665 jobs. The major farming businesses in Yerington and Smith Valley employ 220 positions (Sylvia Banta, Mason Valley Chamber of Commerce, as cited in Lesperance, 2009). Manufacturing was the largest single private employment sector, with 2,533 jobs, followed by retail trade, with 2,212 jobs. Employment in government and government enterprises totaled 2,270 jobs or nearly 13% of total employment (U.S. Department of Commerce, Bureau of Economic Analysis 2008a).

The unemployment rate in Lyon County during 2009 was higher than the Nevada statewide average of 12.3%. During 2009, the unemployment rate in Lyon County ranged from a low of 14.5% in December to a high of 16.4% in September. The unemployment rate in Lyon County increased substantially from the 2007 annual average of 6.7%. (U.S. Department of Labor 2009a), which was still higher than the statewide average of 5.2% (U.S. Department of Labor 2009b).

Employment in Mason Valley totaled 4,172 jobs in 2007. The retail trade sector accounted for 1,846 jobs, followed by the government sector with 651 jobs, and the entertainment, accommodation, and food services sector with 269 jobs. The agriculture and forestry sector accounted for 397 jobs (Bonnenfant et al. 2009).

Employment in Smith Valley totaled 254 jobs in 2007. The agriculture and forestry sector accounted for 85 jobs, followed by the construction sector with 33 jobs (Bonnenfant et al. 2009).

Mineral County

Full- and part-time employment in Mineral County totaled 2,284 jobs in 2006, a decrease of about 50 jobs from 2001. In December 2009, the Hawthorne Army Depot eliminated approximately 100 jobs, and more job losses are expected (Reno Gazette Journal 2009). Nonfarm employment represented 98% of total employment, and farm employment accounted for the remaining 2%, or 45 jobs. Employment in government and government enterprises totaled 613 jobs, or

nearly 27% of total employment (U.S. Department of Commerce, Bureau of Economic Analysis 2008b).

The unemployment rate in Mineral County during 2009 was lower than the Nevada statewide average of 12.3%. During 2009, the unemployment rate in Mineral County ranged from a low of 8.3% in December to a high of 10.5% in September. The unemployment rate in Mineral County increased from the 2007 annual average of 6.5%. (U.S. Department of Labor 2009a), which was still higher than the statewide average of 5.2% (U.S. Department of Labor 2009b).

Income

Lyon County

Personal Income

Personal income totaled just over $1.3 billion in Lyon County in 2006, of which nonfarm income accounted for approximately 99% of the total. Per capita personal income totaled approximately $26,300 in 2006, substantially less than the statewide per capita personal income of $38,944 (U.S. Department of Commerce, Bureau of Economic Analysis 2008c).

Farm Income

Farm income totaled approximately $71.5 million in 2006. Income generated by the sale of livestock and livestock products was nearly the same as income generated by the sale of crops, totaling $32.8 million and $34.5 million, respectively. Between 2001 and 2006, farm income generated in Lyon County has trended upward. Farm income in 2006 was approximately $8.1 million higher than the amount generated in 2001 (U.S. Department of Commerce, Bureau of Economic Analysis 2008d). Most of this income was generated in Mason Valley and Smith Valley.

Mineral County

Personal Income

Nonfarm personal income totaled just over $134.6 million in Mineral County in 2006. Total personal income totaled just over $132.7 million. The total personal income level is less than the total nonfarm personal income because of an approximate $1.9 million loss in farm income. Per capita personal income totaled approximately $27,863 in 2006, substantially less than statewide per capita personal income of $38,944 (U.S. Department of Commerce, Bureau of Economic Analysis 2008e).

Farm Income

Farm income was approximately $1.7 million 2006. Income from livestock and livestock products and from crops totaled $413,000 and $807,000, respectively. Total income decreased by $854,000 from 2001 (U.S. Department of Commerce,

Bureau of Economic Analysis 2008f). Farm income in Mineral County is mostly attributable to WRPT farming on the Walker River Indian Reservation. The entire WRPT farm allotments were fallowed in 2007, 2008, and 2009 to provide water to Walker Lake. Livestock grazing continued on the reservation during those years, and was the primary source of agricultural income rather than crops. However, payments for fallowing were made to farmers under the Water Lease and Purchase Program agreement between Reclamation and WRPT under PL 93-638, the Indian Self-Determination and Education Assistance Act. The WRPT fallowing program is temporary and may or may not be continued another year.

Agricultural Production

Lyon County

Cropland in Lyon County totaled 78,910 acres in 2007; cropland acreage varies from year to year. This included approximately 38,200 acres in Mason Valley and 20,400 acres in Smith Valley (Table 7-2 in Chapter 7, Land Use and Agriculture). Cropland in Mason Valley and Smith Valley represents approximately 75% of irrigated lands in Lyon County. The market value of agricultural products sold from farms in Lyon County was approximately $91.1 million in 2007. This represents about 18% of the total 2007 farm sales from the entire state. Livestock and poultry accounted for $29 million. Crop production accounted for $62.1 million of the total market value of agricultural products sold. Of this amount, forage crops, including hay, accounted for approximately $49.2 million. The average sales per farm totaled approximately $280,000, substantially more than the statewide average of $164,000 (U.S. Department of Agricultural, National Agricultural Statistics Service 2007).

The market value of agricultural products sold by Lyon County farmers increased from approximately $45.9 million in 1987 to $91.1 million in 2007 (U.S. Department of Agriculture, National Agricultural Statistics Service 2007). The total acreage classified as cropland has remained relatively constant over this same period, ranging from a low of 72,000 acres in 2002 to a high of 79,000 acres in 1997 (U.S. Department of Agriculture, National Agricultural Statistics Service 1992, 1997, 2002, and 2007). Cropland in the county totaled approximately 78,900 acres in 2007 (U.S. Department of Agriculture, National Agricultural Statistics Service 2007). Acreage planted to forage crops also remained fairly constant between 1987 and 2007, ranging from a low of 40,100 acres in 2002 to a high of 49,200 acres in 2007 (U.S. Department of Agriculture, National Agricultural Statistics Service 1992, 1997, 2002, 2007).

Mineral County

Cropland in Mineral County totaled 6,382 acres in 2007. The market value of agricultural products sold from farms in Mineral County was approximately $2.9 million in 2007 (U.S. Department of Agriculture, National Agricultural

Statistics Service 2007). This represents less than 1% of the total 2007 farm sales in the state. The average sales per farm totaled approximately $35,035 in 2007, much less than the statewide average of $163,931.

Environmental Consequences

This section describes the impact analysis relating to socioeconomics for the acquisition alternatives and the No Action Alternative. It lists the criteria used to conclude whether an impact would be adverse or beneficial.

Dr. Lesperance, Director of Agriculture at the Nevada Department of Agriculture wrote a socioeconomic evaluation paper regarding this chapter of the Administrative DEIS (Lesperance 2009). In addition, many of Cooperating Agencies for this Revised DEIS also provided comments on the Administrative DEIS and those comments are equally important for evaluation in the Revised DEIS. Comments on the public DEIS related to the socioeconomic analysis were also provided. Dr. Lesperance's paper is specifically discussed here, however, because it has been publicly cited several times as being of particular importance to the agricultural communities. Some of the statistics and data used in Dr. Lesperance's paper match those presented in this Revised DEIS. The primary differences in the socioeconomic analyses are related to the factors discussed below.

Dr. Lesperance concludes that 80% of the total current water use for agriculture in Mason and Smith Valley would be acquired for Walker Lake (i.e., up to 132,500 af/yr out of 166,000 af/yr of "combined irrigation use" exclusive of approximately 126,000 af/yr of estimated groundwater use). As explained in detail in the analysis in Chapter 3, Water Resources, the Revised DEIS analysis estimates that approximately 82,000 af of surface water would need to be acquired under the Purchase Alternative to deliver an average additional inflow of 50,000 af/yr to Walker Lake.

Another factor that affects the amount of water assumed to be acquired is the estimated loss rate in the reach from Wabuska to Walker Lake; Dr. Lesperance and the Revised DEIS analysis use different loss rates in their analyses. Dr. Lesperance uses a total average loss rate of 40.6% inclusive of evaporation, channel leakage, and use by the Walker River Indian Reservation. The Revised DEIS analysis addresses on-reservation irrigation diversions as continued exercise of WRPT's decreed water right and not part of other physical losses based on USGS diversion data. For physical losses, the Revised DEIS analysis uses a composite incremental loss rate of approximately 10%.

The higher amounts of acquired water assumed to be needed, and the use of higher average loss rates below Wabuska, result in a much higher potential

economic impact in Dr. Lesperance's paper than is demonstrated in the Revised DEIS analysis.

Assessment Methods

Impacts were determined by evaluating expected future conditions with each alternative versus the baseline of existing conditions and trends. An impact is identified when the change from baseline is attributable to the implementation of the alternative.

Acquisition Scenarios

Agricultural production for Alternatives 1 and 2 is based, in part, on three acquisition scenarios. These scenarios, the Full Transfer Scenario and two Consumptive Use Scenarios (Full Consumptive Use Scenario and Partial Consumptive Use Scenario), are described in Chapter 3, Water Resources, under Transfer Scenarios for Alternatives 1 and 2.

In the Full Transfer and the Partial Consumptive Use Scenarios, the acreage of irrigated agricultural lands that could be involved in acquisitions from willing sellers is estimated to range between 14,800 acres and 18,600 acres. For Alternative 1, it was assumed that these lands would be retired from irrigated agricultural production (i.e., redirected to non-water consuming uses or left as open space). For Alternative 2, it was assumed that lands would be fallowed and would rotate in and out of irrigated agricultural production during the 20-year program.

For Alternative 3, it was assumed that no lands would be retired and that water conservation practices would be implemented that would only partially attain the goal of adding an average inflow of 50,000 af/yr. See Chapter 3, Water Resources, for a detailed description of the methods used to estimated effects on irrigated land.

Agricultural Production

Although most of the crop production in East Walker area and Smith and Mason Valleys is alfalfa or other forage crops, the specific agricultural lands that may be affected by the proposed acquisitions are not known. Therefore, a gross average per acre crop value for alfalfa grown in Lyon County (i.e., the predominant irrigated crop, and one more likely to be affected by water rights offered for sale than, say, onions or other high-investment crops) was used to estimate the potential loss in agricultural production value under each alternative. The average per acre value was determined to be $529 (Bartholet et al. 2009), which represents a 7-year rotation for alfalfa, including fallowing for 1 year. This per-acre value was then applied to the acreage of agricultural land that could be affected under each alternative. For purposes of this analysis, it was assumed that crop

production would cease on the irrigated lands from which water rights are purchased.

Agriculture Employment and Personal Income

The potential changes in employment and personal income levels that may occur as a result of reduced agricultural production were estimated by applying the per acre employment and income multipliers developed by the University (Bartholet et al. 2009). Affected employment has three components: direct, indirect, and induced employment. Direct employment refers to people working on farms; indirect employment refers to people working in agricultural support industries (e.g., suppliers of seed, chemicals, and fuel, and suppliers and servicers of agricultural equipment); and induced employment refers to people employed in the broader economy that supply goods and services to people employed in agriculture. Tables 10-1 and 10-2 provide a summary of estimated losses in employment and income in Lyon County that would occur under the Full Transfer and Partial Consumptive Use Scenarios, which represent a potential range of acreage retired from irrigated agricultural production.

Table 10-1. Estimated Impacts on Employment in Lyon County as a Result of Changes in Agricultural Production

Employment	Employment Multiplier (jobs/acre)	Estimated Job Loss	Baseline Employment	Loss as Percent of County Total
Full Transfer Scenario (assumes production ceases on 14,800 acres)				
Direct	0.007	103	665	15.5
Indirect	0.002	30		
Induced	0.001	15		
Total		148	18,048	0.8
Partial Consumptive Use Scenario (assumes production ceases on 18,600 acres)				
Direct	0.007	130	665	19.5
Indirect	0.002	37		
Induced	0.001	19		
Total		186	18,048	1.0

Sources: Employment multipliers: Bartholet et al. 2009.

Table 10-2. Estimated Impacts on Personal Income in Lyon County as a Result of Changes in Agricultural Production

Type	Income Multiplier ($/acre)	Estimated Income Loss ($ million)	Total Personal Income ($ million)	Loss as Percent of County Total
Full Transfer Scenario (assumes production ceases on 14,800 acres)				
Direct	73	1.4		
Indirect	61	1.1		
Induced	17	0.3		
Total	151	2.8	1,300	0.22
Partial Consumptive Use Scenario (assumes production ceases on 18,600 acres)				
Direct	73	1.1		
Indirect	61	0.9		
Induced	17	0.3		
Total	151	2.2	1,300	0.17

Sources: Income multipliers: Bartholet et al. 2009.

The estimated changes in employment and income under each alternative were compared to total employment in Lyon County, and the combined Mason Valley, Smith Valley, and East Walker area.

Changes in employment within the Mason Valley, Smith Valley, and East Walker area were estimated by first identifying the census tracts and blocks falling within each area, calculating the population for each area as reported at the census block level, and then calculating the percentage of the total Lyon County population residing within each area. (Smith Valley and East Walker were combined into one area because they are within the same census block.) These percentages were then applied to the total change in employment estimated for each alternative to estimate job loss in Mason Valley, Smith Valley, and the East Walker area.

Recreation Employment and Income

Employment and income resulting from changes in recreation opportunities at Walker Lake were qualitatively assessed and based on the changes reported in Chapter 11, Recreation.

Information reported by USFWS indicates that fishing trip expenditures made by Nevada residents and nonresidents within Nevada totaled approximately $61.4 million in 2006 (U.S. Fish and Wildlife Service, U.S. Department of Commerce, U.S. Census Bureau 2006). Wildlife viewing trip expenditures made by Nevada residents and nonresidents within Nevada totaled approximately $159 million in 2006 (U.S. Fish and Wildlife Service U.S. Department of Commerce, U.S. Census

Bureau 2006). Anglers spend approximately $30 per visitor day; approximately 13% on lodging and the remainder in local retail sectors (Bartholet et al. 2009).

As reported in Chapter 11, Recreation, visits to Walker Lake State Recreation Area averaged approximately 37,300 annually between 2004 and 2009. Anecdotal information provided by Nevada Division of State Parks staff (Johnson pers. comm.) suggests that 70% of these visitors are anglers and 30% are using the park's facilities. It is also believed that most anglers are local. For purposes of this analysis, it was assumed that almost all expenditures associated with recreation at Walker Lake State Recreation Area are by local anglers.

Tax Revenues

Sales Taxes

Sales taxes generated within Lyon County could be adversely affected by changes in agricultural production and the resulting reduction in the purchase of taxable goods and services by farmers as well as a reduction in purchases attributable to a decrease in total personal income. Conversely, sales taxes generated within Mineral County may increase as a result of the additional purchase of goods and services attributable to an increase in recreation activity at Walker Lake. (There may also be interactions between the two counties, since goods and services for both local and out-of-area recreational uses could be purchased in both areas.) The potential changes in sales tax revenues generated within Lyon and Mineral Counties were qualitatively assessed.

Property Taxes

The assessed value of property within Lyon County totaled approximately $1.4 billion in 2007. The assessed value of agricultural lands totaled approximately $25 million. Property taxes generated within Lyon County totaled approximately $28 million in 2007. Of the $28 million, $760,000 was generated from agricultural lands (Bartholet et al. 2009). Property tax revenues generated from agricultural lands represented about 1.4% of the Lyon County's 2007 budget.

If agricultural lands are left vacant, property tax generated from these lands would most likely decrease; however, this decrease may not be substantial if these lands are valued as open space (Bartholet et al. 2009). As suggested above, the potential loss of property tax revenues from agricultural lands affected by the program would represent a small proportion of the total property tax revenues generated within Lyon County.

Because it is not known how property values would be affected by the program, potential changes in property tax revenues generated within Lyon County were qualitatively assessed.

Property Values

A study of the socioeconomic effects of water transfers within Sacramento Valley (Mann 2002) suggests that property values may decrease or increase in the area directly affected by a transfer. Irrigated lands may be viewed as an investment opportunity when a transfer program is in place. Conversely, some property values may decrease when the level of income and profits generated from an existing use are directly tied to the availability of water. This suggests the following outcomes.

- A long-term (or permanent) acquisition of water would likely result in a greater adverse impact on property values when compared to a short-term (or temporary) acquisition program.
- Changes in the demographic characteristics of a region may offset to some degree the adverse impact of a water transfer as other economic activities occur, such as residential or commercial development.
- Landowners receiving payments for their water may reinvest all or a portion of those payments in land improvements.

Many variables may affect regional property values. As indicated above, Alternative 1 may preclude irrigated agriculture from an estimated14,800 to 18,600 acres in Mason and Smith Valleys. This represents 25 to 32% of irrigated agricultural land in these valleys (Chapter 7, Land Use and Agriculture, Table 7-2). Such a large decrease in irrigated agriculture would most likely reduce the value of those properties. This potential impact on property values may be less under Alternative 2 because lands would be fallowed and would rotate in and out of production during the expected 3- to 20-year program. Alternative 3 is not expected to adversely affect property values because it would not directly affect the acreage of irrigated lands in the study area. The improvements to the water supply infrastructure could increase the value of properties participating in the efficiency measures.

Seller Expenditures

Studies on the impacts of water reallocation have concluded that beneficial regional socioeconomic impacts may accrue as increased income to landowners occurs as a result of purchasing water from willing sellers (Local Entity and San Diego County Water Authority 2004, Palo Verde Irrigation District 2002). These reports conclude that some portion of sellers typically increase expenditures in the local and regional economy. However, these expenditures are not typically large enough to offset the adverse socioeconomic impacts of lands withdrawn from agricultural production. These potentially attenuating increases in expenditures were considered qualitatively in the assessment.

Impact Criteria

The determination of impacts on employment and income was made at the county level for Mineral County and at both the county level and a subregional level for Lyon County (including Mason Valley and Smith Valley). Socioeconomic impacts were considered adverse if the acquisition alternatives or No Action Alternative would:

- result in a substantial decrease in employment, personal income, or sales taxes generated in Lyon and Mineral Counties.

An increase in recreation-based employment was considered beneficial.

Impacts

No Action Alternative

As indicated in the discussion of agricultural production in Lyon County above, the total cropland and acres planted with forage crops has remained relatively constant between 1987 and 2007 and a significant change to cropland acreage or crops is not expected under the No Action Alternative. Within that same time period, the market value of the major agricultural products grown in Lyon County has generally trended upward with occasional decreases driven by market factors. It is expected that the market value of these products will likely continue to increase, especially if the recent growth in production and/or processing of onions, lettuce, and other higher-valued crops continues.

As indicated in Chapter 7, Land Use and Agriculture, land uses in the study area are not expected to change under the No Action Alternative. This conclusion, combined with the historic trend data, suggests that the amount of land under agricultural production in Lyon County is not expected to change substantially under the No Action Alternative. Because the amount of land under agricultural production is not expected to substantially increase or decrease, substantial changes in agriculture-related employment, personal income, or tax revenues are not expected.

Because the condition of Walker Lake would continue to decline, economic activity in the vicinity of Hawthorne and Walker Lake attributable to recreation opportunities is expected to continue to decrease. As indicated in Chapter 11, Recreation, recreation opportunities associated with fish and wildlife at Walker Lake would continue to be adversely affected if the lake's elevation and water quality continue to decline. This would be an adverse socioeconomic impact.

The continued decline in recreation-related opportunities at Walker Lake would result in an adverse impact on employment, personal income, and sales tax revenues in Mineral County.

Alternative 1 (Purchase Alternative)

Acquisitions under Alternative 1 are expected to add an average of 50,000 af/yr of water to Walker Lake. It is possible, however, that less than the full 50,000 af would be provided to the lake either because of funding issues or because there would not be enough willing sellers. With funding of $56 million, it is estimated that the annual average inflow to the lake would increase by 7,300 af.

This analysis of impacts under Alternative 1 assumes that the Purchase Alternative would be fully funded and that acquisitions would increase the average annual inflow to the lake by 50,000 af. Unless otherwise noted, if the full amount of water were not acquired, the impacts would be similar in nature (i.e., adverse, minor, beneficial, or no impact) but of less magnitude.

Impact SOC-1: Change in Total Employment in Lyon County as a Result of Changes in Agricultural Production (Minor Impact)
Implementing Alternative 1 would result in less agricultural production in Mason and Smith Valleys and the East Walker area located in Lyon County. Acquisitions could result in an estimated annual production loss ranging from $7.8 million to $9.9 million. As indicated in the Affected Environment section, it was assumed that most of the agricultural lands affected by acquisitions produce alfalfa or other forage crops. Depending on the acquisition scenario (14,800 to 18,600 acres), this would result in production losses ranging from approximately 33 to 42% of the total value of hay and other forage crops grown in Lyon County. When compared to the total value of agricultural products sold from Lyon County, this loss would range from approximately 9 to 11%.

The per acre employment multiplier (Bartholet et al. 2009) indicates that the estimated direct, indirect, and induced losses in employment that may occur as a result of the loss in agricultural production in Lyon County would total between 148 and 186 jobs. This includes the estimated direct loss of 103 to 130 jobs. This estimated loss represents approximately 1% of total employment in Lyon County and less than 1% of total employment in the two-county study area (20,332 jobs).

The loss of total employment as a result of implementing Alternative 1 is considered a minor adverse impact because these losses would represent less than 1% of total employment occurring in the two-county study area and approximately 1% of employment occurring in Lyon County. The minor nature of this impact would be the same with either full funding or funding of $56 million, but its expected magnitude would be proportional to the amount of allocated funding.

The loss in employment could be slightly offset if landowners receiving payments choose to invest all or a part of those payments locally. This could include raising and/or processing alternative crops, dry farming, or other enterprises (Bartholet et al. 2009).

Impact SOC-2: Change in Total Employment in Mason and Smith Valleys as a Result of Changes in Agricultural Production (Adverse Impact)
As discussed under Impact SOC-1, the per acre employment multiplier (Bartholet et al. 2009) indicates that the estimated direct, indirect, and induced losses in employment that may occur as a result of the loss in agricultural production in Lyon County would total between 148 and 186 jobs. This includes the estimated direct loss of 103 to 130 jobs.

Employment in Mason Valley and Smith Valley totaled 4,426 jobs in 2007. Assuming that the direct, indirect, and induced losses in employment would occur only within Mason Valley (including Yerington) and Smith Valley, the total lost jobs would represent approximately 3 to 5% of employment in the Mason Valley and Smith Valley areas.

The total loss of employment would be considered an adverse impact because a 3 to 5% loss of employment is a substantial proportion of total employment in Mason and Smith Valleys. This impact would be the same with either full funding or funding of $56 million, but its expected magnitude would be proportional to the amount of allocated funding.

The loss in employment could be slightly offset if landowners receiving payments choose to invest all or a part of those payments locally. This could include raising and processing alternative crops, dry farming, or other enterprises (Bartholet et al. 2009).

Impact SOC-3: Change in Agricultural Employment as a Result of Changes in Agricultural Production (Adverse Impact)
The loss in annual production of $7.8 million to $9.9 million (see Impact SOC-1) would reduce farm employment in Lyon County by approximately 16 to 20%.

If these direct losses were to occur only within Mason and Smith Valleys, the impact would be much greater. The direct change in employment resulting from the loss in agricultural production would account for approximately 21 to 27% of total farm employment within Mason and Smith Valleys.

This employment loss would be an adverse impact both locally in Mason and Smith Valleys and for Lyon County. The adverse nature of this impact would be the same with either full funding or funding of $56 million, but its expected magnitude would be proportional to the amount of allocated funding for acquisitions with higher impact under full funding.

The loss in employment could be slightly offset if landowners receiving payments choose to invest all or a part of those payments locally. This could include raising and/or processing alternative crops (Bartholet et al. 2009) or other enterprises.

Impact SOC-4: Change in Employment as a Result of Changes in Recreation Opportunities at Walker Lake (Beneficial Impact with Full Funding; No Impact with Funding of $56 Million)
As indicated in Chapter 11, Recreation, implementing Alternative 1 would result in a beneficial impact on recreation opportunities at Walker Lake. Based on spending profile information and visitation data collected by the Nevada Division of State Parks, existing spending to participate in recreation opportunities occurring at Walker Lake totals an estimated $1.1 million annually. This represents about 1.5% of total spending made by anglers in Nevada in 2006.

Increasing the surface elevation of the lake would have a beneficial impact on recreation opportunities by improving access and increasing the population levels of fish and wildlife. Enhancing these recreation opportunities would increase economic activity in Mineral County because out-of-region visitation to Walker Lake and associated expenditures on goods and services would increase (Seung et al. 1990, Fadali et al. 1998).

Angler days could increase to approximately 38,600 if the Acquisition Program were to result in a return of fishing activity to the peak experienced in 1999. This recreation activity would generate an estimated 10 jobs in Mineral County (Bartholet et al. 2009). However, it should be noted that it is not known when the Walker Lake fishery would return to the degree needed to support 38,600 angler days.

With full funding of Alternative 1, increased visitation to Walker Lake would be expected to have a minor beneficial impact on local employment as the demand for recreation-related services and products would increase.

As indicated in Chapter 11, Recreation, acquisitions from funding of $56 million would not benefit sport fishing, birding, and associated recreational opportunities in the Walker Lake area in the long run. Similarly, funding of $56 million would provide no benefit to shoreline recreation and boating access at Walker Lake compared to existing conditions. Lake surface elevation would continue to drop and TDS concentration would increase, though less than under the No Action Alternative.

Impact SOC-5: Change in Income as a Result of Changes in Agricultural Production (Minor Impact)
As discussed under Impact SOC-1, Alternative 1 would result in the loss of agricultural production in Mason and Smith Valleys and the East Walker area. As a result of loss in agriculture-related employment, total personal income in Lyon County and in the study area would also decline.

The estimated loss in employment resulting from changes in agricultural production and losses in total personal income would range from $2.2 to $2.8 million. This loss represents approximately 0.17 to 0.22% of total personal

income in Lyon County. The loss in agricultural production would result in a minor adverse impact on total personal income in Lyon County.

The minor nature of this impact would be the same with either full funding or funding of $56 million, but its expected magnitude would be proportional to the amount of allocated funding.

The losses in income may be slightly offset if landowners receiving payments choose to invest all or a part of those payments locally. This could include raising and/or processing alternative crops (Bartholet et al. 2009) or investing in other local business opportunities.

Impact SOC-6. Change in Income as a Result of Changes in Recreation Opportunities at Walker Lake (Beneficial Impact)
As a result of potential increases in employment associated with enhanced recreation opportunities at Walker Lake, personal income is expected to increase slightly in Mineral County, with full funding of Alternative 1. Increased visitation to Walker Lake may have a minor beneficial impact on total personal income levels in Mineral County as a result of an increase in demand for recreation-related services and products.

With acquisitions from funding of $56 million, recreational opportunities in the Walker Lake area would not benefit substantially in the long run, compared to existing conditions, as indicated above in Impact SOC-3. Lake surface elevation would continue to drop and TDS concentration would increase, although less than under the No Action Alternative. Corresponding impacts on recreation-related employment and personal income would be expected.

Impact SOC-7: Change in Tax Revenues (Minor Impact)
As indicated in Impact SOC-1, implementing Alternative 1 would likely result in a reduction in agricultural production. This loss of production would result in a loss of employment and personal income in Lyon County. This reduction in economic activity could also result in a reduction in sales tax revenues if purchase of taxable goods and services declines.

The potential change in sales tax revenues would be considered a minor adverse impact because a large proportion of purchases made by landowners and employees (e.g., groceries and agricultural implements) are exempt from sales tax (Bartholet et al. 2009).

If formerly productive agricultural lands in Lyon County are left vacant as a result of implementing Alternative 1, it is likely that these properties would receive a lower property tax valuation than for agricultural lands (Bartholet et al. 2009). This lower valuation would result in a slight reduction in total property tax revenues generated within Lyon County.

The minor nature of this impact would be the same with either full funding or funding of $56 million, but its expected magnitude would be proportional to the amount of allocated funding.

Alternative 2 (Leasing Alternative)

Because Alternative 2 involves recurring water leases, the actions of Alternative 2 would last only until the funding is exhausted. Assuming that sufficient water is leased to increase inflow to Walker Lake by an average 50,000 af/year, funding of $56 million would last an estimated 3 years, while full funding would last an estimated 20 years. Under full funding, it is expected that lands would be fallowed and would rotate in and out of production during the 20-year program.

Impact SOC-1: Change in Total Employment in Lyon County as a Result of Changes in Agricultural Production (Minor Impact)
With full funding of Alternative 2, the impact on total employment would be the same as described for Alternative 1, but it would be temporary. Similar to Alternative 1, losses in employment could be slightly offset if landowners receiving payments choose to invest all or a part of those payments locally.

With funding of $56 million, the initial impact on employment in Lyon County would be the same as described for Alternative 1 because the same amount of land is expected to be fallowed. The long-term adverse impact on employment would be avoided, however, because funding of $56 million would only last approximately 3 years. At the end of this period, the leasing would cease for landowners leasing water, and landowners most likely are expected to return fallowed agricultural lands back into production.

Impact SOC-2: Change in Total Employment in Mason and Smith Valleys as a Result of Changes in Agricultural Production (Adverse Impact)
With full funding of Alternative 2, the impact on total employment in Mason Valley and Smith Valley would be the same as described for Alternative 1, but it would be temporary. Similar to Alternative 1, losses in employment could be slightly offset if landowners receiving payments choose to invest all or a part of those payments locally.

With funding of $56 million, the initial impact on employment in Mason Valley and Smith Valley would be the same as described for Alternative 1 because the same amount of land would be fallowed. The long-term adverse impact on employment would be avoided, however, because funding of $56 million would only last approximately 3 years. At the end of this period, the leasing would cease for landowners leasing water, and landowners most likely are expected to return fallowed agricultural lands back into production.

Impact SOC-3: Change in Agricultural Employment as a Result of Changes in Agricultural Production (Adverse Impact)
With full funding, the impact of Alternative 2 on agricultural employment would be the same as described for Alternative 1; however, once funding ended, the fallowed agricultural land is expected to be returned back into production. The agricultural-related employment impact could be offset if landowners receiving payments choose to invest all or a part of those payments locally.

With funding of $56 million, the initial impact on employment in Lyon County would be the same as discussed for Alternative 1 because the same amount of land would be removed from production. The long-term adverse impact on agricultural employment would be avoided, however, because funding of $56 million would only last approximately 3 years. At the end of this period, the leasing would cease for landowners leasing water, and landowners most likely are expected to return fallowed agricultural lands back into production.

Impact SOC-4: Change in Employment as a Result of Changes in Recreation Opportunities at Walker Lake (Beneficial Impact)
With full funding, the impact of Alternative 2 on recreation-related employment would be the same as described for Alternative 1. This minor beneficial impact is associated with recreation opportunities at Walker Lake. Once funding ends and if the environmental conditions at Walker Lake return to preprogram conditions, it is expected that employment would also return to preprogram conditions.

As indicated in Chapter 11, Recreation, Alternative 2 with funding of $56 million would provide some temporary benefits to recreation opportunities, but no long-term benefits. After approximately 3 years, lake surface elevation would drop and TDS concentration would increase, with no subsequent benefit to recreational opportunities. A corresponding initial increase and then decline in recreation-related employment and personal income would be expected.

Impact SOC-5: Change in Income as a Result of Changes in Agricultural Production (Minor Impact)
With full funding, the impact of Alternative 2 on personal income resulting from changes in agricultural production would be expected to be essentially the same as for Alternative 1; however, once funding ends, the fallowed agricultural land could be placed back into production. The loss in income could be slightly offset if landowners receiving payments invest all or a part of those payments locally.

With funding of $56 million, short-term minor impacts on personal income would occur as a result of loss in agricultural production, as under the full funding scenario; however, these impacts may be less because landowners may rotate lands in and out of production during the 20-year program period.

Impact SOC-6: Change in Income as a Result of Changes in Recreation Opportunities at Walker Lake (Beneficial Impact)
With full funding, the impact of Alternative 2 on personal income would be the same as described for Alternative 1. Once funding ends and if the environmental conditions at Walker Lake return to preprogram conditions, it is expected that income would also return to preprogram conditions.

Impact SOC-7: Change in Tax Revenues (Minor Impact)
Under Alternative 2, the impact on sales tax revenues would be the same as described for Alternative 1, but may be temporary. Once funding ends and if the environmental conditions at Walker Lake return to preprogram conditions, it is expected that sales tax revenues associated with recreation at Walker Lake would also return to preprogram conditions.

Alternative 3 (Efficiency Alternative)

As discussed in Chapter 3, Water Resources, it is estimated that full funding of Alternative 1 would increase inflow to Walker Lake by 50,000 af/yr on average, while full implementation of Alternative 3 would yield 32,300 af/yr. Unless otherwise indicated, the impacts of Alternative 3 would be similar to those of Alternative 1 with full funding (i.e., no impact, minor, beneficial, or adverse), but less in magnitude because less water would be available for acquisition.

Impacts Similar in Nature to Alternative 1

Impact SOC-4: Change in Employment as a Result of Changes in Recreation Opportunities at Walker Lake (Beneficial Impact)
Under Alternative 3, the magnitude of the beneficial impact on employment resulting from increased recreation opportunities at Walker Lake is not expected to be as great as under Alternative 1 because less water would reach the lake and there would be little improvement in boating access compared to existing conditions. However, other benefits to recreational opportunities attributable to Alternative 1 would also occur with Alternative 3.

Impact SOC-6: Change in Income as a Result of Changes in Recreation Opportunities at Walker Lake (Beneficial Impact)
Under Alternative 3, the magnitude of the beneficial impact on personal income resulting from increasing recreation opportunities at Walker Lake is not expected to be as great as under Alternative 1 because less water is expected to reach the lake and there would be little improvement to boating access compared to existing conditions. However, other benefits to recreational opportunities attributable to Alternative 1 would also occur under Alternative 3.

Impacts Different from Alternative 1

Impact SOC-1: Change in Total Employment in Lyon County as a Result of Changes in Agricultural Production (Beneficial Impact)
Under Alternative 3, no permanent change in employment would occur because implementing efficiency methods to conserve water would not necessitate reducing or fallowing agricultural lands.

Improvements to the water delivery systems in Mason and Smith Valleys and the East Walker area and initiating other efficiency improvements are expected to temporarily increase employment and income in the study area. Improvements would benefit the local economy. The magnitude of this benefit would be driven by the amount of expenditures made on improving the water delivery system, the duration of construction, and the extent to which local contractors and workers would be used to construct the improvements.

Impact SOC-2: Change in Total Employment in Mason and Smith Valleys as a Result of Changes in Agricultural Production (No Impact)
Under Alternative 3, no permanent change in total employment would occur because implementing efficiency methods would not affect land status.

Impact SOC-3: Change in Agricultural Employment as a Result of Changes in Agricultural Production (No Impact)
Under Alternative 3, no permanent change in total employment would occur because implementing efficiency methods would not affect land status.

Impact SOC-5: Change in Income as a Result of Changes in Agricultural Production (No Impact)
Under Alternative 3, no adverse impact on personal income levels in Lyon County is expected because agricultural production would not decrease.

Improvements to the water delivery system in Mason and Smith Valleys and the East Walker area and other efficiency measures would temporarily increase income in the study area. These improvements and other efficiency measures would increase total personal income level in Lyon County and in the study area. The magnitude of this increase would be driven by the amount of expenditures, the duration of construction, and the extent to which local contractors and workers would be used.

Impact SOC-7: Change in Tax Revenues (Beneficial Impact)
Under Alternative 3, maintaining agricultural production and implementing water efficiency measures in the study area could result in a short-term beneficial impact on sales taxes generated in Lyon County for the duration of the Acquisition Program.

Chapter 11 Recreation

Chapter 11 Recreation

Introduction

This chapter describes the affected environment for recreation in the study area and the potential impacts on recreation that would result from the acquisition alternatives and No Action Alternative.

Sources of Information

The key sources of data and information used in the preparation of this chapter are listed below. Full references can be found in Chapter 17, References.

- BLM, Carson City Field Office Consolidated Resource Management Plan (Bureau of Land Management 2001)
- BLM, Walker Lake Recreation Management Plan (Bureau of Land Management 1979)
- Lyon County Master Plan (Lyon County 1990)
- Mineral County Master Plan (Mineral County 2006)

Affected Environment

This section describes the environmental setting related to recreation in the study area. Although the project area is the entire Nevada portion of the Walker River Basin (Chapter 1), the study area for recreation was defined as the following areas in Lyon and Mineral Counties: West Walker River, East Walker River, mainstem Walker River, Walker Lake, irrigated land in the valleys, Weber Reservoir, Mason Valley and Alkali Lake WMAs, and a 1-mile zone around each of these areas.

California and Douglas County, Nevada, were not included in the study area. Although the Walker River watershed originates in Mono County, California, the acquisition alternatives would not include acquisitions of land, water appurtenant to the land, and related interests in California or Douglas County, Nevada. Under all acquisition alternatives, Topaz Lake Reservoir and Bridgeport Reservoir are expected to continue to operate as required by existing water rights licenses, permits, and agreements and are not expected to change from current patterns of use; therefore, these reservoirs has been excluded from the study area. The California and Douglas County, Nevada, portions of the basin would not be affected directly or indirectly by the acquisition alternatives.

Key recreational activities addressed by this Revised DEIS are those that are water dependent or are influenced by their proximity to Walker River, Walker Lake, or WMAs. These include shoreline use, boating, sport fishing, hunting,

Hiking, and wildlife viewing. A map of recreation areas and facilities within the study area is provided in Figure 11-1.

Recreation in the study area occurs on land owned or administered by the following entities:

- BLM, Carson City Field Office
- USFS (Humboldt-Toiyabe National Forest)
- DOD (Hawthorne Army Depot)
- WRPT
- YPT
- NDOW
- Mineral County
- Lyon County
- Private Owners

Bureau of Land Management

BLM lands in the study area are managed by the Carson City District Office. These lands are used for multiple purposes, including wilderness, recreation, mining, herd management areas, mineral and energy leases, and grazing allotments (Bureau of Land Management 2001).

BLM owns and manages land on the west and east shores of Walker Lake. Three BLM recreation facilities are located on the west shore: Sportsman Beach, Tamarack Beach, and Twenty Mile Beach. Sportsman's Beach provides 31 individual camp sites plus two undeveloped camping areas that accommodate RV and tent campers. Facilities include vault toilets, covered picnic tables, barbeque grills, paved access roads, and a public boat ramp area (Bureau of Land Management 2008a). The public boat ramp at Sportsman's Beach is unusable and is expected to be removed by NDOW because declining lake level has caused the shoreline to recede, resulting in a shallow approach (Hull pers. comm.). The boat dock, which was rusting and dangerous, has been removed. Both Tamarack Beach and Twenty Mile Beach offer paved access to the lakeshore and have vault-style toilets. Primitive camping is allowed at both sites, but there is no developed camp site (Bureau of Land Management 1999). Between October 1, 1998, and September 20, 2007, approximately 291,973 combined visits were made to these three facilities (Hull pers. comm.).

On the west side of Walker Lake, off-highway vehicle (OHV) use is limited to designated roads and trails that provide access to 2,640 acres.

Note: The Mason Valley Wildlife Management Area (WMA) has increased in size since this figure was created, but the additional acres are not included in the USGS database that was used to create this figure. See Figure 7-2 for a more accurate depiction of the WMA boundaries.

In addition, the number of acres in agriculture changes from year to year, and the acreages shown here are a snapshot in time for general reference only.

SHOE

STOREY

CHURCHILL

LYON

Walker River

CARSON CITY

Mason Valley Wildlife Management Area

Walker River

Weber Reservoir

Yerington

Alkali Lake State Wildlife Management Area

Walker River Indian Reservation

Schurz

DOUGLAS

Mason Valley

Smith Valley

Walker River Resort

Willson Canyon Recreation Area

East Walker River

Smith

West Walker River

Twenty Mile Beach

Tamarack Beach

MINERAL

Sportsman Beach Recreation Site

Walker Lake

Walker Lake State Park

Cliff House Lakeside Resort

Antelope Valley

Hawthorne Army Depot

Hawthorne

Rosaschi Ranch

NEVADA

CALIFORNIA

ESMERALDA

Legend

- Recreation Facilities
- Cities / Towns
- Rivers
- Study Area
- County Boundaries
- Project Area
- Toiyabe National Forest Boundary

Owner

- Bureau of Land Management
- Lakes / Reservoirs
- U.S. Department of Defense
- Tribal Land
- State of Nevada Lands
- Private
- U.S. Forest Service

Source: ICF Jones & Stokes 2008

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ICF Jones & Stokes
an ICF International Company

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Figure 11-1
Recreation Facilities in the Study Area

The east shore provides primitive camping, hiking, OHV use, and wildlife viewing and does not contain any constructed recreation facilities. There is unlimited OHV access to the east side of the lake (Bureau of Land Management 2001).

BLM owns and manages Wilson Canyon on the West Walker River. Wilson Canyon is a major OHV riding area, and is also popular as a place to camp, fish, hike, and picnic. There is also an interpretive trail. BLM plans to fence and place signs along the bed and banks of the river to protect the river, and motorized vehicles and camping will not be allowed inside the fence (Bureau of Land Management 2008b).

National Forest System Lands

USFS manages the Humboldt-Toiyabe National Forest, located along the upper reaches of the East and West Walker Rivers. The only USFS-developed facility in the study area is Rosaschi Ranch, located on East Walker River. Rosaschi Ranch is open to the public and is a popular fly-fishing site for rainbow and brown trout. It has a "catch-and-release" fishing regulation (Flyfish Nevada 2008). Other recreational activities on national forest lands include hiking, backpacking, camping, fishing, hunting, OHV use, horseback riding, bird and wildlife viewing, photography, and summer ranger-guided programs and activities. During the winter, activities include cross-country skiing, snowshoeing, and snowmobiling. In the Humboldt-Toiyabe National Forest, recreation visits were estimated to be 3.2 million in 2006 (U.S. Forest Service 2008).

Hawthorne Army Depot

The DOD's Hawthorne Army Depot is a 147,000-acre ammunition storage depot on the south end of Walker Lake. The portion of lake that falls under the DOD's jurisdiction is not open to the public for recreation purposes because of unexploded ordinance hazard. This area is delineated by buoys to prevent boaters from entering (Schildt pers. comm.).

Walker River Indian Reservation

The Walker River Indian Reservation provides opportunities for dispersed recreation; camping and fishing are the main activities. Weber Reservoir is located on the reservation and is a popular weekend spot for informal camping, fishing, and picnicking by tribal members (Miller Ecological Consultants 2005).

Fishing on the reservation occurs primarily in Walker River, Weber Reservoir, and the northern tip of Walker Lake. The reservoir supports a warmwater fishery under normal operating conditions (Miller Ecological Consultants 2005). WRPT maintains fishing regulations on the reservation. Fish species include trout, largemouth bass, catfish, crappie, and carp (Walker River Paiute Tribe 2008).

Boating in the reservation is limited to canoes, kayaks, rafts, and boats with motors less than 10 horsepower. No personal watercrafts (e.g., jet skis) are allowed in these waters (Walker River Paiute Tribe 2008). Boating on the portion of Walker Lake located on reservation lands is limited to the fishing season only, and only by permit. Two signs located along the shoreline and an imaginary line between them designate where the reservation begins (Schildt pers. comm.).

Yerington Paiute Indian Reservation

The Yerington Paiute Indian Reservation is surrounded by private and BLM lands. YPT members hunt birds and small game on the reservation. YPT has planned the restoration of wetlands along the Wabuska Drain in the Perazzo Slough area, and has proposed recreational facilities as part of this program. This program would also support the gathering of traditional plants.

Tribal members use multiple sites in the study area for gathering traditional plants and materials used in cultural and spiritual activities. This activity is concentrated near surface water, in wetlands, and along the Walker River. Although YPT does not equate cultural and spiritual activities with recreation, plant collection occurs in areas that may be managed for recreation by state and federal agencies. Plants collected include *Ta'boosi*, a river sedge plant; *Toi*, cattails; *Sai'bu*, tules; *Suu'vii*, red willows; *Wuu'wii'pui*, buckberries; *Ma'va'bui*, yellow currents; *Toi'buh*, rosebushes; *Kwi'bah'noh*, stinging nettles; *Numu wai'va*, river grass; rye grass; wild mushrooms; *Suung'a'vii*, cottonwood trees; *To'no'vii*, greasewood; *Pah sah'wa'vii*, big sagebrush; and *Wii'ha*, dogbane.

Nevada Department of Wildlife – Wildlife Management Areas

The State of Nevada, through NDOW, owns or has long-term leases on more than 117,000 acres of land incorporated into WMAs across the state. The management focus of most WMAs is development of wetland- and waterfowl-related activities, including the use of these areas as public shooting grounds, with all other uses being secondary (Nevada Department of Wildlife 2002). Public uses include bird watching, hiking, fishing, and hunting. Hunting on WMAs targets migratory game bird, upland game bird, furbearer, and big game hunting (Nevada Department of Wildlife 2008a).

Two WMAs occur in the study area: Alkali Lake WMA and Mason Valley WMA. These WMAs are described in detail below. See also Chapter 7, Land Use and Agriculture for information on the WMAs.

Mason Valley Wildlife Management Area

Mason Valley WMA is located on the north end of Mason Valley and totals approximately 13,735 acres. The WMA is open year-round and attracts hunters, anglers, and other outdoor enthusiasts. It also provides nature education opportunities (Nevada Department of Wildlife 2008a).

The Walker River bisects the WMA as it traverses from south to north. Other major bodies of water include Hinkson Slough, North Pond, Mallard Pond, Honker Lake Bass Pond, Crappie Pond, and approximately 30 additional smaller ponds, sloughs, and channels that are scattered across the WMA. Boating is allowed, but some bodies of water are closed during certain times of the year. Vessels must travel at or below 5 nautical miles per hour at all times (Nevada Department of Wildlife 2008a).

Wildlife-related recreation activities include hunting, fishing, wildlife viewing, photography, horseback riding, camping in the primitive campground, educational activities, picnicking, hiking, and touring the Mason Valley Hatchery (Nevada Department of Wildlife 2008b). Seasonal hunting in the WMA consists primarily of waterfowl hunting, but upland game and big game hunting is also allowed on certain days in the season (Nevada Department of Wildlife 2008b).

Fishing for both warmwater and coldwater species is available in the WMA. Largemouth bass is the most sought-after game species during the late spring and summer and is found in about 33% of the ponds in the WMA. Three trout species are stocked in Hinkson Slough and North Pond (Nevada Department of Wildlife 2008b).

Very good fishing for trout, largemouth bass, catfish and bluegill is available at the WMA. Public use of the WMA reaches its highest level during the fishing season, sometimes exceeding 4,000 users per month (Bull pers. comm. 2009).

Alkali Lake Wildlife Management Area

Alkali Lake WMA is located on the north end of Smith Valley and is approximately 3,448 acres. Recreation opportunities include hunting, hiking, wildlife viewing, and photography. Camping is not allowed (Nevada Department of Wildlife 2008a). When water is present, Alkali Lake is used by ducks, geese, shorebirds, and wading birds, and provides hunting opportunities. The lake does not support fishing (Bull pers. comm. 2008).

Nevada Division of State Parks

Nevada Division of State Parks owns and maintains Walker Lake SRA, located 11 miles north of Hawthorne, off U.S. Highway 95. Facilities at the SRA include picnic tables, seven shade structures with tables, barbecue grills, and fire pits at each structure; and two vault-style restrooms. The concrete boat ramp is not in use because of low lake elevation; the ramp is currently over a hundred yards from the water. The ramp was extended 30 yards in 1982, but the lake receded so fast it became unusable within a few years. A lake surface elevation equivalent to that of 1980 (i.e., roughly 20 feet higher than the lake's July 2008 elevation) would be needed for this ramp to be usable. A temporary primitive boat ramp 200 yards north of the unusable concrete ramp was installed by State Parks with assistance from Mineral County. Funds previously allocated for improvements to

this ramp have been reallocated because of the state of the lake. Boaters are currently launching and retrieving boats at Walker Lake SRA from the shore using four-wheel drive vehicles (Hull pers. comm. 2008; Angler Guide 2008). Activities at the SRA include fishing, boating, swimming, wildlife viewing, and hiking. Visitor use appears to have been relatively stable over the past 4 years (Table 11-1).

Table 11-1. Walker Lake State Recreation Area Visitor Use

	Total Estimated Visitors[a]					
	2004	2005	2006	2007	2008	2009
Jan	2,637	2,568	2,408	2,325	1,779	1,244
Feb	2179	2,204	2,804	2,524	3,465	1,591
March	3,008	4,515	2,523	2,523	6,661	1,903
April	2,603	5,520	2,100	2,100	2,064	6,514
May	3,160	7,217	7,939	7,939	5,940	9,853
June	2,641	2,584	2,842	1,819	5,478	3,432
July	1,861	2,047	2,267	1,865	4,333	3,584
August	1,787	4,257	4,196	3,175	3,175	2,541
September	1,773	1,500	1,858	1,790	933	928
October	1,643	5,413	5,954	1,702	1,388	1,760
November	1,704	1,600	2,000	2,000	1,720	1,150
December	1,557	3,630	5,636	5,072	3,974	1,551
Total	26,553	43,055	42,527	34,834	40910	36,051

Source: Johnson pers. comm. 2010.

[a] Calculated by multiplying the number of vehicles by an average number of occupants per vehicle. The average number of occupants changes with each season as determined by a visitor survey of State Park users conducted several years ago.

In July 2009, the Walker Lake SRA was closed as a result of budget cuts. As a result, restrooms at the lake were closed and trash removal services were discontinued, but no gates were installed. The closure has had little impact on use (Johnson pers. comm. 2010).

Lyon County

In Lyon County, the Walker River and adjacent lands provide such recreational opportunities as fishing, hiking, wildlife viewing, hunting, and photography. Public access along the West Walker River is limited because of private ownership. The East Walker River flows through private lands as well as BLM lands and USFS lands (Humboldt-Toiyabe National Forest), which allows for

recreational access to the water. The mainstem Walker River within Lyon County flows through private lands, land owned by the City of Yerington and Lyon County, land owned by the State of Nevada (Mason Valley WMA), and the Walker River Indian Reservation. The mainstem Walker River provides the most public access opportunities because of the large amount of public lands that are immediately adjacent to the river.

Lyon County maintains two parks within the study area, Dressler Park in the town of Wellington and Mason Park in the town of Mason.

Mineral County

Mineral County has one major town, Hawthorne, and a few smaller towns. Hawthorne contains a primary school, elementary/junior high and high schools, and a community college. The schools sites have ball fields and playgrounds. Hawthorne has county-maintained parks. Walker Lake is located entirely in Mineral County and provides water-related recreation opportunities, including boating, water skiing, sport fishing, swimming, and birding.

The only sport fish found in Walker Lake is LCT, which historically was stocked annually by NDOW and USFWS. Currently, stocking occurs if environmental conditions in the lake permit. No stocking occurred in 2009 and will likely not occur in 2010. Under ideal environmental conditions, LCT can live up to 9 years and achieve weights greater than 10 pounds (Wright pers. comm. 2010). Numerous festivals and events are held in Mineral County annually. The town of Hawthorne hosts three fishing derbies and Armed Forces Day. An annual Loon Festival has been celebrated at Walker Lake, but was not held in 2009 because of the low number of loon sightings in 2008. The Loon Festival was replaced by the Walker Lake Education Day, which highlighted the multi-organization and agency efforts to prevent the collapse of the freshwater fishery and associated environmental ecosystems (Lahontan Audubon Society 2009). The annual Pinenut Festival is held in September in Schurz on the Walker River Indian Reservation (Walker Lake Working Group 2008). The El Capitan Fishing Derby and the Thanksgiving Fishing Derby are also held at Walker Lake (Walker Lake Working Group 2008).

City of Yerington

The City of Yerington, located in Lyon County, maintains seven park facilities, providing amenities such as active sports fields, a swimming pool, playgrounds, picnic tables and shade structures, a skate park, fishing lake, and walking paths (City of Yerington 2008).

The mainstem Walker River flows through the city and delineates much of its western boundary. The river in this reach provides recreation activities, including fishing, bird watching, and photography.

Private Owners

Numerous privately owned recreational vehicle (RV) parks are located within the study area, primarily in or near Hawthorne and Yerington. Most of the parks offer overnight, weekly, and monthly camping options, but do not contain recreation amenities on site or allow tent camping. The RV parks in Hawthorne are 8 miles from Walker Lake SRA and have other nearby recreation opportunities on BLM land.

Cliff House Resort is the only private facility located on the west shore of Walker Lake. It has 30 acres and a 5,000-square-foot boathouse with attached boat repair shop, motel, restaurant, bar, game room, and RV hookups (Dzvonick 2008).

Walker River Resort, near the town of Smith, is a private resort and hunting preserve located on West Walker River. The resort offers RV camping and cottages. Activities on the resort include seasonal bird hunting, clay shooting, fly fishing, swimming, golfing, and resort-planned activities. OHV riding is not allowed on the resort property, but is allowed on the surrounding 100,000 acres of BLM land (Walker River Resort 2008).

Privately owned farmland provides opportunities for wildlife viewing and upland bird hunting.

Environmental Consequences

This section describes the impact analysis relating to recreation for the acquisition alternatives and the No Action Alternative. It lists the criteria used to determine whether an impact would be adverse or beneficial.

Assessment Methods

As described above, information about the recreation resources in the study area was gathered. This section assumes any lands potentially acquired by NFWF as part of the Acquisition Program would not be managed for public recreation purposes.

Impact Criteria

Impacts on recreation would be considered adverse if implementation of the alternatives would result in a substantial loss in recreational activity or opportunities in the study area. Outcomes that conflict with recreational policies, goals, objectives, or plans of agencies or jurisdictions in the study area would also be considered adverse.

Impacts

No Action Alternative

The No Action Alternative would result in adverse impacts on recreation at Walker Lake in several ways. With no increase in water inflow, lake elevation and water volume would continue to decrease and TDS concentration would continue to increase (Chapter 3, Water Resources). The higher TDS concentration would further reduce the Walker Lake fishery, and LCT could no longer be stocked in the lake (Chapter 5, Biological Resources—Fish), effectively ending all sport fishing in Walker Lake. The collapse of the fishery would reduce the food supply for migratory birds, such as common loon (Chapter 6, Biological Resources—Wildlife). Festivals and recreation activities that center on fishing and migratory birds, including fishing derbies, would attract fewer participants or would be altogether canceled. With fewer birds in the area, recreational birding would be less attractive to visitors.

Higher TDS concentration would make recreational activities involving water contact, such as swimming, less desirable as a result of a potential increase in eye and skin irritation and algae growth. Walker Lake elevation would continue to decline, exposing more lake bottom. This would further decrease the scenic quality of the lake environment affected by the declining lake levels, aesthetically detracting from many outdoor recreational activities at or within view of the lake, such as boating, hiking, and birding. Increased fugitive dust during wind events from the dried lakeshore would negatively affect the recreation experience at the lake. Further shrinking of Walker Lake would make access to recreation facilities on the west shore more difficult and could cause the closure of facilities. The No Action Alternative also would undermine progress toward and achievement of Mineral County's recreation-related goals. These would be adverse impacts.

Alternative 1 (Purchase Alternative)

Water rights acquired under Alternative 1 are expected to add an average additional inflow of 50,000 af/yr to Walker Lake. It is possible, however, that less than the average 50,000 af/yr would be provided to the lake either because of funding issues or because there would not be enough willing sellers. With funding of $56 million, it is estimated that the average inflow to the lake would increase by 7,300 af/yr.

This analysis of impacts under Alternative 1 assumes that the Purchase Alternative would be fully funded and that the average inflow to the lake would increase by the full 50,000 af/yr. Unless otherwise noted, if the full amount is not acquired, the impacts would be similar in nature but of less magnitude.

Direct Impacts

Impact REC-1: Increase Consistency with Mineral County Recreation Policies (Beneficial Impact with Full Funding; No Impact with Funding of $56 Million)
The increased inflow of an average of 50,000 af/yr under Alternative 1 would improve lake ecology and recreational conditions at Walker Lake. This improvement would support Mineral County's goal to continue recreational use of Walker Lake as well as goals to preserve and improve outstanding natural and scenic features and to restore health and functioning to the natural resources of the county. This would be a beneficial impact.

It is estimated that acquisitions limited to funding of $56 million would increase average inflows to Walker Lake by an average of 7,300 af/yr. This increase would be insufficient to significantly improve the ecology of the lake, but it would begin the process of reversing the lake's decline. Funding of $56 million would not by itself achieve Mineral County's goals as they apply to Walker Lake, but it would contribute toward those goals to a greater degree than the No Action Alternative.

Indirect Impacts

Impact REC-2: Improve Sport Fishing Opportunities in Walker Lake as a Result of Improved Water Quality (Beneficial Impact with Full Funding; No Impact with Funding of $56 Million)
Under the Purchase Alternative, increased inflow to Walker Lake of an average of 50,000 af/yr is expected to decrease TDS concentration, resulting in an overall beneficial impact on water quality for the Walker Lake fishery (Chapter 5, Biological Resources—Fish). A decrease in TDS concentration in Walker Lake is expected to increase the survivability and size of LCT and therefore improve the sport fishing opportunities at Walker Lake. Improved fisheries would also support the multiple fishing derbies held throughout the year. This would be a beneficial impact.

With acquisitions from funding of $56 million, sport fishing would not benefit substantially, but there could be some short-term benefit, depending on the timing of releases of acquired water from Weber Reservoir. If acquired water is released to provide spring freshets, this could result in a short-term decrease in TDS concentration that could help stocked LCT acclimate to Walker Lake (Chapter 5, Biological Resources—Fish). However, despite the average 7,300 af/yr of additional inflow, Walker Lake levels would continue to decline and TDS concentration would rise over the long run to a projected concentration of over 30,000 mg/l in 2200. This is slightly better than the No Action Alternative, but not sufficient to improve the long-term prospects for LCT survival and associated sport fishing.

Impact REC-3: Improve Boating Access as a Result of Increased Inflow to Walker Lake (Beneficial Impact with Full Funding; No Impact with Funding of $56 Million)
Under the Purchase Alternative, increased inflow to Walker Lake is expected to cause lake elevation to rise a maximum of 43 feet from its November 2009 elevation. (Chapter 3, Water Resources), which would submerge the boat ramp at Walker Lake SRA and the boat ramp at Sportsman beach and make them operable again (the boat ramp at Sportsman Beach would be submerged first with rising lake elevation). This would be a beneficial impact.

With acquisitions from funding of $56 million only, lake elevation would continue to drop, although less than under the No Action Alternative. (See Chapter 3, Water Resources, Table Lake Summary, Estimated Future Water Surface Elevation and TDS Concentrations for Walker Lake for All Alternatives, for future changes in lake elevation.)

Impact REC-4: Improve Shoreline Recreational Use as a Result of Increased Inflow to Walker Lake (Beneficial Impact with Full Funding; No Impact with Funding of $56 Million)
Under the Purchase Alternative, increased inflow to Walker Lake is expected to cause lake elevation to rise a maximum of 43 feet from its November 2009 elevation (Chapter 3, Water Resources). The expected rise in water elevation would make access to the water for swimming, wading, fishing, and other shoreline recreation easier and more pleasurable. This would be a beneficial impact.

With acquisitions from funding of $56 million only, lake elevation would continue to drop, although less than in the No Action Alternative. (See Chapter 3, Water Resources, Table Lake Summary, Estimated Future Water Surface Elevation and TDS Concentrations for Walker Lake for All Alternatives, for future changes in lake elevation.)

Impact REC-5: Increase in Other Recreational Experiences and Activities as a Result of Increased Inflow to Walker Lake (Beneficial Impact with Full Funding; No Impact with Funding of $56 Million)
Under the Purchase Alternative, as discussed in Impact REC-2, an improved fishery would benefit migratory bird species, including common loon and American white pelican, which feed on fish in Walker Lake (Chapter 6, Biological Resources—Wildlife). These migratory birds would continue to use Walker Lake as a stopover, which would help sustain the sport of birding in the Walker Lake area. An improved fishery and subsequent benefits to migratory bird species would promote festivals that center on migratory birds, such as the Loon Festival. These would be a beneficial impact compared to the No Action Alternative.

With funding of $56 million, under Alternative 1 any improvements in the fishery would be minimal and short term, as discussed in Impact REC-2, and would not be expected to benefit migratory bird populations. Consequently there would be no substantial benefit to related recreational events.

Impact REC-6: Improve Sport Fishing Opportunities in East Walker River, West Walker River, and Mainstem Walker River as a Result of Increased Inflow to Walker Lake (Beneficial Impact)
Under the Purchase Alternative, increased flows in East Walker River, West Walker River, and mainstem Walker River would improve water quality and increase habitat for native fish species along these reaches of the river from the highest location where previously diverted agricultural water is acquired. Fishing downstream of Weber Dam only occurs when water is released from the dam, which is limited and infrequent. Increased flow downstream from Weber Dam from the Acquisition Program would enhance the potential to support native fish species (Chapter 5, Biological Resources—Fish). This would likely enhance fishing in the pertinent reaches of the Walker River, which would be a beneficial impact.

This beneficial impact would be similar in nature with either full funding or funding of $56 million, and the expected magnitude of the impact would be proportional to the level of funding.

Impact REC-7: Decrease Hunting and Wildlife Viewing Opportunities on Farmland (Adverse Impact)
Under Alternative 1, acquisitions are expected to result in a substantial reduction in the amount of agriculture land. If the water supply is removed from the land, agricultural production could cease, or the land could be converted to uses other than agriculture (Chapter 7, Land Use and Agriculture, Table 7-3). Agriculture lands provide foraging habitat for a variety of bird and mammal species, which are valued by recreationalists for viewing or hunting. Retiring or converting agricultural lands to other uses would reduce the amount of agricultural foraging habitat available to wildlife species that rely on agricultural lands, and thus could substantially reduce their numbers in the study area (Chapter 6, Biological Resources—Wildlife). The reduction in numbers would reduce the opportunities to view or hunt wildlife on agricultural lands.

This adverse impact would be similar in nature with either full funding or funding of $56 million, although the expected magnitude of the impact would be proportional to the level of funding.

Alternative 2 (Leasing Alternative)

Because Alternative 2 requires recurring acquisitions of water leases, the actions of Alternative 2 would continue until funding is exhausted. With full funding, implementation of Alternative 2 would last an estimated 20 years, assuming

Walker Lake inflow was increased by an average 50,000 af/year. With funding of $56 million implementation of Alternative 2 is expected to last approximately 3 years.

Unless otherwise noted, the impacts of Alternative 2, below, would be similar in nature to those of Alternative 1 but temporary and of less magnitude.

Direct Impacts

Direct Impacts Similar to Alternative 1

Impact REC-1: Increase Consistency with Mineral County Recreation Policies (Beneficial Impact)
Increased inflow over a period of approximately 20 years with full funding would substantially improve conditions at Walker Lake, which would support Mineral County's recreation and natural resource goals. This would be a beneficial impact.

Increased Walker Lake inflow of an average of 50,000 af/yr for 3 years with funding of $56 million would result in a slight improvement in conditions at the lake compared to current conditions. This would support Mineral County's goal to continue recreational use of Walker Lake and other natural resources, but would not substantially contribute to Mineral County's goals of preserving, improving, and restoring health and functioning of the county's natural resources such as Walker Lake.

Indirect Impacts

Indirect Impacts Similar to Alternative 1

Impact REC-2: Improve Sport Fishing Opportunities in Walker Lake as a Result of Improved Water Quality (Beneficial Impact)
Under Alternative 2, increased inflow to Walker Lake is expected to decrease TDS concentration and increase survival rate of LCT, thus improving sport fishing opportunities. This beneficial impact would be similar in nature to that with full funding of Alternative 1, but temporary (3 to 20 years depending on funding amount) and of less magnitude. However, in the long run, once funding was exhausted, Walker Lake levels would continue to decline and TDS concentration would rise and there would be no long-term benefit to LCT survival and associated sport fishing.

Impact REC-4: Improve Shoreline Recreational Use as a Result of Increased Inflow to Walker Lake (Beneficial Impact)
Under Alternative 2, increased inflow to Walker Lake of an average of 50,000 af/yr is expected to cause lake elevation to rise 10 to 13 feet. The rise in lake elevation would improve access to the water for swimming, wading, fishing, and

other shoreline recreation. This rise would be temporary, however, and of less magnitude than under Alternative 1.

With acquisitions from funding of $56 million only, lake elevation is expected to rise 1 to 2 feet. This rise would not be sufficient to improve shoreline recreation access, although it would be less detrimental than the continued decline in lake elevation under the No Action Alternative. (See Chapter 3, Water Resources, Table Lake Summary, Estimated Future Water Surface Elevations and TDS Concentrations for Walker Lake for All Alternatives, for future changes in lake elevations.)

Impact REC-5: Increase in Other Recreational Experiences and Activities as a Result of Increased Inflow to Walker Lake (Beneficial Impact)
Under Alternative 2, an improved fishery from an increased inflow to the lake would benefit migratory bird species and temporarily sustain the sports of birding and fishing. However, after 3 to 20 years depending on funding amount for acquisitions, Walker Lake would begin to decline again and festivals and recreational events centering on the Walker Lake fishery and migratory birds would decline and, most probably, eventually end (Chapter 6, Biological Resources—Wildlife).

Impact REC-6: Improve Sport Fishing Opportunities in East Walker River, West Walker River, and Mainstem Walker River as a Result of Increased Inflow to Walker Lake (Beneficial Impact)
Under Alternative 2, increased flows in East Walker River, West Walker River, and Mainstem Walker River would generally improve water quality and native fish habitat along these reaches of the river from the highest location where previously diverted agricultural water is acquired. The improvement to fish habitat would be limited to the duration of the release of flows, i.e. approximately 3 to 20 years depending on funding amount for acquisitions (Chapter 5, Biological Resources—Fish). Improved conditions would allow for increased sport fishing opportunities. This beneficial impact would be similar in nature to that of Alternative 1, but temporary and of less magnitude.

Impact REC-7: Decrease Hunting and Wildlife Viewing Opportunities on Farmland (Adverse Impact)
Under Alternative 2, a reduction in agricultural lands from the reduction in available water would reduce opportunities to view or hunt wildlife on agricultural lands. However, after 3 to 20 years, depending on funding amount for acquisitions, lands could be returned to agriculture production, thus returning to the pre-leasing program amount of agricultural land foraging habitat for wildlife and opportunities to view and hunt wildlife.

Indirect Impacts Different from Alternative 1

Impact REC-3: Improve Boating Access as a Result of Increased Inflow to Walker Lake (No Impact)
Under Alternative 2, increased inflow to Walker Lake is expected to cause lake elevation to rise 10 to 13 feet. This would be insufficient to submerge the boat ramp at Walker Lake SRA or the boat ramp at Sportsman Beach, which are now inoperable. Boat access would remain similar to present conditions. Therefore, Alternative 2 would provide no benefit. Although lake elevation would be higher than under the No Action Alternative, boat ramp use would be similar. (See Chapter 3, Water Resources, Table Lake Summary, Estimated Future Water Surface Elevations and TDS Concentrations for Walker Lake for All Alternatives, for future change in lake elevation.)

Alternative 3 (Efficiency Alternative)

The impacts of Alternative 3 would be similar in nature to those of Alternative 1 with full funding, but of less magnitude.

Direct Impacts

Direct Impacts Similar to Alternative 1

Impact REC-1: Increase Consistency with Mineral County Recreation Policies (Beneficial Impact)
Increased inflow of an average of 32,200 af/yr under this alternative would improve conditions at Walker Lake, which would support Mineral County's recreation and natural resource goals. This would be a beneficial impact.

Indirect Impacts

Indirect Impacts that would not apply to Alternative 3

Impact REC-7: Decrease Hunting and Wildlife Viewing Opportunities on Farmland (No Impact)
Under Alternative 3, land under agricultural production would not be retired from agricultural use or converted to other uses. Therefore, the foraging habitat for wildlife species would not be diminished, and there would be no impact on wildlife species. Recreation opportunities to view or hunt wildlife would remain the same.

Indirect Impacts Similar to Alternative 1

Impact REC-2: Improve Sport Fishing Opportunities in Walker Lake as a Result of Improved Water Quality (Beneficial Impact)
Under Alternative 3, increased inflow to Walker Lake would increase lake surface elevation by an estimated 4 to 13 feet, resulting in a somewhat lower TDS

concentration than existing conditions for 20 to 50 years (Chapter 3, Water Resources). This could increase survival of LCT and enhance sport fishing, which would be a beneficial impact. However, TDS concentration would eventually increase over time at this amount of inflow (Chapter 3, Water Resources). Increased inflow could improve sport fishing opportunities for a number of years, but not permanently.

Impact REC-4: Improve Shoreline Recreational Use as a Result of Increased Inflow to Walker Lake (Beneficial Impact)
Under Alternative 3, increased inflow to Walker would increase lake surface elevation by an estimated 4 to 13 feet. The expected rise in lake elevation would improve access to the water for swimming, wading, fishing, and other shoreline recreation. This rise in lake elevation would be of less magnitude than under Alternative 1.

Impact REC-5: Increase in Other Recreational Experiences and Activities as a Result of Increased Inflow to Walker Lake (Beneficial Impact)
As discussed above in Impact REC-2, Alternative 3 could improve the fishery somewhat and support migratory bird species at Walker Lake. This would support the sports of fishing and birding and related recreational events. This would be a beneficial impact. Because TDS concentration would eventually increase in the long term and affect fish and the birds that feed on them, these benefits would not be permanently sustained.

Impact REC-6: Improve Sport Fishing Opportunities in East Walker River, West Walker River, and Mainstem Walker River as a Result of Increased Inflow to Walker Lake (Beneficial Impact)
Under Alternative 3, increased flows in East Walker River, West Walker River, and Mainstem Walker River would generally improve water quality and native fish habitat (Chapter 5, Biological Resources—Fish). Improved conditions would allow for increased sport fishing opportunities. This beneficial impact would be of less magnitude than under Alternative 1 because there would be a lower amount of increased river flows.

Indirect Impacts Different from Alternative 1

Impact REC-3: Improve Boating Access as a Result of Increased Inflow to Walker Lake (No Impact)
Under Alternative 3, increased inflow to Walker Lake would increase lake surface elevation by an estimated 4 to 13 feet. The rise in lake elevation would not be substantial enough to submerge the boat ramp at Walker Lake SRA or the boat ramp at Sportsman Beach. There would be no benefit compared to present conditions. Although the lake elevation would be much higher than under the No Action Alternative, the ability to use boat ramps would be similar. (See Chapter 3, Water Resources, Table Lake Summary, Estimated Future Water Surface

Elevations and TDS Concentrations for Walker Lake for All Alternatives, for future change in lake elevation.)

Chapter 12 Indian Trust Assets

Chapter 12 Indian Trust Assets

Introduction

This chapter describes the affected environment for Indian Trust Assets (ITAs) and the potential impacts on ITAs that would result from the acquisition alternatives and No Action Alternative.

ITAs are legal interests in property held in trust by the United States government for federally recognized Indian tribes or individual Indians. An Indian trust has three components: (1) the trustee, (2) the beneficiary, and (3) the trust asset. ITAs can include, but are not limited to, land, minerals, federally reserved hunting and fishing rights, federally reserved water rights, and instream flows associated with trust land. Beneficiaries of the Indian trust relationship are federally recognized Indian tribes and tribal members with trust land; the United States government is the trustee. By definition, ITAs cannot be sold, leased, or otherwise encumbered without the approval of the United States government. The characterization and application of the United States government trust relationship have been defined by case law that interprets congressional acts, executive orders, and historic treaty provisions.

Sources of Information

The key sources of data and information used in the preparation of this chapter are listed below. Full references can be found in Chapter 17, References.

- Bureau of Reclamation Indian Trust Asset Policy and NEPA Implementing Procedures (Bureau of Reclamation1994)
- Weber Dam Repair and Modification Project EIS (Miller Ecological Consultants 2005)
- WRPT's official website (Walker River Paiute Tribe 2008a–d)

Affected Environment

This section describes the environmental setting related to ITAs in the study area. Although the project area is the entire Nevada portion of the Walker River Basin (Chapter 1), the study area for ITAs includes the lands owned by two federally recognized tribes in the Nevada portion of the Walker River Basin: YPT and WRPT. The Bridgeport Indian Colony is located in Bridgeport Valley, California, and is outside the geographic scope of the Acquisition Program analyzed in the DEIS.

Yerington Paiute Tribe

YPT has historically and prehistorically occupied the entire Walker River Basin and areas beyond, such as Mono Lake, Bodie, Sweetwater, the Desert Creek area, and Aurora. The YPT Indian Reservation was set aside in 1916. YPT was recognized under the Indian Reorganization Act of June 1934, and the bylaws and constitution were approved in 1936 recognizing the tribal government (Sharpe et al. 2008).

The YPT's lands consist of YPT Indian Colony and YPT Indian Reservation (also known as Campbell Ranch). The Colony occupies 13.7 acres within the city limits of Yerington, Nevada. Land uses at the Colony are a mix of residential and commercial. The Colony has 46 homes, 12 apartments, and four tribal elders' apartments. Commercial uses include a tribal smoke shop, the Tribal Elder Center, Head Start, a three-office building that houses the EPA/General Assistance Program, the Law Enforcement Substations, and an education tutoring center. YPT also leases 1.5 acres to a Subway sandwich franchise at 198 Goldfield Avenue; this property is not held in trust for YPT. YPT also owns Arrowhead Market, a gas station and mini-market located on Campbell Lane, off the reservation (Emm pers. comm.).

Campbell Ranch encompasses 1,162 acres 10 miles north of Yerington. Land uses at Campbell Ranch are primarily agricultural and residential. Nine assignees farm on private land on the ranch and grow primarily alfalfa and onions. YPT grows alfalfa on 900 acres. Campbell Ranch also has 84 homes, including nine tribal ranch assignees' residences. The YPT leases 21.2 acres of ranch land to Rite of Passage, a school for troubled youth (Emm pers. comm.).

The final Walker River Decree (Decree C-125) provides water rights for the YPT Reservation and Colony, which are primarily used for agricultural purposes. YPT's current decreed water right in a year with a full water supply is approximately 3,958 acre-feet with priority dates from 1864 to 1905 (Wilson pers. comm.). Some water rights for the Colony have been transferred to Campbell Ranch for irrigation (Emm pers. comm.). YPT also has permits to use approximately 1,200 af/yr of groundwater (Wilson pers. comm.).

Walker River Paiute Tribe

WRPT refers to itself as Agai-Dicutta (Trout Eaters) Band of Northern Paiute Nation (Walker River Paiute Tribe 2008a). The Walker River Indian Reservation is located on 325,000 acres between the northeast end of Mason Valley and Walker Lake and has a population of approximately 1,200. The reservation was set aside by federal action on November 29, 1859, and later affirmed by Executive Order in 1874. Most of the land is held in trust by the United States for the benefit of WRPT (Miller Ecological Consultants 2005).

Approximately 10,000 acres of reservation land were divided into 20-acre allotments and distributed to individual WRPT members. These allotments are also held in trust by the United States, but are for the benefit of the individuals (Miller Ecological Consultants 2005).

Agriculture production on the reservation represents Mineral County's major farming district (Mineral County 2008). Grazing is the primary land use, as well as some ranching (Walker River Paiute Tribe 2008a), but agricultural crops are also an important part of the economic base. Alfalfa is the primary crop grown, mainly along formerly riparian areas (Walker River Paiute Tribe 2008b). Approximately 2,800 acres have been used at various times for agricultural production. Of this, approximately 2,100 acres are irrigated allotments, consisting mainly of alfalfa and grass hay. WRPT had previously irrigated tribal trust land with five center pivots. Weber Dam and Reservoir provides storage and regulates the delivery of the reservation's direct flow water rights under Decree C-125 for irrigation water used on the Walker River Indian Irrigation Project. In 2007, 2008, and 2009, all the allotments on the reservation were part of a fallowing program funded by a desert terminal lakes grant with the purpose of providing inflows to Walker Lake.

The unincorporated town of Schurz is located on the reservation at the intersection of U.S. Highways 95 and 95-A. Land uses in Schurz include residential, tribal headquarters, and commercial uses, such as a gas station with a convenience store, a smoke shop, and a fireworks outlet (Walker River Paiute Tribe 2008a and 2008c).

Community resources include the tribal administrative offices, health clinic, and police office; a volunteer fire department; and a school for kindergarten through 8th grade (Miller Ecological Consultants 2005).

Most housing on the reservation is single-family, detached houses (Miller Ecological Consultants 2005). Some of these houses are built on allotments and others on tribal land. WRPT's housing department administers two programs to help tribal members: a modified lease purchase program called the mutual help program and a rental program for the members with the lowest income. The department also operates programs to renovate existing homes. The department has built more than 280 housing units and operates a rental assistance program for low-income tribal members attending certain institutions of higher learning (Walker River Paiute Tribe 2008d).

ITAs include, but are not limited to, the reservation, irrigated and unirrigated trust allotment lands, water rights, Weber Dam and Reservoir, and the fish, wildlife, and riparian vegetation in and along mainstem Walker River and Weber Reservoir (Miller Ecological Consultants 2005).

The WRPT's water rights, which are provided under Decree C-125, are held in trust by BIA (Strekal pers. comm.). Decree C-125 adjudicated to the United States a continuous flow right of 26.25 cfs with an 1859 priority date (the most senior water right in the system) for the irrigation of 2,100 acres of land within the Walker River Indian Reservation. This water may be diverted from the Walker River on or above the reservation over a 180-day irrigation season each year (*United States* v. *Walker River Irrigation District*, 104 F2d 334, 340, 9th Cir 1939).

WRPT asserts exclusive jurisdiction over groundwater in the Walker River Indian Reservation (Yardas 2007, 63). In pending litigation (*United States* v. *WRID*, Case in Equity, C-125B), the United States and WRPT are claiming a federal reserved water right to groundwater, among other claims (Yardas pers. comm.).

Environmental Consequences

Assessment Methods

This section describes the impact analysis relating to ITAs for the acquisition alternatives and No Action Alternative. It lists the criteria used to determine whether an impact would be adverse or beneficial.

Assumptions

For the purposes of analysis, it is assumed that WRPT and YPT would not participate in the Acquisition Program by selling land, water appurtenant to land, or related interests; there are no provisions with appropriate mechanisms for sale of their water rights held in trust by the United States. Although WRPT and YPT are not prohibited from participating, they have not expressed interest to date in participating in the Purchase Alternative of the Acquisition Program analyzed in this Revised DEIS.

Adverse impacts on WRPT reservation lands, reserved water rights (including the Tribes' asserted rights to groundwater), or related interests would not occur as a result of program implementation and will not be discussed further.

YPT's proximity to areas where acquisitions may occur may result in adverse impacts on some of their ITAs.

Impact Criteria

Impacts on ITAs would be considered adverse if implementation of the acquisition alternatives would:

- adversely affect identified ITAs of either Tribe; or

- adversely affect the United States' trust responsibility and ability to maintain and protect legal interests in property reserved by or granted to Indian tribes or individuals by treaties, statutes, Executive Orders, and rights further interpreted by the courts.

Impacts

No Action Alternative

Direct Impacts

No direct disturbance is proposed under the No Action Alternative, and no direct impacts on ITAs attributable to acquisitions of land or water rights are anticipated.

Indirect Impacts

Under the No Action Alternative, the trends of decreasing water elevation and increasing TDS concentration in Walker Lake would continue. This would adversely affect natural resources that WRPT has historically relied upon (i.e., vegetation, fish, and wildlife). Affected resources are described in detail in Chapter 4, Biological Resources – Vegetation and Wetlands; Chapter 5, Biological Resources – Fish; and Chapter 6, Biological Resources – Wildlife. Along the Walker River below Schurz, erosion and habitat degradation would continue. The No Action Alternative would not affect water rights as established under Decree C-125, or land assets such as farmland, rangeland, or recreational land.

Alternative 1 (Purchase Alternative)

As indicated in Chapter 2, Alternatives; and Chapter 3, Water Resources; acquisitions under Alternative 1 are expected to add an average of 50,000 additional af/yr of water to Walker Lake. It is possible, however, that less than the full 50,000 af would be provided to the lake either because of funding issues or because there would not be enough willing sellers. With funding of $56 million, it is estimated that the average annual inflow to the lake would increase by approximately 7,300 af.

This analysis of impacts under Alternative 1 assumes that the Purchase Alternative would be fully funded and that the average annual inflow to the lake would increase by the full 50,000 af. Unless otherwise noted, if acquisitions were limited to those obtainable with funding of $56 million, then impacts would be similar in nature (i.e., adverse, minor, beneficial, or no impact) but of less magnitude.

Direct Impacts

Impact ITA-1: Improve Habitats of Indian Trust Assets in the Lower Walker River and Walker Lake as a Result of Increased Inflow to Walker Lake (Beneficial Impact)
Overall, Alternative 1 is expected to have beneficial impacts on ITAs associated with wetland and riparian habitats in the lower Walker River and Walker Lake. This is because the annual addition of approximately 50,000 af to Walker Lake and the associated increased flow in Walker River would improve habitats for plants, fish, and wildlife in the mainstem Walker River, in or near Weber Reservoir, and at the northern end of Walker Lake. Impacts on wetland and riparian habitats would be minor or beneficial, and implementation of the fully funded Purchase Alternative would have an overall beneficial impact on plants, fish, and wildlife.

With acquisitions from funding of $56 million, average annual inflow to Walker Lake is expected to increase by approximately 7,300 af. This would enhance the potential for decreased water temperature and increased spawning and rearing habitat area for fish species. Although habitat would improve, with an average inflow of 7,300 af/yr, TDS concentration in the lake would continue to gradually increase over the long term, affecting plant, fish, and wildlife species that historically have been of importance to the Paiutes. However, the increase in TDS concentration would be smaller and more gradual than under the No Action Alternative. While a smaller area along the mainstem Walker River would be available for the establishment of riparian or wetland communities than with full funding, greater enhancement of habitat of these types would be expected than under the No Action Alternative.

Impact ITA-2: Potentially Reduce Flexibility to Manage Weber Reservoir for Irrigation Purposes (No Impact)
The Purchase Alternative could result in changes in operation of Weber Dam and Reservoir and require an operations plan to address those changes. Such a plan is anticipated and is expected to ensure that use of decreed water rights in the Walker River Indian Irrigation Project were not impaired and would protect the safety of the downstream community. Implementers of the Acquisition Program will work with BIA and WRPT on an operations plan agreement for Weber Reservoir. An agreement is viewed as necessary to ensure proper water accounting and to protect the interests of all parties with responsibility for water management in the basin. It is anticipated that such an agreement would address a number of factors, including the amount and timing of dedicated Walker Lake water delivered to the Wabuska gage; evapotranspiration and seepage losses between the Wabuska gage and Weber Reservoir; proposed schedule for delivery to Walker Lake; evapotranspiration losses if water is stored in Weber Reservoir; reservoir operations criteria (storage and flood); evapotranspiration and seepage losses between Weber Reservoir and Walker Lake; and coordination among affected parties of water measurement, delivery, storage, and release. Therefore,

the Purchase Alternative would have no impact on the use of the reservation's decreed water rights.

Indirect Impacts

The following three impacts on YPT water resource ITAs could potentially occur. These impacts are fully discussed in Chapter 3, Water Resources.

Impact ITA-3: Reduce Groundwater Recharge and Elevation as a Result of Reduced Infiltration from Fields and Canals or from Transfer of Geothermal Water to Walker River (Adverse Impact)

See Water Resources Impact WI-8.

Impact ITA-4: Alter the Movement of the Anaconda Mine Groundwater Plume as A Result of Change in Groundwater Recharge (Minor Impact)

See Water Resources Impact WI-9.

Impact ITA-5: Reduce Incidental Availability of Water as a Result of Reduced Field Runoff, Seepage, or Return Flow (Minor Impact)

See Water Resources Impact WI-11.

Alternative 2 (Leasing Alternative)

Because Alternative 2 would require recurring water leases, the actions of Alternative 2 would last only until the funding is exhausted. Assuming that sufficient water is leased to increase inflow to Walker Lake by an annual average of 50,000 af, funding of $56 million would last an estimated 3 years, while full funding would last an estimated 20 years, as indicated in Chapter 2, Alternatives; and discussed in Chapter 3, Water Resources.

The impacts of Alternative 2, identified below, would be similar in nature (i.e., adverse, minor, beneficial, or no impact) to those for Alternative 1, but temporary.

Direct Impacts

Impact ITA-1: Improve Habitats of Indian Trust Assets in the Lower Walker River and Walker Lake as a Result of Increased Inflow to Walker Lake (Beneficial Impact)

Impact ITA-2: Potentially Reduce Flexibility to Manage Weber Reservoir for Irrigation Purposes (No Impact)

Indirect Impacts

The following three impacts on YPT water resource ITAs could potentially occur. These impacts are fully discussed in Chapter 3, Water Resources.

Impact ITA-3: Reduce Groundwater Recharge and Elevation as a Result of Reduced Infiltration from Fields and Canals or from Transfer of Geothermal Water to Walker River (Adverse Impact)

See Water Resources Impact WI-8.

Impact ITA-4: Alter the Movement of the Anaconda Mine Groundwater Plume as A Result of Change in Groundwater Recharge (Minor Impact)

See Water Resources Impact WI-9.

Impact ITA-5: Reduce Incidental Availability of Water as a Result of Reduced Field Runoff, Seepage, or Return Flow (Minor Impact)

See Water Resources Impact WI-11.

Alternative 3 (Efficiency Alternative)

As indicated in Chapter 2, Alternatives; and discussed in Chapter 3, Water Resources; full implementation of Alternative 1 would provide an additional 50,000 af/yr on average to Walker Lake. It is estimated that full implementation of Alternative 3 would yield an average annual inflow of 32,300 af.

The impacts for Alternative 3, identified below, would be similar in nature (i.e., adverse, minor, beneficial, or no impact) to those of Alternative 1, but of less magnitude because inflow to Walker Lake would be less under this alternative.

Direct Impacts

Impact ITA-1: Improve Habitats of Indian Trust Assets in the Lower Walker River and Walker Lake as a Result of Increased Inflow to Walker Lake (Beneficial Impact)

Impact ITA-2: Potentially Reduce Flexibility to Manage Weber Reservoir for Irrigation Purposes (No Impact)

Indirect Impacts

The following three impacts on YPT water resource ITAs could potentially occur. These impacts are fully discussed in Chapter 3, Water Resources.

Impact ITA-3: Reduce Groundwater Recharge and Elevation as a Result of Reduced Infiltration from Fields and Canals or from Transfer of Geothermal Water to Walker River (Adverse Impact)

See Water Resources Impact WI-8.

Impact ITA-4: Alter the Movement of the Anaconda Mine Groundwater Plume as A Result of Change in Groundwater Recharge (Minor Impact)

See Water Resources Impact WI-9.

Impact ITA-5: Reduce Incidental Availability of Water as a Result of Reduced Field Runoff, Seepage, or Return Flow (Minor Impact)

See Water Resources Impact WI-11.

Chapter 13 Environmental Justice

Chapter 13 Environmental Justice

Introduction

This chapter describes the affected environment for environmental justice in the study area and the potential impacts on environmental justice that would result from the acquisition alternatives and No Action Alternative.

Executive Order 12898 (1994), Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, provides that each federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. Environmental justice programs promote the protection of human health and the environment, empowerment via public participation, and the dissemination of relevant information to inform and educate affected communities.

Sources of Information

The key source of data and information used in the preparation of this chapter is listed below. Full references can be found in Chapter 17, References.

- 2000 U.S. Census (U.S. Census Bureau 2000a, 2000b)

Census data are collected every decade and the most recent data are nearly 10 years old. While Census data are not 100% accurate, r inclusive, or current, they are the best available data and provide a sound basis for this analysis.

Affected Environment

This section describes the environmental setting related to environmental justice. Although the project area is the entire Nevada portion of the Walker River Basin (Chapter 1), the study area for environmental justice was defined as those census tracts or census block groups that are located within 1 mile of East Walker River, West Walker River, and mainstem Walker River; Walker Lake; irrigation canals that connect to the Walker River; and irrigated land adjacent to the canals where potential impacts from the acquisition alternatives and the No Action Alternative could occur (Figure 13-1). No potential environmental justice impacts from any of the alternatives are known or expected outside of this study area.

Demographic data from the 2000 U.S. Census were examined for the environmental justice study area. Census tracts evaluated in Lyon County were 9402, 9602 (Block Group 2), 9607 (Block Groups 1 through 4), and 9608 (Block Groups 1 through 5). Census Tracts 9402, 9704, and 9705 in Mineral County

were also evaluated. Census Tract 9706 (all Block Groups) in Mineral County falls outside the study area and is therefore excluded from this analysis. Figure 13-1 shows the distribution of census tracts within and adjacent to the study area.

Minority and Low-Income Populations

Minority and low-income populations living in the study area are defined as follows.

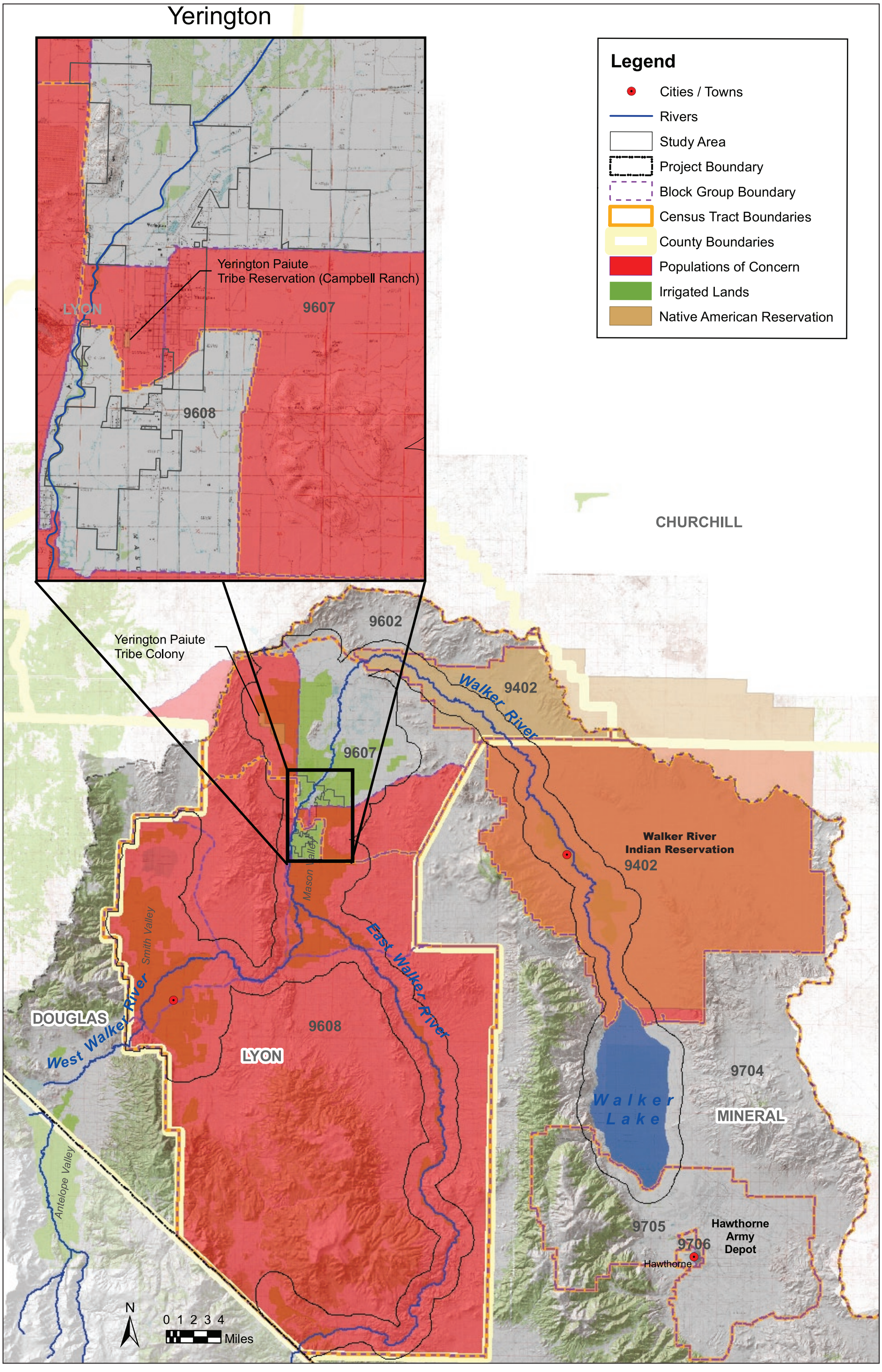
- Low-income populations—persons living below the poverty level. Because the Council on Environmental Quality (CEQ) guidance does not suggest a threshold to be used in identifying low-income populations, a census tract group or block group with a proportion of persons in poverty that is meaningfully higher than in the general population is considered to be low-income for the purposes of this analysis.
- Minorities—persons of American Indian or Alaska Native origin; Asian or Pacific Islander; Black, not of Hispanic origin; Hispanic; or persons of two or more races (without double-counting persons of Hispanic or Latino origin who are accounted for in other groups). Consistent with CEQ's guidance, minority populations are identified where the minority population of the affected area exceeds 50% of the total population, or where the percentage of defined minorities in the affected area is meaningfully greater than the percentage of defined minorities in the general population or other appropriate unit of geographic analysis.

Race and Ethnicity

Racial and population characteristics occurring statewide, regionally, and in the vicinity of the study area are shown in Table 13-1. Table 13-2 summarizes the racial and ethnic characteristics of the study area population and the other comparative populations.

In general, Lyon County and Mineral County have less diverse populations than the state of Nevada. Minorities represent approximately 16.6% percent of the total population of Lyon County and 29.6% of the population of Mineral County, while minorities represent 34.8% of the population at the state level (U.S. Census Bureau 2000a).

Seven census units in the study area were identified as having a higher percentage of minorities as compared to the state and/or county. In Lyon County, Census Tract 9607, Block Group 4, 46.36% of the total population is made up of minorities, which exceeds the minority percentage at both the county level (16.55%) and state level (34.79%). Minorities account for 20.68% of the total in Census Tract 9607, Block Group 3, which exceeds the minority percentage for the county but not for the state. Census Tract 9608 in Lyon County includes four



00516.07 Walker River Basin Restoration Project/EIS/Chp.13/SS (06-09)

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Figure 13-1
Potentially Affected Low-Income and/or Minority Populations in the Study Area

block groups (1, 2, 4, and 5) that have a higher percentage of minorities than the county, although none exceed the state level. In Mineral County, Census Tract 9402, Block Group 1, minority populations are 87.66% of the total. This census unit's inclusion of the Walker River Indian Reservation accounts for it having a substantially higher percentage of minorities in comparison to the county and state.

All of the census units identified above contain one or more minority populations of concern, each of which accounts for a higher percentage of the total population as compared to the county and/or state. Units having high percentages of American Indian residents typically conformed to or overlapped with reservation boundaries. As stated above, in Mineral County, Census Tract 9402, Block Group 1, the primary minority population consists of tribal residents of the Walker River Indian Reservation. American Indians residing in that unit represent 72.03% of the total population and account for a substantially higher percentage of the population as compared to the county (2.11%) and state (1.07%). Likewise, in Lyon County, Census Tract 9607, Block Groups 2 and 4, American Indians residing on the Yerington Indian Reservation and the Yerington Indian Colony accounted for 10.31% and 17.98%, respectively, of the total population. Both populations substantially exceed the American Indian population represented at the county and state level.

A second minority population in the study area is Hispanic/Latinos. In Lyon County, Census Tract 9607, Block Groups 2, 3, and 4, Hispanic/Latinos range from 17.67% to 20.80% of the total population, which is higher than the percentage of Hispanic/Latinos at the county level (10.97%) but is similar to the percentage at the state level (19.72%). In Census Tract 9608, Block Groups 1, 2, 4, and 5, Hispanic/Latinos range from 16.09% to 25.87% of the total population. For some block groups, the census data indicate that these populations exceed the overall percentage of Hispanic/Latinos at the county or state levels. No other Hispanic/Latino populations in the defined area were determined to be meaningfully greater than those at the county or state level.

The comparatively high percentage of Hispanic/Latinos residing in Lyon County cannot be attributed to a single factor. The low cost and relative abundance of housing in Lyon County and its proximity to employment centers in Douglas and Washoe Counties makes it a bedroom community of sorts for the two counties (Sendall et al. n.d.). As a result, many people residing in Lyon County travel to other counties for work. Conceivably, Hispanic/Latinos in the study area could make up a portion of the County's intercounty commuting population. Additionally, there are likely more Hispanic/Latinos living and working in the agricultural communities of Lyon County than the Census may have document. These workers come principally from Mexico and other Latin American countries to work on farms in Mason Valley and Smith Valley and the East Walker area through the U.S. Department of Labor's H-2A Visa program (U.S. Department of Labor 2009).

Table 13-1. Minority Populations in the Study Area

Location (State, County, Census Tract, Block Group)	Total Population	Minority Population	Minority Population (Percent)
Nevada	1,998,257	695,256	34.79
Lyon County	34,501	5,710	16.55
Tract 9402 (1 Block)	2	0	0.00
Tract 9608	4,006	882	22.02
Block 1	1,122	298	26.56
Block 2	1,019	199	19.53
Block 3	727	92	12.65
Block 4	593	140	23.61
Block 5	545	153	28.07
Tract 9607	5,526	1,467	26.55
Block 1	1,090	183	16.79
Block 2	1,183	163	13.78
Block 3	1,992	412	20.68
Block 4	1,029	477	46.36
Tract 9602	6,689	773	11.56
Block 2	2,954	322	10.90
Mineral County	5,071	1,502	29.62
Tract 9402 (1 Block)	851	746	87.66
Tract 9704 (1 Block)	687	59	8.59
Tract 9705	20	0	0.00

Source: U.S. Census Bureau 2000a.

Table 13-2. Detailed Race and Ethnicity Characteristics in the Study Area

Location (State, County, Census Tract, Block Group)	Percent							
	White	Black/African American	American Indian/ Alaska Native	Asian	Native Hawaiian/ Pacific Islander	Some Other Race	Two or More races	Hispanic or Latino (any race)
Nevada	65.21	6.58	1.07	4.43	0.39	0.14	2.46	19.72
Lyon County	83.45	0.59	2.11	0.57	0.12	0.12	2.07	10.97
Tract 9402 (1 block)	100	0	0	0	0	0	0	0
Tract 9608	77.98	0.45	0.92	0.30	0.07	0.17	1.17	18.92
Block 1	73.44	0.45	1.16	0.27	0.09	0.62	1.34	22.64
Block 2	80.47	0.49	0.98	0.39	0.10	0	1.47	16.09
Block 3	87.35	0.28	0.41	0.55	0	0	1.10	10.32
Block 4	76.39	1.01	0.34	0	0.17	0	1.18	20.91
Block 5	71.93	0	1.65	0.18	0	0	0.37	25.87
Tract 9607	73.45	1.05	6.12	0.31	0.02	0.07	2.03	16.96
Block 1	83.21	0.18	0.64	0	0	0.28	2.94	12.75
Block 2	86.22	0.17	10.31	0.68	0	0	2.62	19.61
Block 3	79.32	0.15	1.20	0.20	0	0.05	1.41	17.67
Block 4	53.64	4.96	17.98	0.49	0.10	0	2.04	20.80
Tract 9602	88.44	0.93	1.84	0.45	0.24	0.13	3.05	4.74
Block 2	89.10	0.61	1.46	0.24	0.27	0.37	3.15	4.81
Mineral County	70.38	4.30	13.90	0.30	0.02	0.16	2.48	8.46
Tract 9402 (1 Block)	12.34	2	72.03	0.12	0.12	0	3.41	9.99
Tract 9704 (1 Block)	91.41	1.16	2.33	0	0	0.15	1.75	3.20
Tract 9705	100	0	0	0	0	0	0	0

Source: U.S. Census Bureau 2000a.

Income and Poverty

Income and poverty characteristics occurring statewide, regionally, and in the vicinity of the study area are shown in Table 13-3.

Based on 2000 U.S. Census data, median household incomes in Lyon County and Mineral County were fairly widespread. Lyon County's median income ($40,699) was higher than the median income for Mineral County ($32,891). However, median incomes in both counties were comparably lower than that of the state of Nevada ($44,851).

The percentage of residents living in poverty in Lyon County and Mineral County follows a similar distribution. Based on 2000 U.S. Census data, Mineral County had a higher percentage of persons in poverty (15%) than Lyon County (10.2%). By comparison, 10.8% of the population in the state of Nevada was living in poverty.

At the census tract and block group level, median household incomes were found to range widely in the study area, consistent with the variation in values observed for the two counties. Six census units in the study area were found to have a substantially higher percentage of persons in poverty compared to county-level or statewide data. In Lyon County, Census Tract 9607, Block Group 2, which includes the Yerington Paiute Indian Reservation, persons living in poverty comprised 27.73% of the total population. This accounts for a substantially higher percentage of the population as compared to the county (10.18%) and state (10.29%). Additionally, Census Tract 9608 in Lyon County includes four block groups (1, 2, 4, and 5) that comprise a higher percentage of persons in poverty than the county or state. In Mineral County, Census Tract 9402, Block Group 1, which encompasses the majority of the Walker River Indian Reservation, impoverished persons accounted for 32.08% of the total population. The percentage of impoverished persons residing in this unit is comparatively higher than those at the county and state level.

Table 13-3. Income and Poverty Characteristics in the Study Area

Location (State, County, Census Tract, Block Group)	Median Household Income	Persons in Poverty (Percent)
Nevada	$44,581	10.29
Lyon County	$40,699	10.18
Tract 9608	$37,031	13.68
Block 1	$30,375	16.58
Block 2	$50,385	10.30
Block 3	$36,667	9.63
Block 4	$49,886	15.85
Block 5	$41,442	17.06
Tract 9607	$31,963	13.97
Block 1	$37,083	12.75
Block 2	$27,768	27.73
Block 3	$32,216	11.60
Block 4	$35,945	7.19
Tract 9602	$34,381	12.89
Block 2	$36,208	13.51
Mineral County	$32,891	15.01
Tract 9402 (1 Block)	$24,412	32.08
Tract 9704 (1 Block)	$29,792	19.65

Source: U.S. Census Bureau 2000a, 2000b.

Other Considerations

As detailed in Chapter 11, Recreation, there are many fishing and hunting opportunities on public and reservation lands throughout the study area. Traditional uses of fish, wildlife, and vegetation remain important to YPT and WRPT. Although data are not available to determine the use of renewable natural resources (fish, wildlife, and vegetation) for subsistence by any group in the study area, it is likely these resources are used to supplement the diet of minority and low-income persons, but do not constitute the principal portion of their diet.

Environmental Consequences

This section describes the impact analysis relating to environmental justice for the acquisition alternatives and No Action Alternative. It lists the criteria used to conclude whether an impact would be adverse or beneficial.

Assessment Methods

Environmental justice impacts were evaluated in accordance with guidance provided by the Interagency Working Group established by Executive Order 12898 and CEQ's Environmental Justice: Guidance under the National Environmental Policy Act (Council on Environmental Quality 1997). For the purposes of this analysis, environmental justice issues in the study area focused on the environmental and socioeconomic impacts of the alternatives.

Environmental impacts in the study area relate primarily to impacts on natural resources upon which low-income and minority groups in the study area potentially depend for subsistence purposes. The fish, wildlife, and riparian and other native vegetation in and along mainstem Walker River, Weber Reservoir, and elsewhere in the Walker Basin have been traditionally used by YPT and WRPT. Based on CEQ guidance, subsistence on natural resources is defined as "the dependence by a minority population, low-income population, Indian tribe or subgroup of such populations on indigenous fish, vegetation and/or wildlife, as the principal portion of their diet" (Council on Environmental Quality 1997).

Socioeconomic impacts in the study area relate primarily to impacts on employment. As discussed in Chapter 7, Land Use and Agriculture, the majority of potentially acquired water rights under the acquisition alternatives would come from agricultural land, which would lead to a reduction in the number of acres in agriculture and to agriculture-related job loss in the study area. Thus, there is a potential for a socioeconomic impact on minority or low-income populations through loss of jobs in the agricultural sector. Employment impacts resulting from acquisition alternatives are discussed further in Chapter 10, Socioeconomics.

Impact Criteria

The alternatives would be considered to have an adverse impact on environmental justice if they would:

- disproportionately affect the access of minority or low-income populations to natural resources used for subsistence purposes; or
- disproportionately affect employment opportunities for minority or low-income populations.

Impacts

No Action Alternative

Under the No Action Alternative, there would be no expected change in agricultural production in Smith Valley, Mason Valley, or the East Walker area. Therefore, there would be no change in agriculture-related employment in the study area.

Alternative 1 (Purchase Alternative)

Water rights acquired under Alternative 1 would add an average of 50,000 af/yr of water to Walker Lake. It is possible, however, that less than the full 50,000 af/yr would be provided to the lake either because of funding issues or because there would not be enough willing sellers. With funding of $56 million, it is estimated that the annual average inflow to the lake would increase by 7,300 af/yr.

This analysis of impacts under Alternative 1 assumes that the Purchase Alternative would be fully funded and that water rights acquired would increase the average inflow to the lake by the full 50,000 af/yr. Unless otherwise noted, if acquisitions were limited to those achievable with funding of only $56 million, the impacts would be similar in nature (i.e., adverse, minor, beneficial, or no impact) but of less magnitude.

Direct Impacts

There would be no direct environmental justice impacts under Alternative 1.

Indirect Impacts

Impact EJ-1: Affect Employment of Minority and Low-Income Groups in Lyon County (Adverse Impact)
Under Alternative 1, irrigation water rights would be acquired, which would remove water applied to some agricultural land in Lyon County. If sufficient amounts of water are removed, the land use could convert to nonagricultural uses, which would result in the loss of agricultural employment. As noted above, a significant proportion of the agricultural labor force in Lyon County is composed of migrant Hispanic/Latino farm workers, and many agricultural areas in the county are also served by rural low-income communities. As discussed in Chapter 10, Socioeconomics, the direct change in employment resulting from the loss in agricultural production would account for approximately 16% to 20% of total farm employment in Lyon County. Within the study area, it is estimated that more than 20 jobs would be lost within Mason Valley, Smith Valley, and the East Walker area as a result of implementing Alternative 1.

On a regional basis, the loss of employment as a result of implementing Alternative 1 would not be considered substantial because these losses would represent less than 1% of total employment in the two-county study area and approximately 1% of employment in Lyon County. However, the loss in agricultural production could result in a substantial impact on employment in the Lyon County agricultural production sector, which would have a disproportionately high and adverse impact on low-income and minority groups employed by this sector. This would be an adverse impact.

With funding of $56 million, less water would be removed from agricultural land and fewer acres of land currently in agricultural production could be converted to

nonagricultural uses. Consequently, fewer agricultural jobs held by minority and low-income groups in Lyon County would be affected.

Impact EJ-2: Affect Use of Renewable Natural Resources for Subsistence (No Impact)
Since no subsistence level of use of renewable natural resources by any population has been identified in the study area, an adverse environmental justice impact is not anticipated to occur.

Alternative 2 (Leasing Alternative)

Because Alternative 2 requires recurring water leases, the actions of Alternative 2 would last only until the funding is exhausted. Assuming that sufficient water is leased to increase inflow to Walker Lake by an average 50,000 af/yr, funding of $56 million would last an estimated 3 years, while full funding would last an estimated 20 years.

Unless otherwise noted, the impacts of Alternative 2, identified below, would be similar in nature (i.e., adverse, minor, beneficial, or no impact) to those of Alternative 1, only temporary.

Direct Impacts

There would be no direct environmental justice impacts under Alternative 2.

Indirect Impacts

Indirect Impacts Similar to Alternative 1
Indirect impacts that would be the same under Alternative 2 as under Alternative 1 are identified below.

Impact EJ-1: Affect Employment of Minority and Low-Income Groups in Lyon County (Adverse Impact)

Impact EJ-2: Affect Use of Renewable Natural Resources for Subsistence (No Impact)

Alternative 3 (Efficiency Alternative)

It is estimated that full implementation of Alternative 3 would yield an inflow of water to Walker Lake of only 32,300 af/yr. Unless otherwise noted, the impacts of Alternative 3, identified below, would be similar in nature (i.e., adverse, minor, beneficial, or no impact) to those of Alternative 1, but of less magnitude.

Direct Impacts

There would be no direct environmental justice impacts under Alternative 3.

Indirect Impacts

Indirect Impacts Similar to Alternative 1
Indirect impacts that would be the same under Alternative 3 as under Alternative 1 are identified below.

Impact EJ-2: Affect Use of Renewable Natural Resources for Subsistence (No Impact)

Indirect Impacts Different from Alternative 1
Indirect impacts that would be different under Alternative 3 than under Alternative 1 are identified below.

Impact EJ-1: Affect Employment of Minority and Low-Income Groups in Lyon County (Beneficial Impact)
Under Alternative 3, the proposed efficiency improvements to the water delivery systems within areas of Lyon County identified as having a high percentage of minority and/or low income individuals (Census Tracts 9607 and 9608) would not result in changes in agricultural-related employment because existing agricultural lands in these areas would remain in production. However, construction of these improvements would contribute to the local economy by increasing employment within the construction sector. Thus, it is anticipated that the resulting increases in construction-related employment could potentially benefit minority and/or low income individuals residing in Lyon County if they were part of the increased construction employment sector. The magnitude of this benefit would be driven by the amount of expenditures made on improving the water delivery system, the duration of construction, and the extent to which local contractors and workers are used to construct the improvements.

Chapter 14 Cumulative Impacts

Chapter 14 Cumulative Impacts

Introduction and Summary

The cumulative impacts analysis addresses the combined impacts of implementing the acquisition alternatives and No Action Alternative with those of other related past, present, and reasonably foreseeable projects that could result in impacts on the same environmental resources. This chapter introduces the approach to the cumulative impacts analysis, including the legal requirements and methods used to evaluate cumulative impacts; lists related projects and describes their relationship to the Revised DEIS alternatives; and identifies cumulative impacts by resource area.

Approach to Cumulative Impacts Analysis

Legal Requirements

The CEQ regulations implementing NEPA (40 CFR 1508.7) define a cumulative impact for purposes of NEPA as follows:

> *Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (federal or non-federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.*

Associated actions (past, present, or future) which, when viewed with the proposed actions, may have cumulative significant impacts. Predictions of future cumulative impacts should not be speculative, but should be based on known long-range plans, regulations, or operating agreements. The scope of a cumulative impacts analysis can be limited through the use of tiering (40 CFR 1508.28). Tiering can be used when cumulative impacts have been adequately addressed in a previous document certified for a programmatic plan and the current project is consistent with the plan.

To determine the scope of the cumulative impacts analysis, related projects were identified. These include past, present, and reasonably foreseeable projects that may contribute to cumulative impacts, including, any projects outside of the control of the project proponent or agency. CEQ regulations state that a cumulative impacts analysis commonly only includes those plans for actions that are funded or for which other NEPA analyses are being prepared. The following criteria were used to further narrow the list of projects.

- Is the action likely to occur?

- Does the action have an identified sponsor proposing it?
- Does the action have an identified funding source?
- Has the action initiated NEPA compliance or other regulatory procedures?
- Is the action defined in enough detail to allow meaningful analysis?
- Are the actions relevant?

CEQ regulations also state, "In general, actions can be excluded from analysis of cumulative impacts if the action will not affect resources that are the subject for the cumulative impacts analysis" (Council on Environmental Quality 1997).

Methods

For the purpose of this analysis, implementation of the acquisition alternatives is considered significant if, in concert with other described past, present, or reasonably foreseeable future actions, it would exacerbate the declining status of an identified resource (i.e., a resource that is already adversely affected) or create a condition in which an impact is initially minor but is part of an irreversible declining trend.

Agreements, Plans, and/or Projects with Potential Related Cumulative Impacts

Table 14-1 lists the past, present, and reasonably foreseeable actions considered in the cumulative impacts analysis. While many proposed and potential future actions were identified, only a portion of these actions relate to or directly affect water resources in the project area, or would affect the same environmental resources as the Revised DEIS alternatives.

This section provides a brief description of the other related actions, including the context and background of each action, the status of any environmental review process for each related action (if applicable), and an assessment of the cumulative impact of each action on resources.

Table 14-1. Foreseeable Associated Actions Considered in the Cumulative Impacts Analysis

Project Name	Implementing Agency	Level and Status of Environmental Review
Desert Terminal Lakes Program Projects		
WRID Weed Control Program and Water Gauge Improvements	WRID	None to date
Walker Lake Fish Hatchery	Reclamation/WRPT	None to date
WRPT Purchase and Lease Program	BIA/Reclamation	FONSI
Tamarisk Eradication, Riparian Area Restoration, and Channel Restoration	USFWS, with NDOW and WRPT	Noxious Weed Management Program: EA Riparian Area Restoration: None to date Channel Restoration: None to date
Western Inland Trout Initiative and Fishery Improvements	USFWS, NDOW, WRPT	None to date
Mason Valley Wildlife Management Area – Water Conservation and Other Improvement	Reclamation and NDOW	EA/FONSI
Homestretch Geothermal Pilot Project	Reclamation	Anticipated completion of EA in 2010
WRID 3-Year Water Leasing Demonstration Program	WRID	Unknown
Conservation and stewardship activities in support of the Acquisition Program	NFWF	Unknown
Walker Basin Natural Resources Conservation Service Contractual Agreements		
Environmental Quality Incentives Program	NRCS	Miscellaneous levels NEPA compliance for multiple projects
Wildlife Habitat Incentives Program	NRCS	Miscellaneous NEPA compliance for multiple projects
Conservation Security Program	NRCS	n/a
Agricultural Management Assistance Program	NRCS	Miscellaneous levels NEPA compliance for multiple projects
Miscellaneous Walker Basin Projects and Actions		
Water Rights Acquisition Program for Lahontan Valley Wetlands	USFWS	EIS and ROD

Project Name	Implementing Agency	Level and Status of Environmental Review
East Walker River Oil Spill Draft Restoration Plan / Environmental Assessment	East Walker River Natural Resource Trustees (USFWS, CDFG, Office of Spill Prevention and Response, NDEP, NDOW)	Final Restoration Plan/EA
Lahontan Cutthroat Trout Recovery Plan	USFWS	Short-term action plan for LCT
Weber Dam Repair and Modification Project	BIA	EIS and ROD
Walker River Indian Reservation Storage and Water Rights Litigation, Mineral County Walker River Action litigation, and United States Walker River Basin litigation.	n/a	n/a
Anaconda Copper Mine Superfund Site Remediation Project	EPA	Unilateral administrative orders

Desert Terminal Lakes Program

Beginning in 2002, Congress has passed eight pieces of desert terminal lakes legislation related to the Walker Basin (Appendix 1B). Reclamation's Desert Terminal Lakes Program was established in 2002 pursuant to Section 2507 of PL 101-171. The Walker River Basin Acquisition Program is funded under the Desert Terminal Lakes Program. The initial and subsequent legislation provided $200 million in funding to Reclamation "to provide water to at-risk natural desert terminal lakes". Pertinent portions of the primary public laws related to the Acquisition Program are discussed in Chapter 1, Purpose and Need for Action. These public laws, together with the deteriorated environment of Walker Lake, provide the foundation for the Purpose and Need statement for this Revised DEIS.

Some of the legislation authorizing the Desert Terminal Lakes Program included earmarks for specific projects. Those pertinent to the Acquisition Program are discussed below, and their contribution to cumulative impacts is identified. Desert Terminal Lakes research-funded projects are discussed in Chapter 1, Purpose of and Need for Action, but are not included here because they do not have environmental impacts.

Walker River Irrigation District Weed Control and Gauge Improvements

PL 110-161 Title II Section 208 (a) includes the following language:

- (9) shall allocate $1,000,000 to the Walker River Irrigation District--

- (A) to plan and implement a weed control program to improve conveyance efficiency of water controlled by the Irrigation District; and
- (B) to make improvements to water gauges controlled by the Irrigation District to enhance the water monitoring activities of the Irrigation District.

WRID is currently developing the proposal for this funding and working with Reclamation on the financial assistance grant agreement.

Walker Lake Fish Hatchery

Currently, the population of LCT in Walker Lake is sustained by two fish hatcheries. Approximately 70,000 6-inch LCT were stocked in March 2006 by NDOW and USFWS. Approximately 10,000 of these fish are reared at Mason Valley Hatchery (NDOW) and 60,000 are reared at the federal Lahontan National Hatchery in Gardnerville. For one week prior to release, all hatchery fish are acclimated in a mixture of fresh and saline water in the Walker River (immediately upstream of the Lake). Because of deteriorated lake environmental conditions, no stocking was done by either NDOW or USFWS in 2009.

Creation of another LCT fish hatchery at Walker Lake is currently being evaluated under a $1 million earmark. WRPT is using earmark funding to continue a previous fish evaluation study, to determine the best methods to be employed in a full-scale facility, to complete site investigations, to develop budget cost estimates and to identify requirements for a full-scale facility on the Walker River Indian Reservation.

A planning document will be developed to provide background and site information, programmatic needs, and other information and design criteria on which to base future construction project documents. Environmental review for the future construction of a hatchery facility at Walker Lake has not been initiated.

Walker River Paiute Tribe Purchase and Lease Program

WRPT's surface water rights include the continuous flow of 26.25 cfs, diverted from the Walker River in or above the Walker River Indian Reservation during a 180-day irrigation season to irrigate 2,100 acres of land on the reservation.

BIA operates the Walker River Indian Irrigation Project. The irrigated acres served by this project are composed of 20-acre allotments and the primary crop is alfalfa. Weber Dam and Reservoir are part of the Walker River Indian Irrigation Project operated by BIA and used to regulate the delivery of irrigation water to project allotments. In recent years, operations have varied to accommodate Safety of Dams Phase II construction on the dam, which is now complete.

PL 109-103, Energy and Water Development Appropriations Act, 2006, enacted November 19, 2005, provided not more than $10,000,000 for a water lease and purchase program for WRPT. In 2006, Reclamation entered into a PL 93-638 contract with WRPT to develop and implement the program. WRPT proposed four phases of work for the development, administration, monitoring and evaluation of a water lease and purchase program.

In 2007, 2008, and 2009, WRPT implemented a fallowing program that required:

- WRPT's expenditure of a portion of the funds available under the water lease and purchase program,
- BIA's approval of any lease or fallowing agreements with WRPT to implement the fallowing program,
- BIA's operation of Weber Dam and Reservoir and of the Walker River Indian Irrigation Project in accordance with the fallowing program and in recognition of the modified operations of Weber Dam and Reservoir required to facilitate Reclamation's Safety of Dams construction activities during the irrigation season, and
- the NSE's approval of a Temporary Change of Use Application to transfer the water saved in fallowing to Walker Lake.

The fallowing program is voluntary, and Walker River Indian Irrigation Project landowners may fallow up to a maximum of the entire 2,100 acres. The fallowing program is a temporary program.

Tamarisk Eradication, Riparian Area Restoration, and Channel Restoration within the Walker River Basin

Reclamation contracted with USFWS to implement PL 109-103 Section 208(c) and earmarked $10 million for restoration activities in the Walker River Basin. The funds were obligated in May 2006, and are being administered by USFWS. The funds were not earmarked for specific locations and USFWS formed the Walker River Basin Advisory Group to advise on the use of this funding in 2006.

USFWS initiated activities by preparing a baseline watershed assessment (currently in review) to determine current channel conditions, riparian health, and other factors that affect the overall health of the Walker River watershed. The baseline assessment will be used to detail processes occurring in the basin, prioritize future restoration activities, and set a baseline for monitoring the success of restoration projects. Actual restoration actions are uncertain at this time because of opportunity and funding constraints. Future restoration projects will likely include tamarisk removal, riparian revegetation, and improvements to channel function in the lower Walker River. The types of actions included for funding will likely result in beneficial impacts on wildlife habitat, water quality, and water supply.

Western Inland Trout Initiative and Fishery Improvements

PL 109-103 Section 208(c) also earmarked $5 million to USFWS, WRPT, and NDOW to develop and implement a monitoring plan focused on fishery health, and to complete a study of the Walker Lake ecosystem. Funding was also provided to assist with development of the Western Inland Trout Initiative (which includes a much larger geographic area than the Walker River basin).

In 2006, a 5-year monitoring plan for Walker Lake was developed. Year three of the 5-year monitoring plan is underway. A 5-year program to monitor fish populations and the overall lake ecosystem in response to changing TDS concentration and inflow is also underway. Future projects will include continued (long-term) monitoring of the Walker Lake ecosystem and its response to changing TDS concentration, lake elevation, and river inflow; construction of a pilot acclimation facility to increase survivorship of stocked LCT, and funding WRPT and NDOW to implement fishery improvements.

Mason Valley Wildlife Management Area – Water Conservation and Other Improvements

The Mason Valley WMA is owned by the State of Nevada with management authority assigned to NDOW. The WMA supports an abundance of fish and wildlife that contribute significantly to the biological diversity of the region. The Walker River floodplain meanders through the WMA, which has decreed Walker River water rights, and is the next-to-last diverter of water before the river empties into Weber Reservoir, which lies on the Walker River Indian Reservation.

The actual amount of water delivered to the WMA varies considerably based on precipitation, snow pack, and the total amount of water in the Walker River system. A fish hatchery on the WMA derives its water from five onsite production wells, and discharges approximately 5,700 af/yr to the WMA where the water is reused for wetland enhancement. Groundwater is also used for crop and wetlands irrigation. Other sources of water for the WMA include Nevada Energy's Fort Churchill Cooling Pond and treated effluent from the City of Yerington. The various water supplies are used to maintain wetlands and ponds, and no surface water flows from the WMA into the Walker River because of water quality concerns associated with the hatchery, cooling pond, and effluent waters.

In March, 2004, Reclamation and NDOW entered into a grant agreement for Desert Terminal Lakes Project funds to construct water conveyance systems and implement conservation measures that would result in a net reduction in use of Walker River water. The goals of the water conservation program would be achieved by:

- providing the means for the Mason Valley WMA to more efficiently use alternative water supplies, thereby reducing the total net usage of decree water; and
- implementing water management strategies that would improve water quality to meet established standards for discharge to the Walker River.

An Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) addressing improvements at the Mason Valley WMA were completed in March 2004.

Homestretch Geothermal Pilot Project

Homestretch Geothermal is investigating the feasibility of discharging geothermal plant effluent into the Walker River to provide additional inflow to Walker Lake under a pilot project covering a 5-year period. Homestretch Geothermal can pump 2,700 gallons per minute, with 200 gallons going into a cooling pond and the rest discharged onto the playa or across the highway. Nearly 1,300 gallons per minute (2.9 cfs or 5.7 af/day) is discharged to the nearby land surface and wetland ecosystem.

While the discharge, before mixing, exceeds Walker River water quality standards for certain constituents, Homestretch Geothermal is working on an NPDES permit that adjusts discharge timing to allow for dilution in the river to meet state water quality standards. Under this pilot project, approximately 35,000 af could be transferred over 5 years (up to 7,000 af/yr depending on sufficient river flows for dilution) via 2 miles of pipeline proposed for construction across BLM lands.

Reclamation is preparing an Environmental Assessment for the pilot project estimated to be completed in 2010. Homestretch Geothermal has submitted an NPDES discharge permit application and a draft permit has been developed. This pilot project represents potential beneficial impacts for water supply to Walker River and Walker Lake. It is assumed that this project would not have adverse water quality impacts because of required compliance with the NDEP state water quality standards and the conditions of the NPDES discharge permit.

Walker Basin WRID 3-Year Water Leasing Demonstration Program

NFWF was funded under PL 111-85 to provide funds to WRID, acting in accordance with an agreement between WRID and NFWF to administer and manage a 3-year water leasing demonstration program in the Walker River Basin to increase Walker Lake inflow. This program is intended to provide information regarding the establishment, budget, and scope of a longer-term leasing program.

Walker Basin Land Stewardship and Conservation Activities

Under PL 111-85, funding was provide for conservation and stewardship activities associated with the Acquisition Program, including water conservation

and management, watershed planning, land stewardship, habitat restoration, and the establishment of a local, nonprofit entity to hold and exercise water rights acquired by, and to achieve the purposes of, the Walker Basin Restoration Program. The specific activities to be funded have not been determined by NFWF. Funding in the amount of $200,000 was also provided under PL 111-85 to support alternative crops and alternative agricultural cooperative programs in Lyon and Mineral Counties that promote water conservation in the Walker River Basin.

Walker Basin Natural Resources Conservation Service Contractual Agreements

Numerous landowners in the Walker River Basin have entered into contractual agreements with the U.S. Department of Agriculture NRCS to implement land, irrigation, and related system improvements under a variety of conservation-oriented programs authorized and funded by the 1996 and 2002 Farm Bills. These include the Environmental Quality Incentives Program, Wildlife Habitat Incentives Program, Conservation Security Program, and Agricultural Management Assistance Program. Information provided by the Nevada NRCS indicates that more than 100 such agreements were executed with farmers in Lyon and Mineral Counties in Nevada, and in Mono County in California, between approximately 1998 and 2006, representing a total contract (improvement) value of nearly $4.4 million. The Mason and Smith Valley Conservation Districts have completed several bank stabilization and channel capacity improvement projects in the Walker River Basin.

Miscellaneous Walker Basin Projects and Actions

Water Rights Acquisition Program for Lahontan Valley Wetlands

The Newlands Project, an early federal Reclamation project that relies on both the Carson and Truckee Rivers for its water supply, has provided irrigation water to western Nevada since the early 20th Century. Together with changes in water use caused by modern development, diversions to the Newlands Project have resulted in adverse environmental impacts on the lower Truckee River and Pyramid Lake as well as the historic palustrine wetlands in the Lahontan Valley, resulting in disputes over a number of complex water issues in the Truckee and Carson River basins. In response, Congress passed the Truckee-Carson-Pyramid Lake Water Rights Settlement Act of 1990 (Title II of PL 101-618). Section 206 of the Act established a voluntary (willing-seller) water rights acquisition program to sustain approximately 25,000 acres of wetlands in the Lahontan Valley. Under this program, which is ongoing, USFWS is authorized to purchase land or water rights and transfer the water rights to the Lahontan Valley wetlands (specifically, to wetlands in the Stillwater National Wildlife Refuge, Carson Lake and Pasture, and Fallon Paiute-Shoshone Indian Reservation Wetlands).

In November 1996, USFWS issued its ROD on the program. The program provides for USFWS to purchase up to 75,000 af of water from within the Carson Division of the Newlands Reclamation Project. The partnership of the State of Nevada, the Nevada Waterfowl Association, BIA, Reclamation, and others interested parties has acquired about 39,700 af of water from the Carson Division for Lahontan Valley wetlands to date. This includes acquisitions of 29,000 af by USFWS, 1,800 af by BIA, and 8,900 af by the state and Nevada Waterfowl Association. USFWS is seeking additional water to sustain the wetlands through other methods, such as water leasing, reservoir spills, irrigation drain water, water use reductions at Naval Air Station Fallon, groundwater pumping, or water purchased from the Carson River upstream of Lahontan Reservoir. About 20 to 25% of available water rights in the Lahontan Valley are now dedicated to wetlands rather than agriculture, and that proportion could increase to 40% by the end of the program, expected between 2025 and 2030.

East Walker River Oil Spill Draft Restoration Plan/Environmental Assessment

In August 2008, the East Walker River Natural Resource Trustees (USFWS, California Department of Fish and Game, Office of Spill Prevention and Response, NDEP, and NDOW) released a revised Draft Restoration Plan/Environmental Assessment describing restoration alternatives being considered as compensation for the accidental release of fuel oil into the East Walker River by Advanced Fuel Filtration Systems Inc., in December of 2000. The spill resulted in release of approximately 3,608 gallons into the East Walker River and visibly oiled approximately 10 linear miles of stream habitat, 3 miles of which were in Lyon County, Nevada. The restoration alternatives that are outlined in the Draft Restoration Plan/Environmental Assessment include riparian habitat restoration, instream and riparian habitat restoration (fencing riparian areas, constructing instream structures, removal and control of invasive plants, planting streamside vegetation), and recreational or human-use fishing improvements, including projects that encourage public use and enjoyment of the East Walker River and surrounding area. A final plan was scheduled to be released in December 2008 with implementation of restoration projects scheduled to commence in spring 2009. The plan includes restoration projects on both public and private land. On private property, projects will only be funded when conservation easements or similar agreements with willing landowners are in place (some of which are already in progress).

Lahontan Cutthroat Trout Recovery Plan

LCT is a federally listed threatened and state-protected species whose survival in Walker Lake and Walker River has depended on hatchery stocking since 1953. In 1995, USFWS released the Lahontan Cutthroat Trout Recovery Plan, which encompasses seven basins or systems within the trout's historic range, including

the Walker River Basin. The long-term goal of the plan is to remove LCT from the list of threatened and endangered wildlife and plants.

A Short-Term Action Plan for Lahontan Cutthroat Trout in the Walker River Basin was released in August 2003, and identifies short-term activities and research needed to better understand the conservation needs of LCT specific to the Walker River Basin. The plan identifies priority river reaches, establishes a scientific adaptive-management approach to implementing recovery, and defines monitoring requirements for LCT and their habitat.

Weber Dam Repair and Modification Project

The Weber Dam Repair and Modification Project provides necessary repairs and structures to facilitate fish passage. Weber Dam is a small, earthen dam on the Walker River Indian Reservation that impounds the waters of the Walker River. The dam and its reservoir are BIA facilities operated to provide the reservation with irrigation water and to provide flood protection. The reservoir also provides recreation, fish and wildlife habitat, and other benefits to WRPT. The repair project was implemented after it was determined that the dam was seismically vulnerable. A Final EIS on the project was released in May 2005, and a ROD was issued in August 2005.

Modification and repairs of embankment-related structures were completed in 2007 to reduce the likelihood of dam failure during an earthquake, provide flood protection, and restore the storage capacity of the reservoir to 10,700 af. Repairs to the dam's outlet and spillway gates were completed in April 2009. The fish passage is currently under construction and is anticipated to be completed in April 2010.

Walker River Indian Reservation Storage and Water Rights Litigation

WRPT and the United States government are currently involved in litigation concerning water rights for the Walker River Indian Reservation and efforts to settle claims regarding the provision of water to Walker Lake. WRPT has filed pleadings in federal district court to resolve outstanding issues related to its water rights. Specifically, WRPT is seeking recognition of storage rights for Weber Reservoir and water rights for lands that were returned to the reservation in 1936. Because the final Walker River Decree (Decree C-125) did not provide for an express right to store water in Weber Reservoir, the United States, on behalf of WRPT, is seeking to establish such a right (together with various other rights) under litigation now pending in U.S. District Court of Nevada (United States *v.* WRID, Case in Equity, C-125). Currently, development of farmland on the Walker River Indian Reservation is limited to the current 2,100 acres because no additional state or federal water right allocations are available.

Attempting to predict the outcome of the litigation and any environmental impacts that may result is purely speculative and would not be meaningful. Timing of

resolution of litigation is also unknown. Therefore, no analysis related to the litigation outcome possibilities is included in this Revised DEIS.

Other Walker River Decree Litigation

The United States has claims pending for the use of surface and underground water for numerous federal enclaves throughout the Walker River Basin. Mineral County has moved to intervene in the Walker River Action to assert a claim under the public trust doctrine that seeks "an adjudication and reallocation of the waters of Walker River to preserve minimum levels in Walker Lake."

Attempting to predict the outcome of the litigation and any environmental impacts that may result is purely speculative and would not be meaningful. Timing of resolution of litigation is also unknown. Therefore, no analysis related to the litigation outcome possibilities is included in this Revised DEIS.

Anaconda Copper Mine Superfund Site Remediation Project

The Anaconda copper mine site covers more than 3,400 acres in the north Mason Valley. Portions of the site are owned by Arimetco (in bankruptcy) and portions are public lands managed by BLM. Mining and milling operations at the site were conducted between 1918 and 1978, and the site was abandoned in 2000. At least 103 drinking water wells are found within 4 miles of the mine site, providing the sole source of water for over 5,000 people in the area.

Open-pit mining operations involved extensive groundwater pumping over a long period of time. Upon cessation of activities, a lake was formed in the open pit (called Pit Lake). Pit Lake is a 1-mile-long, 800-foot-deep lake containing about 40,000 af of water (which increases slightly each year). In 1978, groundwater contamination was found beneath the site. Studies found tailing streams contaminated with arsenic, mercury, lead, copper, zinc, and chromium, as well as a contaminant plume in the shallow groundwater. A "pumpback" system was installed to contain the plume and to prevent contamination of drinking water wells (municipal and private) and the contamination of Walker River via the Wabuska Drain. In 2001 and 2003, NDEP performed emergency removals. In 2004, the Atlantic Richfield Company installed ambient air monitoring equipment to evaluate fugitive dust concerns. In late 2004, NDEP requested that EPA take the regulatory lead at the site, as a result of the increased complexity of contaminants at the site (including radioactive contamination).

The Atlantic Richfield Company and YPT currently monitor air, groundwater, surface water, and soil on and adjacent to the site with oversight by EPA and NDEP. However, health assessments have found existing monitoring data inadequate. Improvements to the monitoring programs are ongoing.

In 2005, EPA issued an order to Atlantic Richfield Company to improve site security, update the health and safety plan for onsite workers, implement air

monitoring, conduct a radiation survey on and off the site, continue operating the groundwater pumpback system and heap leach fluids management system, prepare operations and maintenance plans, continue ongoing investigations of the process areas, sample domestic wells for uranium, supply bottled water to residents, and implement a groundwater study.

In 2007, EPA issued a second order requiring remedial investigations and feasibility studies of the Anaconda portions of the site. Currently, EPA is the regulatory lead for cleanup of the site, and is working with other federal agencies, state agencies, and potentially responsible parties.

Cumulative Impact Analysis

This section describes the cumulative impacts that could be associated with the acquisition alternatives and No Action Alternative when combined with other related past, present, and reasonably foreseeable actions in the Walker River Basin.

Cumulative impacts would not be considered adverse for one or both of these reasons:

- cumulative impacts would be beneficial, or
- the impact of the alternatives would not be added to the impact of other projects (i.e., no cumulative impact would occur) or would be too minor or localized to be considered cumulatively.

Impacts for each resource are discussed generally in this chapter for all three action alternatives. Impacts are discussed in more detail and differentiated by alternative and by the availability of full funding or funding of $56 million in each resource chapter in this Revised DEIS.

Water Resources

Implementations of the acquisition alternatives, in combination with other related actions in the Walker River Basin, would result in impacts on water supply, groundwater, and water quality as described below.

Water Supply

Adverse impacts from the acquisition alternatives would include a reduction in irrigation, reduced water supplies for remaining canal users from reduced canal flows, and reduced incidental availability of water from field runoff, seepage, or return flows. Beneficial impacts could occur to Walker Lake from increased inflow and to Walker River from increased river flow.

Several types of actions occurring in the Walker River Basin could increase surface water supply in the Walker River Basin: removal of invasive plants, water conservation and efficiency efforts, and other water acquisition projects. If these actions increase inflow to Walker Lake, lake elevation and water quality would be improved beyond what is described in Chapter 3, Water Resources, for the acquisition alternatives. These actions would result in a beneficial cumulative impact on water supply.

Impacts of the WRID 3-year water leasing demonstration program are expected to be similar in duration to those described in Chapter 3 for the Leasing Alternative under funding of $56 million, which is also estimated to last approximately 3 years depending on leasing prices. If leasing prices for WRID's demonstration program match those estimated for the Leasing Alternative in the Revised DEIS, WRID's program would likely provide about half the amount of water estimated under the Leasing Alternative with funding of $56 million. However, WRID's demonstration program has not been developed and could have some key differences to the Leasing Alternative analyzed in this Revised DEIS. Annual evaluation of the demonstration program is expected to occur to assess whether and how a longer-term leasing program fits within a larger flow restoration effort under the Acquisition Program. The WRID demonstration program is short term in nature. Implementation of this project would not result in additional cumulative impacts to water supply.

Conservation projects in the Walker River Basin that involve the removal of invasive plants that consume a lot of water would free this water supply for beneficial uses. Related projects with a tamarisk removal component include projects on the Walker River Indian Reservation and a long-term tamarisk removal plan that strategically prioritizes eradication activities in the Walker River Basin. The USFWS Walker River Restoration Program and projects conducted by the Mason Valley Conservation District and Smith Valley Conservation District also involve tamarisk eradication as well as noxious weed control in the East Walker River Oil Spill Draft Restoration Plan/Environmental Assessment project. WRID also has an earmark for a weed control program, along with other actions. NFWF also will be implementing land conservation and stewardship activities. These activities are not defined yet but will likely include water conservation and management and watershed planning that could affect water supply.

Related projects with a water conservation or efficiency component include improvements at the Mason Valley WMA and possibly NRCS contractual agreements. Fallowing of lands on the Walker River Indian Reservation has provided additional water to the lake for the past 3years (2007 through 2009). If the Homestretch Geothermal Pilot Project is implemented it could also provide additional water to the lake.

Groundwater

The acquisition alternatives could cause a potentially adverse decrease in groundwater recharge in the Walker River Basin. Other actions in the region also could potentially affect groundwater levels. For example, removal of invasive plants could improve groundwater levels, whereas efficiency and water conservation efforts could reduce groundwater recharge. Fallowing on the Walker River Indian Reservation could decrease groundwater in that area. The Homestretch Geothermal Pilot Project, if implemented, could increase groundwater adjacent to river below the river discharge point. WRID's 3-year demonstration leasing project could affect groundwater levels. The impacts of these actions are likely to be small or temporary compared to the impacts of the acquisition alternatives, and cumulative impacts are not anticipated.

Water Quality

Land retirement and water conservation associated with the acquisition alternatives is expected to have an overall beneficial impact on water quality as a result of higher instream flow, lower water temperatures, increased dilution of poor quality inflow, decreased poor quality return flow, and reduced transport of nutrients and pesticides into receiving waters. Water quality in the lake would be improved by increased inflow. Adverse impacts on water quality could occur from altering the movement of the Anaconda Mine groundwater, or as a result of change in groundwater recharge, introduction of poor quality water (e.g., geothermal) and sedimentation from increased erosion from increased river flow and exposed soils.

Various other related projects could have water quality impacts, including a reduction in the quality of water to be purchased or the introduction of contaminants into the water supply supporting Walker Lake. These projects include the Anaconda Copper Mine Superfund Site Remediation Project, Hawthorne Army Depot Mount Grant Watershed and Well Feasibility Study, and the Homestretch Geothermal Pilot Project. However, this is not considered an adverse cumulative impact because water quality impacts from the acquisition alternatives would be expected to be small, any discharges to the river from the geothermal project would be required to undergo an NPDES permitting process to protect water quality, and water quality at the Anaconda mine site is being monitored by EPA, which would help the Acquisition Program managers avoid using contaminated groundwater to augment river flow.

Biological Resources – Vegetation and Wetlands

The Walker River Basin has been subjected to extensive human impacts from land and water development, population growth, and recreation. These impacts have altered the physical and biological integrity of the basin causing loss of native riparian vegetation along the river system and around the lake as well as a

decline of native fish populations. Functional riparian zones are important to stream systems, providing bank stability, wildlife habitat, nutrient cycling, lowered water temperatures, and a reduction in the colonization potential of nonnative species. The implementation of the acquisition alternatives would result in the potential loss of riparian habitat in some areas (canals and drainage ditches) and a gain in valuable riparian habitat along the Walker River. Various habitat restoration from other projects implemented or planned in the Walker River Basin would also increase riparian vegetation within important river system areas. Cumulative impacts on riparian vegetation along the river system could result in beneficial impacts.

Wetland areas associated with farmland and the south end of Walker Lake could decrease under the acquisition alternatives; however, the loss would be somewhat offset by wetland habitat gained along the river from increased flows. Wetland habitat below Schurz would especially benefit. Some components of other restoration projects occurring in the Walker River Basin could also increase wetland habitat. Cumulative impacts on wetlands are not expected to be adverse.

Implementation of the Purchas and Lease alternatives could result in the permanent or temporary conversion of cropland over time and could result in the spread of weeds and invasive plant species. Other related programs such as the Tamarisk Removal Program, WRID Weed Control Plan, Conservation District Weed Control, potential NFWF stewardship and conservation activities, and the Agricultural Management Assistance Program include activities to prevent the spread of noxious weeds. The acquisition alternatives, when considered in combination with other related programs, would not result adverse cumulative impacts to vegetation and wetlands.

Biological Resources – Fish

The acquisition alternatives, when considered along with other past, present, and reasonably foreseeable future projects, such as a fish ladder at Weber Dam, USFWS Walker River Restoration Program, Walker Lake Fish Hatchery, Walker River Paiute Tribe Purchase and Lease Program, and the USFWS Walker Lake Fishery Improvement Program and Lahontan Cutthroat Trout Recovery Plan, would have an overall beneficial impact on LCT.

Implementation of the acquisition alternatives would improve native fish habitat as a result of increased flows, reduced temperatures, and increased LCT spawning habitat in the Walker River. The acquisition alternatives would also increase the survival of LCT and tui chub as a result of improved water quality in Walker Lake. The WRID 3-year demonstration program would also provide temporary benefits to fish in the river and lake.

Other projects occurring in the Walker River Basin would increase habitat for LCT and other native fish species by restoring the river corridor, providing water

for Walker Lake, providing fish passage, and improving water quality through noxious weed removal. The Walker Lake Fishery Improvement Program will focus on the continued long-term monitoring of the overall Walker Lake ecosystem and its response to changing TDS concentration, lake elevation, and river inflow; and will construct a pilot acclimation facility to increase survivorship of stocked LCT. The cumulative impact of these projects on fish species would be beneficial.

Biological Resources – Wildlife

Implementation of construction-related elements of Alternative 3, along with other projects such as WRID gaging improvements and Weber Dam repair and modification, would result in some temporary construction-related impacts on wildlife. However, it is unlikely that these construction activities, which are not in the same location, would occur at the same time. Therefore, these temporary impacts would not result in adverse cumulative impacts.

Implementation of acquisitions that would temporarily or permanently remove cropland would result in a loss of foraging habitat for many wildlife species. Some habitat would also be lost that has been provided by existing farmland and riparian corridors at the southern end of Walker Lake as that wetland submerges, and at Alkali WMA if return flow diminishes. The Acquisition Program would increase and improve wildlife habitat for birds and other species in other areas, primarily along the river corridor and Walker Lake itself.

Implementation of the acquisition alternatives, in combination with other past, present, and planned programs (river, WMA, NFWF stewardship and conservation activities, and farm restoration/conservation projects and temporary land fallowing) would have a beneficial cumulative impact on wildlife.

Land Use and Agriculture

The acquisition alternatives conflict with Lyon County and City of Yerington land use policies for agricultural preservation, and conflict with the Lyon County Master Plan policy on retaining water resources within the county. Overall agricultural productivity is expected to decrease in the study area and weeds and invasive plant species could increase on retired or fallowed farmland. The acquisition alternatives would comply with land use goals in the Mineral County Master Plan to preserve and improve outstanding natural, historic, or scenic features in the county and to restore health and functioning to the county's natural resources.

The acquisition alternatives, along with other regional and local projects, would contribute to cumulative changes in land uses in the project vicinity. Land use changes in the Walker River Basin would occur as a result of restoration projects, private development, growth in both Lyon and Mineral counties, and temporary land fallowing on the Walker River Indian Reservation. The acquisition

alternatives, along with reasonably foreseeable private land actions, would result in cumulative impacts on land use.

Air Quality

Air quality impacts associated with the acquisition alternatives include less fugitive dust at Walker Lake under full funding and little or no change at the Lake under funding of $56 million. While permanently retired agriculture lands would increase the amount of vacant land, which could become a potential fugitive dust source during high wind events, current agricultural activities also result in the release of fugitive dust as a result of planting, plowing, burning, and off-road vehicle travel (e.g., tractors). Conversely, irrigated crops also tend to suppress dust erosion. Under Alternative 3, on-farm or construction activities for efficiency measures could increase temporary short-term dust emissions.

Noxious weed eradication and restoration with native plants programs occurring in the Walker River Basin would result in more stable soil systems. Fugitive dust in these restoration areas would be reduced, resulting in a minor beneficial cumulative impact on air quality.

Other related projects that also include potential impacts on air quality in the Walker River Basin are primarily those with a construction component (e.g., Walker Lake Fish Hatchery, NRCS contractual agreements, the Walker River Restoration Program, Weber Dam improvements and East Walker River Restoration Program, Anaconda Mine Remediation Project) and they could cumulatively contribute to air quality impacts in the Walker River Basin. It is unlikely that these activities would be implemented concurrently and the actions are temporary; therefore, an adverse cumulative impact on air quality would not be expected.

Cultural Resources

Implementation of Alternatives 1 and 2 would not result in ground-disturbing activity beyond current conditions or those that existed in recent history. Lake elevations would not exceed those recorded in the 1960s; therefore, cultural resources not previously inundated historically, or in the recent past, would be newly inundated or adversely affected as a result of the Purchase Alternative and Leasing Alternative. Under Alternative 3, construction activities may affect cultural resources. Conservation activity projects would be reviewed on a case-by-case basis to determine if these activities have the potential to affect historic properties should they be present and Reclamation cultural resources staff would determine what steps to take to comply with Section 106 of the NHPA, including consulting with SHPO to resolve any adverse impacts pursuant to 36 CFR Part 800.6.

The cumulative impacts of past, present, and future actions on cultural resources in the Walker River Basin relate primarily to the potential for damage to cultural

resources and their context from ground-disturbing activities. Other federal projects occurring in the region would also be required to comply with Section 106 of the NHPA if applicable. Pursuant to the definition at 40 CFR Part 1508.27(b)(8), any potential adverse impacts on cultural resources from federal projects would be mitigated to less-than-significant levels using the Section 106 process. The acquisition alternatives, along with other known activities occurring in the Walker River Basin, are not expected to result in adverse cumulative impacts on cultural resources.

Socioeconomics

The acquisition alternatives could reduce agricultural and other employment, income, and tax revenues as a result of changes in agricultural production in Mason and Smith Valleys and in the east Walker area. Impacts could also result in an increase in public recreation opportunities, income from recreation, and recreation employment in the Walker Lake area. These impacts vary from temporary to permanent, depending on which alternative would be implemented.

Other related actions occurring in the Basin may result in minor increases in available employment and subsequent income and tax revenues for certain sectors (e.g., weed control and restoration projects, Walker Lake Fish Hatchery, Anaconda Mine Superfund Site Remediation, and possibly NRCS contractual agreements).

Private sector residential, industrial, and business growth could occur over time and affect the economies of the region. These growth trends depend on a variety of dynamic social and economic factors in the Mason Valley and Smith Valley rural farm and ranch communities, in Hawthorne and other communities, and on the Walker Indian Reservation.

The socioeconomic impacts of potential private sector and federal projects are either unknown or expected to be minor. These impacts, along with those of the acquisition alternatives, are not expected to be cumulatively adverse.

Recreation

The acquisition alternatives would increase consistency with Mineral County recreation policies, improve sport fishing opportunities, boating access, and other recreational activities at Walker Lake. Increased flow would improve other recreational activities such as sport fishing opportunities in East Walker River, West Walker River, and mainstem Walker River. Recreational resources that could be affected by the acquisition alternatives include camping, boating, fishing, hunting, hiking, and wildlife viewing in the proximity of the Walker River, Walker Lake, various WMAs (including the Mason Valley WMA and Alkali Lake WMA), public lands managed by BLM and USFWS, and the Walker River Indian Reservation.

Under the acquisition alternatives, increasing the surface elevation of Walker Lake would result in a beneficial impact on recreational opportunities by increasing the abundance of fish and wildlife and improving access to the shoreline, boat ramps, and other recreational facilities that are currently well above the existing lake elevation. Other related actions in the region include undertaking activities such as fisheries improvements, WRID demonstration leasing program, and habitat restoration. Conversely, hunting and wildlife viewing associated with private agricultural lands would be affected to varying degrees by implementation of the Acquisition Program. Agricultural wildlife habitat that supports hunting and wildlife viewing would be reduced by varying degrees under full funding and funding of $56 million; however, opportunities for hunting on public lands would remain unchanged. The implementation of the acquisition alternatives in combination with other related actions would have a beneficial cumulative impact on recreation in the Walker River Basin except as related to hunting and wildlife viewing on agricultural land, which would experience adverse cumulative impacts.

Indian Trust Assets

The acquisition alternatives would improve habitats of fish, wildlife, and vegetation ITAs in the lower Walker River and Walker Lake, and would improve the Walker Lake ecosystem. However, adverse impacts on ITAs of YPT could potentially occur as a result of reducing groundwater recharge and elevation, potential movement of the Anaconda Mine groundwater plume, and reducing incidental availability of water as a result of reduced field runoff, seepage, or return flows.

Other reasonably foreseeable projects would have beneficial impacts on ITAs (restoration, WRID's demonstration leasing program, NFWF stewardship and conservation activities, weed removal, Anaconda Copper Mine Superfund Site Remediation, Walker Lake Fish Hatchery, Western Inland Trout Initiative and Fisheries Improvements, and additional instream flows and lake inflow from Homestretch Geothermal Pilot Project water). No adverse cumulative impacts on ITAs from the acquisition alternatives along with other projects in the Walker River Basin are anticipated.

Environmental Justice

The acquisition alternatives could affect minority and low-income groups in Lyon County, including localized losses of agricultural employment and other services and employment for minority and low-income populations. The change in employment for the agricultural sector of Lyon County would be approximately 16% to 20% of total farm employment.

Related projects within the region include implementing potential federal and private construction work, conservation and stewardship activities, fisheries and habitat improvements, and restoration activities. Implementation of the acquisition alternatives, in combination with these other actions, could result in beneficial impacts on environmental justice populations. The impacts of other projects in the Walker River Basin combined with the loss of agricultural employment would not be expected to result in a cumulative adverse impact on environmental justice populations.

Chapter 15 Climate and Climate Change

Chapter 15 Climate and Climate Change

Introduction

This chapter describes the affected environment for climate and climate change in the study area and the potential impacts on climate and climate change that could result from the acquisition alternatives and No Action Alternative.

The potential impacts on resources in the study area as a result of climate change are also discussed.

Sources of Information

The key sources of data and information used in the preparation of this chapter are listed below. Full references can be found in Chapter 17, References.

- Emissions of Greenhouse Gases in the United States 2007 (U.S. Department of Energy 2008)
- Our Changing Climate: Assessing the Risks to California (California Climate Change Center 2006)
- The Science of Climate Change (Intergovernmental Panel on Climate Change 2007)
- Climate Change 2007: The Physical Science Basis—Summary for Policymakers (Intergovernmental Panel on Climate Change 2007)
- The Walker River Basin, Nevada and California: Physical Environment, Hydrology, and Biology (Sharpe et al. 2008)

Affected Environment

This section describes the environmental setting related to climate and climate change in the study area. Although the project area is the entire Nevada portion of the Walker River Basin (Chapter 1), the study area for climate is defined as the entire Walker River Basin, which includes the high Sierra Nevada of California and the Great Basin Desert of Nevada (Sharpe et al. 2008). Although the acquisition alternatives would not result in water acquisitions or changes to operations of reservoirs in California, the Californian portion of the Walker River Basin is included in the study area for this analysis because regional climate affects the basin in its entirety, including the basin's air quality, water, land, and biological resources.

Past and Present Climate

Modern climate in the Walker River Basin varies from humid continental (cold winters with heavy precipitation) at high elevations to low latitude desert (arid, hot summers) at Walker Lake. The Sierra Nevada creates a rain-shadow effect to the east, resulting in decreasing precipitation as storms move from west to east across the mountain range. During the winter, storms generally deposit snow on the Sierra Nevada and Sweetwater Mountains. Occasionally, warm winter storms can cause precipitation in the form of rain at high elevations. These rain-on-snow events can cause flooding. During the summer and fall, thunderstorms can generate runoff and flash floods, although the distribution of precipitation from thunderstorms is very erratic, both in time and location (Sharpe et al. 2008).

Average annual precipitation at Bridgeport, California (elevation 6,440 feet), is approximately 9 inches (57-year record), and average annual precipitation at Hawthorne, Nevada (elevation 4,220 feet), is approximately 5 inches (51-year record). Substantial seasonal and diurnal temperature fluctuations, common to desert environments, occur at the lower elevations. Temperatures at Hawthorne occasionally reach 90 to 100°F but the average annual temperatures at Hawthorne range from a maximum of 71°F to a minimum of 41°F. Temperatures at Yerington consistently exceed 90° during the summer, but the average annual temperatures range from a maximum of 69° to a minimum of 34°. Average annual temperatures at Bridgeport range from a maximum of 62°F to a minimum of 24°F. Bridgeport receives an average of 43 inches of snowfall per year, and Hawthorne receives an average of 2.8 inches. Less than half of the annual precipitation occurs during the growing season (Sharpe et al. 2008, Western Regional Climate Center 2008).

Climate in the Walker River Basin has not been constant. Periods over the last 20,000 years have been colder and wetter (during the last glacial period), warmer and drier, or warmer and wetter than the modern climate, which is an interglacial climate period. Because Walker Lake is a terminus lake and natural inflow to Walker Lake is linked to climate, the historic and prehistoric lake volume fluctuated in response to these differing climate regimes.

Walker Lake's current volume is also related to agricultural water diversions from Walker River, which flows into Walker Lake. Water has been diverted from Walker River since 1852, and agricultural developments, not drought, account for the decline in elevation from approximately 4,083 feet in 1882 to 3,934 feet msl in December 2007 (Milne 1987, Sharpe et al. 2008). This corresponds to a decrease in lake volume from 8.96 million to 1.71 af, a loss of approximately 7.25 million af of water during this time period (Sharpe et al. 2008).

Climate Change

This section provides a background on how global climate change may affect the study area. A description of global climate change, the greenhouse effect, and greenhouse gases is provided in Appendix 15A.

Temperature

A warming global climate has widespread implications for Nevada's environment. An overall average increase of 1.1 to 1.7°C has been observed over the past century (U.S. Global Change Research Program 2000a). Rising temperature trends can affect the timing and quality of precipitation. Snow-covered area in the Walker River Basin is predicted to decrease by 6 to 17% for a 1°C rise in temperature and by 59 to 74% for a 5°C rise in temperature (California Department of Water Resources 2006).

Water Resources

Warming temperatures and changes in the form, timing, and amount of precipitation are very likely to cause earlier melting and significant reductions in the snowpack of the western mountains by the mid-21st Century (Bates et al. 2008). Reductions in mountain snow-water equivalent and annual precipitation, more precipitation falling as rain, increased periods of drought, and earlier peak streamflow already have been observed in the western mountains during the past century. Projections for historically snowmelt-dominated watersheds, such as the Walker River Basin, include snowmelt runoff advances, increasing winter and spring flows, and substantially decreasing summer flows (Kiparsky and Gleick 2003).

Decreases in the Sierra Nevada snowpack have been observed over the last century and are predicted to continue in response to warming. Snowpack is predicted to decrease by as much as 70 to 90% (U.S. Global Change Research Program 2002). Specifically, for each 1°C rise in temperature, researchers predict snow levels will retreat 500 feet upward in elevation in western mountains (Nelson et al. 2007). Winter temperatures in the Sierra Nevada already have risen by almost 2°C in the second half of the 20th Century (Nelson et al. 2007). According to the California Department of Water Resources, only a few degrees rise in temperature could significantly reduce the snow-covered area in the East and West Walker River Basin (California Department of Water Resources 2006). A 3°C rise could reduce snow-covered area in the East Walker watershed by 50%. These changes could increase the number of floods, increase rates of soil erosion, and present a greater risk to property and life.

Table 15-1 shows potential reductions in snow-covered area as a result of changes in temperature.

Table 15-1. Potential Changes in Snow-Covered Area in the East and West Walker River Watersheds by Increases in Temperature

Basin	Snow-Covered Area (% of basin)	Estimated Future Area Covered by Snow (% of basin)				
		1°C Rise	2°C Rise	3°C Rise	4°C Rise	5°C Rise
W. Walker	97	94	83	67	53	41
E. Walker	97	83	69	50	36	26

Source: California Department of Water Resources 2006

The effect of climate change on total precipitation in the Walker River Basin is uncertain, partly because there is much uncertainty associated with using global climate models to predict local hydrologic conditions (Bates et al. 2008). Some studies have predicted increases in rainfall and others have predicted decreases for the southwest and the Sierra Nevada (U.S. Global Change Research Program 2000a, Bates et al. 2008). Walker River Basin is near a transition zone between increased precipitation and decreased precipitation as predicted by average results from 15 climate change models (Bates et al. 2008).

If average precipitation remains unchanged by climate change, total runoff would be expected to decrease. For example, a study of the Colorado River Basin showed that, with no change in precipitation, a 2°C rise can reduce mean annual runoff by 4 to 12%, and a 4°C rise can reduce mean annual runoff by 9 to 21% (Nelson et al. 2007) because of increased evaporation and evapotranspiration.

The effect of climate change on Walker Lake is uncertain. Decreased snowpack could increase the volume of uncaptured runoff and more water may flow to Walker Lake as opposed to being stored in upstream reservoirs for later irrigation purposes. Little change or a decrease in total precipitation could reduce the amount of acquired water and the inflow to the lake. On the other hand, if precipitation were to increase enough to counter the effects of increases in evaporation and evapotranspiration, the amount of water available for irrigation and for lake inflow (whether acquired as part of the Acquisition Program or not) would increase.

Biological Resources

Southwestern semiarid ecosystems consist of a complex array of plant species with various phonologies (seasonal timing of activities) and physiologies. Different biochemical systems mean different responses to temperature, water availability, and carbon dioxide (CO_2) levels in the atmosphere. Semiarid ecosystems like that of the Walker River Basin, which primarily include intermountain basins big sagebrush scrubland, mixed salt desert scrub, and semidesert grassland vegetation, are vulnerable to shifts of structure and dominance that, according to the paleorecord, are not easily reversed. Thus, plants and, in turn, animals that rely on these plants in arid regions may face

significant consequences with only slight changes in water and heat stress (U.S. Climate Change Science Program 2008).

Desertification, which is the long-lasting deterioration of semiarid ecosystems, poses a significant problem in the southwestern United States, especially in light of anticipated decreases in vegetation, available water, and crop yields as a result of climate change. Degraded semiarid vegetation is less resistant to and able to recover from drought. Furthermore, the progress of desertification can be increased by the more frequent or more intense droughts that are likely to result from climate change during the 21st Century (Houghton 2004).

River and lake ecosystem health also could suffer as a result of climate change. Excess nutrients from agricultural fertilizers in conjunction with increased water temperatures could result in decreased dissolved oxygen in water and increased algae blooms on the surface of rivers and lakes (U.S. Global Change Research Program 2000b). Decreases in dissolved oxygen levels and increases in algae blooms, which also deplete the ecosystem of oxygen, could harm the other organisms in the system. Finally, water temperature increases could alter mixing and stratification of water columns in lakes, altering nutrient balances and habitat value and further affecting various species and biodiversity.

Agriculture

In some scenarios, productivity of major agricultural crops will increase (U.S. Global Change Research Program 2000a), but this is not likely to occur in Nevada. The higher net primary productivity as a result of a lengthened growing season is limited mostly to the higher latitudes of North America, where forecast temperature increases are relatively high. In addition, the benefits of elevated atmospheric CO_2 would be offset by adverse effects on crop yields attributable to droughts and other extreme events (and the winds sometimes associated with them). Climate change could also increase both crop and non-crop evapotranspiration rates, leading to increased demand for surface water and groundwater.

Continued climate change likely will shift the ranges of existing invasive plants and weeds and alter competition patterns with native plants. The ranges of these crop-damaging species are likely to expand as the invasive species generally evolve rapidly, and significant populations are already established. Even if invasive species range contraction were to occur, it is likely that new or different weed species would fill the emerging gaps (California Climate Change Center 2006).

Air Quality and Wildfire Hazards

Higher temperatures are expected to increase the frequency, duration, and intensity of conditions conducive to air pollution formation (California Climate

Change Center 2006). There already is an air quality issue of occasional dust and sandstorms in Nevada, resulting from the dust that is generated around the lowered elevation of Walker Lake as well as Owens and Mono Lakes in California and agriculture-related activities (Chapter 8, Air Quality). With more severe, frequent, and lasting heat events such as heat waves and very high temperatures, there could be drier conditions that lead to further decreases in water elevations in these lakes as well as drier soils that could be kicked up into the air.

There have been positive human test results for the West Nile virus across the United States, including western Nevada (U.S. Geological Survey 2008). Coccidioidomycosis (valley fever) is also located in the southwestern United States, where temperatures are high and the soils are dry. With more severe, frequent, and lasting heat events associated with climate change, there could be a greater chance of infectious disease such as West Nile virus spread by insects (e.g., mosquitoes) or valley fever spread by fungi (e.g., *Coccidioides immitis*). Warmer temperatures could lead to a wider ecosystem in which such insects and fungi thrive (U.S. Global Change Research Program 2000a).

Wildfires could increase with an increase in regional fuel loads and a change in precipitation. With a predicted increase in precipitation in the form of winter rain, wildfires in grassland and chaparral areas are anticipated to increase, because more winter rain will stimulate the growth of plant fuel available to burn in the late summer and fall (California Climate Change Center 2006). Wildfires contribute significantly to decreased air quality.

Greenhouse Gases

No studies have been conducted to determine greenhouse gas (GHG) emissions resulting from human activity in the Walker River Basin. Sources of GHG emissions in the Walker River Basin encompass activities related to transportation, industry, agriculture, and energy use in building operations, military operations, and groundwater pumping.

Environmental Consequences

This section describes the impact analysis relating to climate and climate change for the acquisition alternatives and No Action Alternative. It lists the criteria used to determine whether an impact would be adverse or beneficial.

Assessment Methods

The assessment methods used in this analysis are qualitative because of the many uncertainties and lack of data related to climate change. The magnitude of program emissions is not known because the extent of potential construction and operational activities is not yet known. Therefore, the potential impacts of the

acquisition alternatives on GHG emissions from the use of on- and off-road vehicles are discussed in a qualitative manner. In addition, it is not known whether retirement of agricultural lands will lead to replacement of agricultural lands within the Walker River Basin, the state, the country, or another country. Thus, the potential impacts associated with GHG emissions from agricultural effects of the acquisition alternatives are discussed in a qualitative manner. Finally, potential impacts associated with changes in carbon sinks and albedo (the extent to which the land surface reflects the sun's solar radiation) are described at a qualitative level. Much of the information on GHG emissions is supported by the air quality analysis in Chapter 8, Air Quality.

Impact Criteria

NEPA has not established thresholds for determining the adversity or benefit of GHG emissions, carbon sink changes, and albedo shifts from an individual project. No quantitative impact criteria will be set for GHG emissions, carbon sink change, or albedo shift to measure the impact of climate change on the region or the acquisition alternatives. However, absent national guidance and established quantitative thresholds, the alternatives are considered to result in an adverse impact if they would:

- make a considerable contribution to cumulative GHG emissions and global climate change.

Impacts

No Action Alternative

Direct Impacts

Under the No Action Alternative, no known development or transferring of land or water rights is expected to occur in the Walker River Basin. Current operations of water pumping and delivery to land uses in the Walker River Basin would continue and could increase with anticipated increased water demands by the land uses, primarily agricultural land. Because GHG emissions are associated with the energy used for the current pumping or diverting of river water to land uses in the region, GHG emissions could increase, and a minor impact could occur.

Indirect Impacts

Under the No Action Alternative, water pumping and delivery from the Walker River system to land uses in the Walker River Basin would continue and could increase with anticipated increased water demands by the land uses, primarily agriculture. Because natural carbon sinks are primarily related to the carbon uptake potential of the ocean and vegetation, no net increase or decrease in carbon sinks would result. Regional carbon sinks, therefore, are not anticipated to change. There would be no impact.

Because albedo is connected to the reflectivity of land and its vegetated state, no net increase or decrease in albedo value would result. There would be no impact.

Alternative 1 (Purchase Alternative)

Direct Impacts

Impact CC-1: Change Emissions of Greenhouse Gas (Undetermined Impact)
Under the Purchase Alternative, irrigation and surface water rights would be acquired, which would remove water from the agricultural land. Decreasing water delivery to the land would reduce GHG emissions associated with any pumping that may be associated with water diversions and deliveries. If land is not retired and no associated displacement of farming and livestock operations occurs (see discussion below), this would be a beneficial impact.

The Purchase Alternative would likely reduce the amount of farmed land in the Walker River Basin (see acreages in Table 7-3). Although farmland could be converted to other uses, farmers also could maintain their land in agriculture using various means, such as fallowing, growing low-water crops, and improving water use efficiency. The amount of land that might be retired as a result of the acquisition of water is therefore uncertain; however, it is expected that most land associated with water acquisitions would be retired.

If land is retired in the Walker River Basin, this would reduce GHG emissions associated with irrigation, farming equipment, and fertilizer. Reduction in locally and regionally available feed for cattle and other livestock operations could result in a reduction of local and regional livestock operations or the transportation of feed from alternative feed sources at a greater distance than current sources. If local and regional livestock operations remain stable, feed crop farming would have to increase at alternative locations and transportation GHG emissions could increase. If local and regional livestock operations decline because of a reduction in local or regional feed, then livestock operations could be diverted to other regions or even foreign locations.

Thus, reduction of farming in the Walker River Basin may not result in a net decrease of farming or livestock operations globally. Whether this would result in a net increase or decrease or no change in GHG emissions is unknown because it would depend on 1) the net change, if any, in overall farming and livestock activity globally; 2) the GHG intensity of farming and livestock at any new locations; and 3) transportation GHG emissions to either carry feed to current livestock operations from alternative sources or to carry crops and livestock to market from new farming and livestock operations.

Indirect Impacts

Impact CC-2: Change Regional Carbon Sinks Contributing to Global Climate Change (Minor Impact)
Under the Purchase Alternative, irrigation and surface water rights would be acquired, which would remove water from the agricultural land. If sufficient water is removed from the land, the land use could convert from agricultural to nonagricultural uses. Natural carbon sinks exist primarily in the form of the ocean and vegetation, so a slight net decrease in carbon sinks could result, but agricultural land is a carbon sink only when vegetation is present and not after it has been harvested or when fallow. The potential decrease in carbon sinks would be an adverse impact. Land, water appurtenant to the land, or related interests would be acquired, and irrigated land could be converted to dry, mostly nonvegetated areas (see acreages in Table 7-3), and loss of water transport in associated irrigation canals and drains could cause the loss of riparian and wetland habitat in and adjacent to the existing irrigation canals and drains. However, wetland and riparian areas could increase along the river and Walker Lake with increased water remaining in that hydrologic system. As a result, regional carbon sinks are not anticipated to decrease significantly. There would be a minor impact.

Impact CC-3: Change Regional Albedo Contributing to Global Climate Change (Minor Impact)
Under the Purchase Alternative, irrigation and surface water rights would be acquired, which would remove water from the agricultural land. If sufficient water is removed from the land, the land use could convert from agricultural to nonagricultural uses. Because albedo is connected to the reflectivity of land uses, and dry, mostly non-vegetated areas have a higher albedo value than more colorful, vegetated agricultural areas, a slight net increase in albedo value could result. The potential increase in albedo would be a beneficial impact. Land, water appurtenant to the land, or related interests would be acquired, and irrigated land could be converted to dry, nonvegetated areas (see acreages in Table 7-3); however, wetland and riparian areas could increase along the rivers and Walker Lake with increased water allowed to remain in that hydrologic system. The potential decrease in albedo associated with increased wetland and riparian areas would be an adverse impact. Overall, regional albedo value is not anticipated to increase or decrease significantly. There would be a minor impact.

Alternative 2 (Leasing Alternative)

Because Alternative 2 requires recurring water leases, the actions of Alternative 2 would last only until the funding is exhausted. Assuming that sufficient water is leased to increase inflow to Walker Lake by an average 50,000 af/yr, funding of $56 million would last an estimated 3 years, while full funding would last an estimated 20 years. The impacts of Alternative 2, unless noted below, would be

similar in nature (i.e., adverse, minor, beneficial, or no impact) to those of Alternative 1, only temporary.

Direct Impacts

Direct Impacts Similar to Alternative 1

Impact CC-1: Change Emissions of Greenhouse Gas (Undetermined Impact)
Under Alternative 2, irrigation water rights would be leased, which would remove water from the land temporarily (3 to 20 years), but there would be no permanent change in land use. Decreasing water delivery to the land in the short term would temporarily reduce associated pumping or water diversion GHG emissions within the Walker River Basin. If land is not retired and no associated displacement of farming and livestock operations were to occur (see discussion under Alternative 1 above), this would be a short-term beneficial impact.

Reduction of farming in the Walker River Basin may not result in a net decrease of farming or livestock operations globally (see discussion under Alternative 1 above).

Indirect Impacts

Indirect Impacts Different from Alternative 1

Impact CC-2: Change Regional Carbon Sinks Contributing to Global Climate Change (No Impact)
Under Alternative 2, irrigation water rights would be leased, which would remove water from the land temporarily (3 to 20 years), but there would be no permanent change in land use. Water would be removed only temporarily from the land, and no long-term change in carbon sinks could result, because agricultural land uses would not be permanently retired. Regional carbon sinks, therefore, are not anticipated to change. There would be no impact.

Impact CC-3: Change Regional Albedo Contributing to Global Climate Change (No Impact)
Under Alternative 2, irrigation water rights would be leased, which would remove water from the land temporarily (3 to 20 years), but there would be no permanent change in land use. Water would be removed only temporarily from the land, and no long-term change in albedo could result, because agricultural land uses would not be permanently retired and residual agricultural vegetation would be expected to persist for a few years during much of the anticipated leasing period. Albedo, therefore, is not anticipated to change. There would be no impact.

Alternative 3 (Efficiency Alternative)

It is estimated that full implementation of Alternative 3 would yield an additional inflow of water to Walker Lake of an average of 32,300 af/yr. Unless otherwise

noted, the impacts of Alternative 3, identified below, would be similar in nature (i.e., adverse, minor, beneficial, or no impact) to those of Alternative 1, but of less magnitude.

Direct Impacts

Direct Impacts Similar to Alternative 1

Impact CC-1: Change Emissions of Greenhouse Gas (Undetermined Impact)
Under Alternative 3, there would be no change in land use, and irrigation ditches and canals could be lined or piped, which would remove water to riparian vegetation along the canals. In addition, a variety of potential water conservation and efficiency measures would reduce the amount of surface water conveyed or applied to lands. Decreasing water delivery to the land would reduce associated pumping or water diversion GHG emissions within the Walker River Basin.

Indirect Impacts

Indirect Impacts Different from Alternative 1

Impact CC-2: Change Regional Carbon Sinks Contributing to Global Climate Change (No Impact)
Under Alternative 3, there would be no change in land use, and irrigation ditches and canals could be lined or piped, which would remove water to riparian vegetation along the canals. The reduction in carbon sink via decreased riparian vegetation along the canals would be balanced by the increase in carbon sink via increased riparian vegetation along the river. In addition, a variety of potential water conservation and efficiency measures would reduce the amount of surface water conveyed or applied to lands. Water would not be removed from the land, although less water might be applied, and, thus, no change in carbon sink could result, because agricultural land uses would not change. Regional carbon sinks, therefore, are not anticipated to change. There would be no impact.

Impact CC-3: Change Regional Albedo Contributing to Global Climate Change (No Impact)
Under Alternative 3, there would be no change in land use, and irrigation ditches and canals could be lined or piped, which would remove water from riparian vegetation along the canals. The increase in albedo via decreased riparian vegetation along the canals would be balanced by the decrease in albedo via increased riparian vegetation along the river. In addition, a variety of potential water conservation and efficiency measures would reduce the amount of surface water conveyed or applied to lands. Water would not be removed from the land, and, thus, no change in albedo could result, because agricultural land uses would not be changed. Albedo, therefore, is not anticipated to change. There would be no impact.

Impacts of Climate Change

This section describes the potential impacts of climate change on the study area and on the acquisition alternatives. While this discussion distinguishes between the acquisition alternatives, the conditions under the No Action Alternative are described in Affected Environment, above.

Much is unknown about how climate change will actually affect the Walker River Basin. The impacts of global climate change on the region are described at a qualitative level because local and regional projections of specific climate change impacts (such as regionally downscaled versions of global climate models) have significant uncertainty. These impacts are also described at a general level because of the wide geographical area of the Walker River Basin. Scientific findings are summarized and discussed in terms of broad implications for the Walker River Basin.

Water Resources

The key issues for analyzing the impacts of climate change on the acquisition alternatives are the amount of water lost to evaporation, and how much water will be discharged to Walker Lake, whether from delivery of acquired water and water rights, from river flows, or from local surface water and groundwater sources.

The amount of water that reaches Walker Lake will be affected by changes in the timing and form of precipitation. The impact of climate change on total runoff is uncertain, but climate change is likely to reduce the portion of precipitation falling as snow, cause the runoff pattern to shift to earlier in the year, and result in higher peak flows. A shift toward earlier runoff and/or higher seasonal peak flows could reduce surface water available for diversion during the irrigation season. However, more water may fill reservoirs early in the year, before irrigation begins, resulting in increased spilling from the reservoirs. This water would likely not be diverted by farmers and would therefore likely continue down the system to Walker Lake, resulting in more inflow reaching Walker Lake.

A shift to earlier runoff and increased evapotranspiration would likely cause reduced availability of water for irrigation. Because senior water rights are served first, this reduced availability would likely have a larger impact on junior water rights. The seniority of the water rights to be acquired under the Purchase Alternative is not fully known; however, based on existing option and purchase agreements, it appears that most offers will involve an array of natural flow rights with a wide range of priority dates (i.e., both junior and senior), as well as increasing allocations of supplemental storage water for the later priority dates.

The amount of water lost from evaporation could increase with increased average air temperatures. This could result in greater loss of water throughout the Walker River Basin, particularly at the upstream reservoirs and Walker Lake.

The interaction between amount of precipitation, timing of runoff, possible overflow from the upstream reservoirs to the lake, and increased evaporation and subsequent impacts on the lake are unknown.

As described above under Affected Environment, increases in air temperature would cause increases in water temperature that could affect other water quality characteristics. Increased water temperature could affect dissolved oxygen concentration, algal growth, and thermal stratification in Walker Lake. Water quality in Walker Lake would also be affected by any impact of climate change on lake levels. The potential extent of these impacts and impacts on aquatic species of concern is unknown.

Biological Resources

As described above, climate change could affect water quality and the ability of the acquisition alternatives to restore water quality and ecological health in Walker Lake. Warmer water temperatures could force out some coldwater fish species, including LCT, that are currently close to the threshold of their viable habitat; this would decrease overall biodiversity (U.S. Global Change Research Program 2000b). However, the acquisition alternatives would not contribute to warmer water temperatures. Furthermore, the Purchase and Leasing Alternatives would leave an average of 50,000 af/yr (and 32,300 af/yr under the Efficiency Alternative) of water in the Walker River and Walker Lake system and no longer divert this water to agricultural uses in the region. As a result, fishery and river and lake ecosystem health would benefit from a potentially lower saline level.

Chapter 16 Consultation and Coordination

Chapter 16 Consultation and Coordination

Introduction

This chapter describes the consultation and coordination associated with the Acquisition Program. Public and agency involvement and tribal consultation are discussed.

Public Involvement

Reclamation developed a mailing list of known interested parties to provide information on the DEIS; this mailing list has been continually updated throughout the process as more interested parties are identified. Reclamation has provided information and updates on the DEIS to local newspapers throughout the EIS process.

Public Scoping

Scoping is a process to gather input from the public, agencies, and tribes. The issues and concerns that are raised in the scoping process, together with technical input and agency considerations, define the significant issues to be addressed in the environmental document. The primary objectives of the scoping process are to:

- provide the public and potentially affected agencies and tribes with adequate information and time to review and provide oral and/or written comments on a project,
- ensure that issues related to the Acquisition Program are identified early and studied properly,
- ensure that the acquisition alternatives that meet the identified agency Purpose and Need are balanced and thorough, and
- prepare the appropriate environmental documentation.

Reclamation placed a Notice of Intent (NOI) to prepare an EIS and notice of public scoping meeting in the *Federal Register* on September 25, 2007. A brief description of the proposed Acquisition Program, a request for written comments, and details on the public scoping meetings were included in the notice. Reclamation also developed a one-page public notice to the EIS mailing list that provided a brief program description, specifics regarding the scoping meetings, and information on how to obtain additional information on the Acquisition Program. Scoping meetings were also advertised in various newspapers.

Scoping meetings were held on four dates at four locations.

- Monday, October 22, 2007, 6:00–8:00 p.m. in Reno, Nevada
- Tuesday, October 23, 2007, 6:00–8:00 p.m. in Yerington, Nevada
- Wednesday, October 24, 2007, 6:00–8:00 p.m. in Hawthorne, Nevada
- Thursday, October 25, 2007, 6:00–8:00 p.m. in Bridgeport, California

During these meetings, the public was given information on the Acquisition Program, including the EIS Purpose of and Need for the Acquisition Program, information about the acquisition alternatives, program objectives, authorizing legislation, the EIS process, and the project team. In addition, written comments were solicited and received from the public at these meetings and afterward.

The Walker River Basin Acquisition Program EIS Scoping Report[1] (Bureau of Reclamation, prepared by ICF Jones & Stokes 2008) provides an overview of the Acquisition Program. The report describes the environmental compliance process associated with the analysis of the acquisition alternatives, including the role of public scoping. The report also discusses the public scoping meetings, lists issues raised by the public, describes the process of evaluating issues in development of the acquisition alternatives, identifies Cooperating Agencies and their expertise, discusses tribal consultation, and contains comments received throughout the scoping process.

Public Participation in Acquisition Program EIS Meetings

In addition to the public scoping process, public participation has been encouraged and has occurred throughout the EIS process. Public input has been received, evaluated, and incorporated as appropriate in development of this Revised DEIS.

In addition to the public scoping meetings, Reclamation held a series of public information meetings to describe the acquisition alternatives developed for the DEIS and to update the public on the status of the DEIS. Following a presentation at the meetings, Reclamation provided an opportunity for questions and answers. Notification of these meetings were sent to the mailing list of known interested parties and published in local newspapers. Three meetings were held in separate locations in the Walker River Basin.

- Tuesday, June 24, 2008, 6:00–8:00 p.m. in Yerington, Nevada
- Wednesday, June 25, 2008, 1:00–3:00 p.m. in Hawthorne, Nevada

[1] The Scoping Report is available on Reclamation's web site at http://www.usbr.gov/mp/lbao/desert_terminal/walker_river_basin.html

- Wednesday, June 25, 2008, 6:00–8:00 p.m. in Smith Valley, Nevada

Public Review of the DEIS

- The DEIS was another opportunity for the public to provide input on the analysis of the environmental impacts of the Acquisition Program alternatives and No Action Alternative. Public comment was provided in several ways, via mail, email, or fax to Caryn Huntt DeCarlo, Bureau of Reclamation, or submitted at the public hearings.

Four public hearings were held to receive verbal and written comments on the DEIS. The hearing format included a presentation followed by a formal public comment session. Meeting locations and dates were as follows:

- **Reno**: Monday, August 17, 6-8 p.m., Rancho San Rafael County Park, Main Ranch House, 1595 N. Sierra Street
- **Yerington**: Tuesday, August 18, 6-8 p.m., Casino West Convention Center, 11 North Main Street
- **Wellington**: Wednesday, August 19, 6-8 p.m., Smith Valley Community Center, 2783 Highway 208
- **Hawthorne**: Thursday, August 20, 6-8 p.m., Mineral County Public Library, First & A Street

The DEIS was made available and posted at: http://www.usbr.gov/mp/nepa/nepa_projdetails.cfm?Project_ID=2810.

Copies of the DEIS were also made available at the following locations:

- Lyon County Main Office – 27 S. Main Street, Yerington, NV
- Lyon County Library –22 Day Lane, Smith Valley, NV
- Lyon County Library – 20 Nevin Way, Yerington, NV
- Mineral County Library – First & A Street, Hawthorne, NV
- Walker River Paiute Tribe – 1022 Hospital Road, Schurz, NV
- Yerington Paiute Tribe – 171 Campbell Lane, Yerington, NV
- Bureau of Reclamation, Denver Office Library, Building 67, Room 167, Denver Federal Center, 6th and Kipling, Denver, CO
- Natural Resources Library, U.S. Department of the Interior, 1849 C Street NW, Main Interior Building, Washington, DC
- Bureau of Reclamation, Mid-Pacific Regional Office Library, 2800 Cottage Way, W-1825, Sacramento, CA

In addition, hard copies of the DEIS were mailed to those who requested them

The Notice of Availability was published in the *Federal Register* on July 24, 2009, and the DEIS was made available for review and comment. The original comment period ended on September 14, 2009, but was extended to October 5, 2009.

The Revised DEIS includes responses to the public, agency and tribal comments made on the DEIS.

Agency Consultation and Coordination

This section describes consultation and coordination that Reclamation and its consultant team have conducted with Cooperating Agencies. The criterion for being a Cooperating Agency is that the agency has jurisdiction by law or special expertise concerning the proposed action. This includes special expertise with respect to an environmental issue.

Agency Consultation

U.S. Fish and Wildlife Service

Endangered Species Act Consultation

Section 7 of the ESA, as amended, prohibits federal agencies from authorizing, funding, or carrying out activities that are likely to jeopardize the continued existence of a listed species or destroy or adversely modify its critical habitat. By consulting with USFWS before initiating projects, agencies review their actions to determine if these could affect listed species or their habitat. Through consultation, USFWS works with other federal agencies to help design their programs and projects to conserve listed and proposed species. Regulations for the consultation process can be found at 50 CFR 402.

Reclamation contacted USFWS on September 5, 2007, for information on federally listed threatened and endangered species potentially occurring in the project area. On September 14, 2007, USFWS provided a list of federally listed threatened or endangered species. Reclamation met with USFWS informally on October 27, 2007, regarding potential impacts on federally listed species that may occur as a result of the Acquisition Program. A Biological Assessment (BA) to evaluate impacts on listed species from the Acquisition Program was written for Reclamation to initiate informal Section 7 consultation with USFWS. Consultation with USFWS was finalized on September 17, 2009, when USFWS concurred with Reclamation's determination of a *may affect, but not likely to adversely affect* LCT determination for the Acquisition Program. Other species from the species list provided by USFWS were discussed in the BA. Some of these species were not analyzed in detail in the BA because they were not known

to occur in the study area. Other species were outside of the Acquisition Program study area or had never been recorded along the Walker River.

Other Consultations

National Historic Preservation Act

Cultural resources is a term used to describe both *archaeological sites* depicting evidence of past human use of the landscape and the *built environment*, which is represented in structures such as dams, roadways, and buildings. The NHPA of 1966 is the primary federal legislation that outlines the federal government's responsibility to cultural resources. Other applicable cultural resources laws and regulations that could apply include, but are not limited to, include the Native American Graves Protection and Repatriation Act and the Archaeological Resources Protection Act. Section 106 of the NHPA requires the federal government to take into consideration the effects of an undertaking listed on or eligible for inclusion in the NRHP. Those resources that are on or eligible for inclusion in the NRHP are referred to as historic properties.

The Section 106 process is outlined in 36 CFR Part 800. These regulations describe the process that the federal agency (Reclamation) takes to identify cultural resources and the level of impact that the proposed undertaking will have on historic properties. In summary, Reclamation must first determine whether the action is the type of action that has the potential to affect historic properties. If the action is the type of action that has the potential to affect historic properties, Reclamation must identify the APE, determine whether historic properties are present within that APE, determine the impact that the undertaking will have on historic properties, and consult with the SHPO to seek concurrence on Reclamation's findings. In addition, Reclamation is required through the Section 106 process to consult with Indian Tribes concerning the identification of sites of religious or cultural significance, and consult with individuals or groups who are entitled to be consulting parties or have requested to be consulting parties.

Reclamation and NFWF have documented an agreement regarding NFWF compliance with Section 106 of NHPA for Alternative 3 (Efficiency Alternative); Reclamation determined that Alternative 1 (Purchase Alternative) and Alternative 2 (Leasing Alternative) would have no direct or indirect impacts on cultural resources.

Involvement of Cooperating Agencies

A complete list of Cooperating Agencies that were invited and accepted participation in the preparation and review of the DEIS is provided in Table 16-1. Representatives of some of the Cooperating Agencies have participated in one-on-one meetings with Reclamation on various dates; attended the public scoping,

information, and DEIS meetings throughout the EIS process; and/or participated in the Cooperating Agency meeting held on January 31, 2008. Some Cooperating Agency representatives have provided Reclamation with written and oral comments on the Acquisition Program, potential issues of concern, the Scoping Report, and the Administrative and Public DEIS. All Cooperating Agencies were offered opportunities to participate in the review and provide comments on the majority of the Administrative DEIS and had the opportunity to provide comments again during the 73-day public comment period for the DEIS.

Table 16-1. Cooperating Agencies

Federal Agencies
Bureau of Indian Affairs
U.S. Fish and Wildlife Service
Federally Recognized Tribal Governments
Walker River Paiute Tribe
Yerington Paiute Tribe
State Agencies
Nevada Department of Wildlife
Local Agencies
Lyon County
Mineral County
Mason Valley Conservation District
Smith Valley Conservation District
Walker River Irrigation District
Other
University of Nevada

The following entities were invited to participate as Cooperating Agencies and declined: the Nevada Department of Conservation and Natural Resources, Bureau of Land Management, and U.S. Board of Water Commissioners. The Bridgeport Indian Colony did not respond to the request to be a Cooperating Agency.

Tribal Consultation

Reclamation sent consultation requests to three tribes for government-to-government consultation activities with tribal entities having entitlements to Walker River or Walker Lake and those that may be affected by or have interests related to the Acquisition Program. Of the three tribes contacted, WRPT and YPT have responded with interest. WRPT participated as a Cooperating Agency and participated with Reclamation in tribal consultation. YPT did not respond to tribal consultation requests but did accept Cooperating Agency status and participated in that process for DEIS development. Both WRPT and YPT provided comments on the Administrative and Public DEIS. The Bridgeport Indian Colony did not respond to requests for tribal consultation or Cooperating Agency status. Reclamation has included all three tribes on all informational mailings related to DEIS development.

Reclamation initiated consultation with WRPT in writing on September 12, 2007, and had additional consultation correspondence throughout the development of the DEIS. Reclamation participated in consultation meetings with WRPT on December 7, 2007, June 26, September 23, and October 9, 2008. Tribal consultation on the DEIS was held with WRPT on September 22, 2009.

Environmental Justice Outreach

Environmental justice, as discussed in Chapter 13 refers to the fair treatment of people of all races, income, and cultures with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

Executive Order 12898 (1994), Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, states that each federal agency will make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.

For the DEIS, compliance with Executive Order 12898 was accomplished by informing the widest possible cross-section of the potentially interested public about the Walker River Basin Acquisition Program DEIS, and providing opportunities for input from not only the general public but members of local and regional ethnic-minority and low-income populations. Efforts targeting these populations included 1) holding an open house-style public scoping meeting in each major population center in the Walker River Basin (Yerington, Hawthorne, Bridgeport, and Schurz); 2) making an offer of Cooperating Agency status to the three tribal entities in the EIS project area (WRPT, Bridgeport Indian Colony, and

YPT); and 3) sending letters to representatives of YPT, Bridgeport Indian Colony, and WRPT to request initiation of tribal consultation, as required under Executive Order 13175 and the Presidential Memorandum on Government-to-Government Relations with Native American Tribal Governments.

Chapter 17 References

Chapter 17 References

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Chapter 16 Consultation and Coordination

No references.

Chapter 18 List of Preparers

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