

# RECLAMATION

*Managing Water in the West*

## **Walker River Basin Acquisition Program Revised Draft Environmental Impact Statement**

### **Volume 1: Chapters 1 through 18**



Photo by Tom Lopes

#### **Cooperating Agencies**

Bureau of Indian Affairs, U.S. Fish and Wildlife Service, Walker River Paiute Tribe, Yerington Paiute Tribe, Nevada Department of Wildlife, Lyon County, Mineral County, Mason Valley Conservation District, Smith Valley Conservation District, Walker River Irrigation District, and University of Nevada



**U.S. Department of the Interior  
Bureau of Reclamation**

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## **Mission Statements**

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

*Revised Draft Environmental Impact Statement prepared by*

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# Executive Summary



# Executive Summary

This Revised Walker River Basin Acquisition Program (Acquisition Program) Draft Environmental Impact Statement (Revised DEIS) has been prepared for informational purposes rather than a National Environmental Policy Act (NEPA) analysis for federal agency decision making. The Revised DEIS includes responses to public comments on the Acquisition Program DEIS released for public review in July 2009. The Revised DEIS has been updated to include changes as determined appropriate from public comment as well as new data, analysis, and legislation regarding the Acquisition Program.

The Bureau of Reclamation (Reclamation) does not have decision-making authority over the Acquisition Program analyzed in the document and has determined NEPA compliance is not required. This determination was previously explained in the July 2009 DEIS, in mailings and news releases for the DEIS, and at the August 2009 DEIS public hearings.

Additional comments regarding the Acquisition Program are not being solicited on this Revised DEIS. A formal Notice of Cancellation of the EIS has been submitted to the *Federal Register*. A Final EIS (FEIS) and Record of Decision (ROD) will not be issued.

## Introduction

Reclamation has prepared this Revised DEIS for the Walker River Basin Acquisition Program. The Revised DEIS examines a No Action Alternative and three acquisition alternatives for implementation of the Acquisition Program to acquire water for Walker Lake, an imperiled desert terminal lake in Nevada. The purpose of the Acquisition Program is to support efforts to preserve Walker Lake while protecting agricultural, environmental, and habitat interests in the Walker River Basin.

Reclamation's role for the Acquisition Program as authorized in Public Law (PL) 109-103 and PL 111-85 is to provide funding through Reclamation's Desert Terminal Lakes Program to the University of Nevada (University) or the National Fish and Wildlife Foundation (NFWF).

Under an agreement entered into by NFWF and the University in December 2009, the University assigned to NFWF all of the University's rights, interests, and obligations for the Acquisition Program. This includes all the option and purchase agreements previously entered into by the University. NFWF's role going forward will be to further develop and administer the Acquisition Program. The University's role will be to support such efforts through associated research, modeling, and monitoring. To date the University has implemented extensive research studies in the Walker River Basin and entered into 10 option agreements with willing sellers for potential acquisition of water.

## Authorizing Legislation

Since 2002, Congress has passed eight pieces of desert terminal lakes legislation related to the Walker River Basin (Appendix 1B). These laws, together with the deteriorated environment of Walker Lake, provide the foundation for the Purpose and Need statement for this Revised DEIS. The two primary laws related to the Acquisition Program analyzed in this Revised DEIS are PL 109-103 (2006 Energy and Water Development Appropriations Act enacted in 2005), Title II, Section 208(a); and PL 111-85 (2010 Energy and Water Development Appropriations Act enacted in 2009), Sections 206–208.

Both laws authorize Reclamation to provide funding to the University or NFWF to, among other things, acquire from willing sellers land, water appurtenant to the land, and related interests in the Walker River Basin, Nevada. The laws authorize NFWF (and formerly the University) to make acquisitions that they determine are the most beneficial to environmental restoration in the Walker River Basin. As noted above, NFWF will administer the Acquisition Program. These laws are explained in detail in Chapter 1 and Appendix 1B.

## Background

The Walker River originates in the eastern portion of the Sierra Nevada in California, flows into eastern Nevada, and empties into Walker Lake, an at-risk natural desert terminal lake that has no outlet. The lake is located in a watershed that supports significant agricultural activity.

From 1882 to present, diversions from the river, primarily for upstream irrigated agriculture, have resulted in a 156-foot drop in the lake's surface elevation and a corresponding reduction in water volume from about 9 million acre-feet (af) to about 1.5 million af. In many months there is little or no inflow into Walker Lake.

The decline in Walker Lake surface elevation has resulted in extremely poor water quality, including an increase in the total dissolved solids (TDS) concentration from approximately 2,500 milligrams per liter (mg/L) in 1882 to 17,500 mg/L in 2009. The high TDS concentration has threatened the lake's viability as a fishery, including sustainability of the federally listed threatened Lahontan cutthroat trout (LCT) population. The existing water quality has far-reaching impacts on the health of the lake and its associated ecosystems. Concern over the lake's deteriorating ecological condition has led to Congressional legislation (Appendix 1B) intended to address the lake's problems.

## Purpose and Need Statement

Reclamation developed the following Purpose and Need statement for this Revised DEIS, responding to direction in the applicable Desert Terminal Lakes Public Laws for the Acquisition Program:

*The purpose of the Walker River Basin Acquisition Program is to provide water to Walker Lake, an at-risk natural desert terminal lake in Nevada, by acquiring, from willing sellers, land, water appurtenant to the land, and related interests in the Walker River Basin in Nevada; and to make acquisitions that are the most beneficial to environmental restoration in the Walker River Basin. The Acquisition Program is needed to implement section 208(a) of PL. 109-103 and Sections 206-208 of PL 111-85 in accordance with section 2507 of PL 101-171 (as amended) and section 207(a)(1) of PL 108-7.*

## EIS Process

The involvement of state, local, and federal agencies; the public; tribes; and Cooperating Agencies in the development and review of the Revised DEIS is discussed in detail in Chapter 16, Consultation and Coordination.

- **Step 1: Notice of Intent** to prepare an EIS was published in the *Federal Register* in September 2007.
- **Step 2: Public scoping** - Agencies, tribes, and the public were asked to comment on the Acquisition Program and alternatives to be analyzed in the EIS. Four scoping meetings were held at the beginning of the process and three additional public meetings were held after draft alternatives were developed.
- **Step 3: Impact analysis of the alternatives** – An analysis of the acquisition alternatives and No Action Alternative was developed and adverse and beneficial impacts disclosed. An Administrative DEIS was circulated to Cooperating Agencies for review and comment.

**Mitigation:** Mitigation measures for adverse impacts were not developed for the Acquisition Program because the legislation does not give Reclamation decision-making authority for development and implementation of the Program; therefore, the impacts described in the Revised DEIS are the impacts that would occur without any mitigation. Including mitigation in the analysis of impacts would be speculative because it is unknown what mitigation measures would be considered and implemented by NFWF.

- **Step 4: July 2009 DEIS** - Even though Reclamation determined that NEPA compliance was not required, a DEIS was provided for public review and

comment. Four DEIS Public hearings were held to provide information and solicit comments on the Acquisition Program.

- **Step 5: Revised DEIS** - Under NEPA a Final EIS and ROD are usually issued after preparation of a DEIS. However, Reclamation has determined that since the agency does not have discretion for implementation or control over expenditures of the Acquisition Program by the recipient, an FEIS and ROD will not be issued.

Reclamation decided it was appropriate to issue a Revised DEIS with responses to public comments made on the July 2009 DEIS. All comments provided in writing and at the public hearings were considered and evaluated and changes were made to the DEIS if determined appropriate by Reclamation. The Revised DEIS was also updated to include new data, legislation, and analysis.

- **Step 6: Notice of Cancellation of EIS** in the *Federal Register* – An FEIS and ROD will not be issued and additional comments are not being sought on the Revised DEIS. A Notice of Cancellation of the EIS has been submitted to the *Federal Register*.

## Determination that NEPA is Not Required

In 2008, DOI revised its regulations for implementing NEPA (43 Code of Federal Regulations [CFR] Part 46 Implementation of the NEPA of 1969 Final Rule); the rule was finalized on November 14, 2008. Section 46.100 (a) of these regulations states in part:

*If Federal funding is provided with no Federal agency control as to the expenditure of such funds by the recipient, NEPA compliance is not necessary.*

Reclamation does not exercise control or responsibility over the Acquisition Program, is not approving the action, and does not have control over the expenditure of federal funds by the recipient. NEPA compliance is therefore not required because the Acquisition Program and funding of the program is not a federal agency discretionary action by Reclamation.

A ROD is usually the final step in the NEPA process for an EIS. The ROD is the federal decision made on the range of alternatives addressed in the EIS. The authorizing legislation directs that NFWF (and formerly the University) determines how the Acquisition Program is to be developed and implemented. Reclamation's directed role is to provide funding to the University or NFWF for those purposes. Reclamation has no authority to issue a ROD making decisions on the Acquisition Program. NEPA compliance, including issuing a ROD, is not required.



Reclamation determined that while NEPA compliance is not required, there was value in issuing a Revised DEIS. The Revised DEIS discloses impacts as they are known at this time and incorporates the results of the process that allowed public opinion to be heard, documented for public availability, and considered in the analysis. The Revised DEIS was completed to provide the public and NFWF current data and other information on the Walker River Basin and on analysis of beneficial and adverse impacts expected from implementation of the Acquisition Program.

## **Organization of the Revised DEIS**

### **Volume 1**

Volume 1 of the Revised DEIS provides background information, legislated authorization for the Acquisition Program, Purpose and Need of the Acquisition Program, alternatives considered, and an analysis of the environmental consequences impacts of the No Action Alternative and acquisition alternatives. The public involvement process and other consultation and coordination are also described. The Revised DEIS incorporates updates and changes based on recent data and studies, new legislation and analysis, and public comment.

### **Volume 2**

Volume 2 includes public comments and questions on the July 2009 DEIS and Reclamation's responses to each comment. All comments provided in writing and at the public hearings were considered and evaluated, and changes were made to the DEIS if determined appropriate by Reclamation.

## **Alternatives**

Three acquisition alternatives (Purchase, Leasing, and Efficiency) were developed for a willing seller Acquisition Program in a manner consistent with the authorizing legislation. These alternatives are summarized below and are discussed in detail in Chapter 2. The provision of funding is the same for each alternative; however, the alternatives differ in the way the acquisitions would be implemented. A No Action Alternative is also identified and analyzed for comparison purposes.

The objective of all acquisition alternatives is to acquire sufficient water from willing sellers to increase average annual inflow to Walker Lake by 50,000 af. This objective was selected for impact analysis purposes based on several prior studies, which indicated that additional inflow of approximately this amount (over and above period-of-record inflow) would lead to significant reductions in Walker Lake TDS concentration and improve ecological conditions of the lake. All three

alternatives have value for providing water to the lake and some form of each is being considered for implementation in combination as supported by the authorizing legislation for the Acquisition Program.

Acquisitions would be negotiated by NFWF based on offers from willing sellers. The location of specific acquisitions or how much would be offered by willing sellers cannot be determined in advance. Because of the unknowns related to a willing seller program, assumptions applicable to all acquisition alternatives were developed in order to analyze potential impacts of the Acquisition Program and are described in detail in Chapter 2. The assumptions are listed below.

- Geographic Distribution of Acquisitions
- Measurement and Monitoring
- Program Administration
- Acquisition Considerations
- Change in Point of Diversion, Place, or Purpose of Use
- Reservoir Operations
- Pending Litigation

### **No Action Alternative**

Under the No Action Alternative, no land, water appurtenant to the land, or related interests would be acquired. Surface water diversions, groundwater withdrawals, and overall water use would remain the same in the future as under current conditions, and NFWF would not use funds provided by Reclamation for an Acquisition Program to increase inflow of water to Walker Lake.

### **Alternative 1 (Purchase Alternative)**

Alternative 1 (Purchase Alternative) would fund NFWF to provide water to Walker Lake by acquiring land, water appurtenant to land, and related interests from willing sellers in the Walker River Basin in Nevada. Parts of the alternative are briefly summarized below with a more detailed explanation in Chapter 2.

#### ***Potential Types of Acquisitions***

Acquisitions from willing sellers can be grouped into the following general categories: whole farms or ranches, provisional water cards, stand-alone water rights, and other types of offers.

#### ***Types of Water Rights That Could Be Acquired***

Types of water rights or water derived from those rights could include decreed natural flow water, storage rights held by the Walker River Irrigation District

(WRID), primary or supplemental groundwater rights, state-certificated surface waters held by WRID, drainage or tailwater rights, and geothermal groundwater.

### ***Option Agreements***

As of December 2009, the University had entered into a total of 10 option and purchase agreements with willing sellers to acquire water and water rights (and related interests) appurtenant to lands in Nevada. There is no assurance that any single agreement (or all agreements) will be exercised, either in whole or in part.

### ***Walker Lake Inflow Associated with Acquisitions and Funding***

Two types of transfers are evaluated; a Full Transfer Scenario (which assumes that the full expected average yield of a water right could be transferred downstream) and Consumptive Use Scenarios (which assume that water transfers would be limited to the consumptive use portion of a water right).

The Revised DEIS analysis looked at two funding scenarios, \$56 million and full funding and analyzed the amount of af/yr additional inflow to Walker Lake that would be expected under each funding amount.

### ***Limit on Reduction in Irrigated Lands***

To limit the potential impacts of this alternative on agricultural land use and the upstream agricultural economy, it was the University's intention to limit reductions in irrigated land to no more than 33% of the assumed pre-acquisition baseline. For impact assessment purposes, the maximum permanent reduction in irrigated and/or water-righted land attributable to the Purchase Alternative is still assumed to be 33%. However, retirement of irrigated land may not be as large as was evaluated because it is likely that a mix of water acquisition alternatives could eventually be implemented, lessening the reduction of agricultural land.

### ***Required Applications, Agreements, and Approvals***

Under Alternative 1, the place of use for the acquired water rights would be transferred to the lower Walker River and Walker Lake in order to best accommodate deliveries to the new expected point of diversion at the Wabuska gage. This would involve many applications, agreements and approvals from various entities as detailed in Chapter 2.

### ***Alternative 2 (Leasing Alternative)***

Alternative 2 (Leasing Alternative) is adapted from a program described conceptually by WRID (Spooner pers. comm.) and may or may not be the same as the newly funded 3-year WRID demonstration leasing project. For this Revised DEIS Leasing Alternative it would feature centrally administered surface water leases from individual willing sellers, derived from water rights appurtenant to

lands in Nevada. Water banking is excluded from Alternative 2 in this Revised DEIS. Alternative 2 would involve surface storage with operations similar to those of all other alternatives.

Alternative 2 would focus on purchases of water, not water rights. Water rights would be retained by existing owners, but all or a specific portion of the water associated with the rights would be committed for the duration of the lease period according to the terms of binding voluntary agreements. All water leased would revert to the original rights holder following the end of the agreed-upon lease period.

### ***Types of Water Rights for Leased Water***

Potentially, all types of surface water would be eligible for enrollment under agreements for renewable or rotating terms of an estimated possible 1 to 3 years each. Leases of surplus or excess water associated with WRID's state permit water rights might also be possible.

### ***Walker Lake Inflow Associated with Acquisitions and Funding***

As discussed in Appendix 2B, an average assumed lease cost of slightly over \$200 per af is assumed; this estimate may not represent actual costs that would be paid. Based on these assumptions, expected average annual Walker Lake inflows were analyzed in the Revised DEIS for \$56 million and for full funding.

### ***Limit on Reduction in Irrigated Lands***

The 33% limit on reductions in irrigated and/or water righted land, described above for Alternative 1, could also apply in the aggregate to Alternative 2.

### ***Program Administration***

Annual lease payments would be based on the amount of water actually provided, rather than on the face value or average yield of the water rights. Annual payments would be structured to provide for an initial payment early in the year based on projected deliveries, and a final payment or adjustment at the end of the year would be based upon actual deliveries under the program.

### ***Required Applications, Agreements, and Approvals***

It is anticipated that temporary changes in the point of diversion or the place, manner, and purpose of use of water rights involved in the leasing program would be sought based upon relevant provisions of Nevada water law along with annual approvals from WRID, and modifications to the Decree would also likely be needed. All other required applications, agreements and approvals would be obtained as detailed in Chapter 2.

### **Alternative 3 (Efficiency Alternative)**

Alternative 3 (Efficiency Alternative) would involve program funding for conservation and water management improvements that could make water available for subsequent movement to Walker Lake. This alternative would feature a variety of potential water conservation and efficiency measures that would reduce the amount of surface water conveyed or applied to lands with appurtenant surface water rights in the Walker River Basin in Nevada.

#### ***Types of Efficiency Measures***

There are two general categories of potential measures: system efficiency measures and on-farm efficiency measures. System efficiency measures would reduce losses in the conveyance of surface water from the point of diversion to the land where the water is used (i.e., to the farm headgate). On-farm efficiency measures would reduce the amount of water needed to serve crop evapotranspiration (ET) needs (and/or to reduce crop ET itself) from the farm headgate to the point of final demand.

Some efficiency measures are already in effect in the Walker River Basin. While similar agreements with individual landowners could potentially play an important role in the Acquisition Program the need for associated water rights change approvals would have to be addressed.

#### ***Walker Lake Inflow Associated with Increased Efficiencies***

The analysis presented in Chapter 3, indicates that an average of 50,000 af/yr of additional inflow to Walker Lake could only be achieved under Alternative 3 if Alternative 3 included conversion to crops that use less water (crop switching). Much of the existing inefficiency in the system is currently contributing to incidental groundwater recharge; loss of this groundwater recharge would be expected to greatly increase river infiltration.

In light of such uncertainties associated with crop switching, the potential water savings associated with reduced crop ET resulting from the cultivation of low water use alternative crops has not been included in the Revised DEIS analysis of Alternative 3.

#### ***Program Administration***

Conservation agreements would be established by the program administrator with willing water rights holders. These agreements would identify the conservation or efficiency measures that would be implemented with program funding in exchange for conveyance or assignment of the associated water rights in amounts commensurate with the expected water savings. All or a portion of the applicable water rights would then be transferred to the lower Walker River and Walker Lake.

### ***Required Applications, Agreements, and Approvals***

For this alternative to be feasible, it would be necessary to establish regulatory and administrative mechanisms to ensure that the conserved water could be transferred to Walker Lake. The Nevada State Engineer's (NSE's) office has indicated a willingness to consider a number of potential approaches to the transfer of conserved water derived from existing water rights within the Walker River Basin that would allow for continued irrigation of at least a portion of the lands to which those water rights are appurtenant (Gallagher pers. comm.).

## **Summary of Environmental Consequences**

The primary environmental consequences of the acquisition alternatives and No Action Alternative are briefly outlined below with a more detailed discussion provided in the Revised DEIS chapters for each individual resource category. Impacts below are summarized generally and differences in duration of impacts between alternatives and differences caused by full funding versus current funding of \$56 million are not discussed in the summaries below. Table ES-1 summarizes the estimated surface elevation and TDS concentration for Walker Lake for each alternative. Table ES-2 summarizes the impacts of each alternative and compares the impacts of the acquisition alternatives.

### **Water Resources**

The following text describes the main water resource impacts (impacts on irrigation, Walker Lake volume and water quality, groundwater, and erosion).

#### ***Irrigated Lands***

Under the No Action Alternative, irrigated lands would not be affected.

The acquisition alternatives would be expected to reduce the amount of water available for irrigation and could result in a 0 to 33% reduction in irrigated lands, depending on the alternative and assumptions.

#### ***Walker Lake Storage and Water Quality***

Under the No Action Alternative, Walker Lake storage, surface elevation, and surface area would decrease. Water quality would become degraded, and TDS concentration would increase to levels that would significantly alter the ecosystem of the lake.

Under the acquisition alternatives, Walker Lake elevation could increase to a maximum of 3,970 feet and TDS could decline to a low of 11,300 mg/L (Table ES-1). However, depending on the alternative and funding level, conditions could

continue to deteriorate, although not to the same degree as for the No Action Alternative.

### ***Groundwater***

Under the No Action Alternative, groundwater levels could continue to decline as appears to be occurring under existing conditions.

Under the acquisition alternatives, groundwater levels could increase or decrease depending on implementation details.

### ***Erosion***

Under the No Action Alternative, erosion problems associated with decreasing lake surface elevation would continue.

The acquisition alternatives could reduce erosion associated with decreasing lake surface elevation, but erosion and sediment load in the river could increase as a result of increases in river flow and increases in the amount of exposed earth.

## **Biological Resources – Vegetation and Wetlands**

Under the No Action Alternative, the lake would continue to decline and recede from wetlands at the south end of the lake, but they would persist because they are spring-fed. Erosion of the area along Walker River below Schurz would continue, causing wetland and riparian communities to decline further. Declining lake elevations would cause an initial increase in widgeon grass wetlands, but also a corresponding loss of open water habitat. Ultimately, elevated TDS concentration would cause the loss of widgeon grass in the lake. Noxious weed invasion of riparian habitat in the lower Walker River, particularly the establishment of tamarisk, would likely increase. Farming practices in agricultural fields would continue to result in control of weeds including adjacent agricultural fields and along conveyance ditches and drains.

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. Wetland areas associated with farmland, shallow areas around Walker Lake, Alkali Wildlife Management Area (WMA), the south end of Walker Lake, and submergent wetlands in Walker Lake could decrease under the acquisition alternatives; however, the losses would be somewhat offset by an increase in wetland habitat along the river as a result of increased flow. Wetland habitat below Schurz would especially benefit.

Implementation of the acquisition alternatives could result in the permanent or temporary conversion of cropland-type wildlife habitat over time and the spread of weeds and invasive plant species in and adjacent to cropland habitat.

## **Biological Resources – Fish**

Under the No Action Alternative, lake surface elevation would continue to decline and TDS concentration would continue to increase, likely surpassing 20,000 mg/L before 2050 and ultimately reaching well over 35,000 mg/L by the 2200. These TDS concentrations would cause mortality of LCT and tui chub.

Implementation of the acquisition alternatives would improve native fish habitat as a result of increased flow, reduced temperature, 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. Increased sedimentation in upstream Walker River could affect the fitness of native fish. However, most concentrations are low and would not be expected to rise to 100 mg/L as a result of increased flows. Similarly, increased sedimentation could adversely affect LCT spawning habitat in the mainstem Walker River. However, if flow velocity is high enough, loose sediment would continue downstream and flows could clean spawning gravel sites.

## **Biological Resources – Wildlife**

Under the No Action Alternative, continued increase of TDS concentration would likely result in a decrease in the Walker Lake fishery, which would have an adverse impact on the feeding grounds for migratory birds that feed on fish. Additionally, beds of widgeon grass have increased as the TDS concentration in Walker Lake has increased, but would likely disappear from Walker Lake with TDS levels increasing to up to 39,500 mg/l.

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 along canals, in wetlands at the southern end of Walker Lake as that wetland submerges, and at Alkali WMA if return flows are diminished. The acquisition alternatives would increase and improve wildlife habitat for birds and other species in other areas, primarily along the river corridor and Walker Lake itself.

## **Land Use and Agriculture**

Under the No Action Alternative, population growth could put pressure on agricultural land, but agriculture would continue to be an important part of the economy and culture in Mason and Smith Valleys. Population in Mineral County is expected to continue to decrease, which could reduce the number of occupied residences and commercial businesses. Use of public facilities would also be expected to decline. Land use conditions at the Walker Lake State Recreation Area (SRA) would also be expected to decline as the lake elevation dropped.

The acquisition alternatives conflict with Lyon County and City of Yerington land use policies for agricultural preservation, and 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.

### **Air Quality**

Under the No Action Alternative, Walker Lake surface elevation would decline further, exposing more submerged lake bed and creating the potential for increased windblown dust. No change in dust emissions would be expected from current farmland in Lyon County.

Air quality impacts associated with the acquisition alternatives would include less fugitive dust at Walker Lake. While permanently retiring agricultural lands would increase the amount of vacant land, which could become a potential source of fugitive dust 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.

### **Cultural Resources**

Under the No Action Alternative, Walker Lake surface elevation would continue to decline to an estimated 3,900 feet by 2200. Cultural resources would remain relatively unchanged from present conditions.

Implementation of Alternative 1 (Purchase Alternative) and Alternative 2 (Leasing Alternative) 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 not be newly inundated or adversely affected as a result of these alternatives. Under Alternative 3 (Efficiency Alternative), 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 National Historic Preservation Act (NHPA).

### **Socioeconomics**

Under the No Action Alternative, the amount of land in agricultural production in Mason and Smith Valleys is not expected to substantially increase or decrease, and 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.

The acquisition alternatives would reduce employment, income, and tax revenues as a result of changes in agricultural production in Mason and Smith Valleys and the East Walker area. The lost jobs would represent a substantial proportion of total employment (approximately 3 to 5%) in the Mason Valley and Smith Valley areas. The direct change in employment resulting from the loss in agricultural production would account for approximately 21 to 27% of total farm employment in Mason and Smith Valleys. The area of irrigated agricultural land in these valleys could decrease by 25 to 32% under Alternative 1, which would likely reduce the value of those properties. This potential impact on property values may be less under Alternative 2 because lands would only be temporarily fallowed. Alternative 3 is not expected to adversely affect property values and efficiency improvements could increase the value of properties participating in the efficiency measures. The acquisition alternatives could also increase public recreation opportunities, income from recreation, and recreation employment in the Walker Lake area. These impacts vary from temporary to permanent, depending on alternative.

## **Recreation**

The No Action Alternative would result in adverse impacts on recreation at Walker Lake in several ways: TDS concentration would continue to increase, which would further reduce the Walker Lake fishery, and LCT could no longer be stocked in the lake, effectively ending all sport fishing in Walker Lake; the collapse of the fishery would reduce the food supply for migratory birds, which would negatively affect festivals and recreation activities that center on fishing and migratory birds; and as more lake bottom became exposed the scenic quality of the lake environment would deteriorate, fugitive dust would negatively affect the recreation experience at the lake, and access to recreation facilities would become more difficult. The No Action Alternative also would undermine progress toward and achievement of Mineral County's recreation-related goals.

The acquisition alternatives would increase consistency with Mineral County recreation policies and 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 Bureau of Land Management (BLM) and the U.S. Fish and Wildlife Service (USFWS), and the Walker River Indian Reservation.

## **Indian Trust Assets**

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 the Walker River Paiute Tribe (WRPT) has historically relied upon (i.e., vegetation, fish, and wildlife). The No Action Alternative would not affect water rights as established under the Walker River Decree (Decree C-125), or land assets such as farmland, rangeland, or recreational land.

The acquisition alternatives would improve habitats of fish, wildlife, and vegetation Indian trust assets (ITAs) in the lower Walker River on the present-day Walker River Indian Reservation and at Walker Lake, and would improve the Walker Lake ecosystem. However, adverse impacts on ITAs of the Yerington Paiute Tribe (YPT) could potentially occur as a result of reduced groundwater recharge and elevation, potential movement of the Anaconda Mine groundwater plume, and reduced incidental availability of water as a result of less field runoff, seepage, or return flows.

## **Environmental Justice**

There would be no direct environmental justice impacts under the No Action Alternative.

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.

## **Cumulative Impacts**

Several types of actions 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.

Various 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, the Acquisition Program would not contribute to 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 a National Pollutant Discharge Elimination System (NPDES) permitting process to protect water quality, and water quality at

the Anaconda mine site is being monitored by the U.S. Environmental Protection Agency (EPA), which would help the Acquisition Program managers avoid using contaminated groundwater to augment river flow.

The implementation of the acquisition alternatives could result in the 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.

Implementation of the Purchase and Leasing 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 on vegetation and wetlands.

Implementation of the acquisition alternatives, which would increase and improve wildlife habitat for birds and other species along the river corridor and Walker Lake, in combination with other past, present, and planned programs (river, WMA, NFWF stewardship and conservation activities, and farm restoration or conservation projects and temporary land fallowing) would have a beneficial cumulative impact on wildlife.

Implementation of the acquisition alternatives and 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.

## **Climate and Climate Change**

Under the No Action Alternative, water would continue to be pumped and delivered to irrigate agricultural lands in the Walker River Basin. Pumping could increase as demands for irrigation increase. Because greenhouse gas (GHG) emissions are associated with the energy used to pump or divert river water to land uses in the region, GHG emissions could increase, and a minor impact could occur.

Under the Purchase Alternative, decreasing water delivery to the land would reduce GHG emissions associated with pumping. However, livestock and farming operations on retired lands could be diverted to other locations. Thus, reducing farming in the Walker River Basin may not result in a net decrease of farming or

livestock operations globally. Regional carbon sinks are not anticipated to decrease significantly because agricultural land is a carbon sink only when vegetation is present. Although loss of water transport in associated irrigation canals and drains could cause the loss of adjacent riparian and wetland habitat, increased flows in the river and inflow into Walker Lake could result in increases in those adjacent riparian areas.



**Table ES-1.** Estimated Future Water Surface Elevation and TDS Concentrations for Walker Lake for All Alternatives

	Estimated Future Lake Elevation (feet)						Estimated Future TDS (mg/L)				
	At High Point <sup>a</sup>	Approximate Year of High Point <sup>b</sup>	At Year 2200	At High Point-Change from September 2007 <sup>c</sup>	At Year 2200-Change from September 2007	At Year 2200-Change from No Action Alternative	at Low Point	Approximate Year of Low Point <sup>b</sup>	at Year 2200	At Low Point-Change from September 2007 <sup>c</sup>	At Year 2200-Change from No Action Alternative
No Action Alternative											
High Average Inflow	NA	NA	3,906	NA	-29		NA <sup>d</sup>	NA <sup>d</sup>	39,500		
Low Average Inflow	NA	NA	3,898	NA	-37		NA <sup>d</sup>	NA <sup>d</sup>	51,000		
Alternative 1 - Proposed Project											
Current Funding (average additional 7,300 af/yr)											
High Average Inflow	NA	NA	3,915	NA	-20	9	NA <sup>d</sup>	NA <sup>d</sup>	31,600		-7,900
Low Average Inflow	NA	NA	3,905	NA	-30	7	NA <sup>d</sup>	NA <sup>d</sup>	40,700		-10,300
Full Funding (average additional 50,000 af/yr)											
High Average Inflow	NA	NA	3,970	NA	35	64	11,300	2090	12,400	-4,319	-27,100
Low Average Inflow	NA	NA	3,965	NA	30	67	12,300	2090	13,500	-3,319	-37,500
Alternative 2 – Leasing Alternative											
Current Funding (additional 50,000 af/yr for 3 years) <sup>a</sup>											
High Average Inflow	3,937	2011	3,906 <sup>d</sup>	2	-29 <sup>d</sup>	0 <sup>d</sup>	15,400	2011	39,500 <sup>d</sup>	-219	0 <sup>d</sup>
Low Average Inflow	3,936	2011	3,898 <sup>d</sup>	1	-37 <sup>d</sup>	0 <sup>d</sup>	15,600	2011	51,000 <sup>d</sup>	-19	0 <sup>d</sup>
Full Funding (additional 50,000 af/yr for 20 years) <sup>a</sup>											
High Average Inflow	3,948	2028	3,906 <sup>d</sup>	13	-29 <sup>d</sup>	0 <sup>d</sup>	13,200	2028	39,500 <sup>d</sup>	-2,419	0 <sup>d</sup>
Low Average Inflow	3,945	2028	3,898 <sup>d</sup>	10	-37 <sup>d</sup>	0 <sup>d</sup>	13,900	2028	51,000 <sup>d</sup>	-1,719	0 <sup>d</sup>
Alternative 3 - Efficiency Alternative											
75% Efficiency (average additional 32,300 af/yr) <sup>f</sup>											
High Average Inflow	NA	NA	3,948	NA	13	42	14,800	2060	16,800	-819	-22,700
Low Average Inflow	NA	NA	3,939	NA	4	41	16,000	2030	19,600	381	-31,400

<sup>a</sup> Lake elevations for Alternatives 1 and 3 are expected to generally tend towards their equilibrium values, which are estimated to be attained after year 2100. However, because the increased inflow for Alternative 2 would be temporary, lake level would be expected to rise to a high point and then tend towards the same equilibrium as the No Action Alternative.

<sup>b</sup> Assumes that the Walker Lake Acquisition Program was initiated at the beginning of water year 2008 (fall 2007).

<sup>c</sup> Fall 2007 was used as a basis of comparison (elevation of 3,935 feet and TDS concentration of 15,600 mg/L in September 2007) because calculations assumed the Acquisition Program was initiated at the start of water year 2008 (October 1, 2008 - September 30, 2008). Because the actions of Alternatives 1 and 3 could continue indefinitely, the lake elevation would change until it eventually would fluctuate about a particular equilibrium value that is independent of the starting elevation. Because Alternative 2 would be temporary, the starting elevation is more important. Because the exact start date of the Acquisition Program is unknown, the short-term results for Alternative 2 are best evaluated not in terms of elevations and TDS concentrations, but in terms of change from the starting point used in the assessment.

<sup>d</sup> No low point for TDS because lake level continues to drop from current elevation

<sup>e</sup> Alternative 2 was evaluated using the year 3 and year 20 values from the analysis for the fully-funded Alternative 1 (all these scenarios assume an additional average inflow of 50,000 af/yr). Whether the increased inflow was ended at year 3 or 20, the eventual lake levels would be the same as for the No Project Alternative, it would just take 3-20 years longer to reach the equilibrium, and the TDS concentration at year 2200 would be similar to that for the No Project Alternative.

<sup>f</sup> The 75% efficiency assessment is an evaluation of a theoretical optimal efficiency that would be difficult to attain throughout the Walker River Basin. It does not include any increase in flow resulting from farmers shifting to crops that use less water.





**Table ES-2.** Impact Summary for the Acquisition Program Alternatives

Chapter/ Impact Number	Impact Title	Type of Impact (Direct or Indirect)	Alternative		
			1 Purchase Alternative	2 Leasing Alternative	3 Efficiency Alternative
CH 3: Water Resources					
No Action Alternative					
	<i>Hydrologic Change HC-1: Alter Walker Lake Storage and Surface Area (Decrease)</i> Under the No Action Alternative, Walker Lake storage, surface elevation, and surface area would decrease. <i>Impact WI-1: Alter Walker Lake Water Quality as a Result of Change in Lake Storage (Adverse)</i> Under the No Action Alternative, water quality would become degraded and TDS levels would increase to levels that would significantly alter the ecosystem of the lake. <i>Impact WI-2: Decrease Down-Cutting in Lower Walker River as a Result of Increased Lake Level (Adverse)</i> Under the No Action Alternative, erosion problems associated with decreasing lake levels would continue.				
Action Alternatives					
WI-1	<i>Alter Walker Lake Water Quality as a Result of Change in Lake Storage</i>	D	Beneficial	Beneficial	Beneficial
WI-2	<i>Decrease Down-Cutting in Lower Walker River as a Result of Increased Lake Surface Elevation</i>	D	Beneficial	Beneficial	Beneficial
WI-3	<i>Increase Erosion as a Result of Increased River Flow and Increased Exposed Soil</i>	D	Adverse	Adverse	Adverse
WI-4	<i>Increase Localized Flooding as a Result of Increased River Flow</i>	D	Minor	Minor	Minor

Table ES-2. Continued

Chapter/ Impact Number	Impact Title	Type of Impact (Direct or Indirect)	Alternative		
			1 Purchase Alternative	2 Leasing Alternative	3 Efficiency Alternative
WI-5	<i>Improve River Water Quality as a Result of Increased Dilution of Poor Quality Inflows</i>	D	Beneficial	Beneficial	Beneficial
WI-6	<i>Diminish River Water Quality as a Result of Introduction of Water with Poor Quality</i>	D	Minor	Minor	No Impact
WI-7	<i>Reduce River Water Temperature as a Result of Increased Flow</i>	D	Beneficial	Beneficial	Beneficial
WI-8	<i>Reduce Groundwater Recharge and Elevation as a Result of Reduced Infiltration from Fields and Canals or from Transfer of Geothermal Water to Walker River</i>	I	Adverse, Beneficial, or No Impact	Beneficial, Minor, or No Impact	Adverse
WI-9	<i>Alter the Movement of the Anaconda Mine Groundwater Plume as A Result of Change in Groundwater Recharge</i>	I	Minor	Minor	Minor
WI-10	<i>Reduce Water Supplies for Remaining Canal Users as a Result of Reduced Canal Flow</i>	I	Minor	Minor	Minor
WI-11	<i>Reduce Incidental Availability of Water as a Result of Reduced Field Runoff, Seepage, or Return Flow</i>	I	Minor	Minor	Minor
WI-12	<i>Improve River Water Quality as a Result of Reduced Return Flow</i>	I	Beneficial	Beneficial	Beneficial
WI-13	<i>Decrease Quality of Stormwater Runoff as a Result of Construction-Related Activities</i>	I	NA	NA	Minor
<b>Hydrologic Changes</b>					
HC-1	<i>Alter Walker Lake Storage and Surface Area</i>	D	Increase	Increase	Increase
HC-2	<i>Reduce Irrigated Land as a Result of Acquisitions</i>	D	Decrease	Decrease	No Change

Table ES-2. Continued

Chapter/ Impact Number	Impact Title	Type of Impact (Direct or Indirect)	Alternative		
			1 Purchase Alternative	2 Leasing Alternative	3 Efficiency Alternative
HC-3	<i>Increase River Flow</i>	D	Increase	Increase	Increase
HC-4	<i>Change in Amount of Groundwater Pumping</i>	D and I	Increase or Decrease	Increase or Decrease	No Change

#### CH 4: Biological Resources—Vegetation and Wetlands

##### No Action Alternative

Under the No Action Alternative, the lake surface elevation would continue to decline and recede from wetlands at the south end of the lake, but they would persist because they are spring-fed. Erosion of the area along Walker River below Schurz would continue, causing wetland and riparian communities to decline further. Declining lake elevations would cause an initial increase in widgeon grass wetlands, but also a corresponding loss of open water habitat. Ultimately, elevated TDS concentration would cause the loss of widgeon grass in the lake. Noxious weed invasion of riparian habitat in the lower Walker River, particularly the establishment of tamarisk, would likely increase. Farming practices in agricultural fields would continue to result in control of weeds including adjacent agricultural fields and along conveyance ditches and drains.

Table ES-2. Continued

Chapter/ Impact Number	Impact Title	Type of Impact (Direct or Indirect)	Alternative		
			1 Purchase Alternative	2 Leasing Alternative	3 Efficiency Alternative
Action Alternatives					
VEG-1	Loss of Wetland Communities at Alkali Lake WMA Caused by Potential Acquisitions in Smith Valley	I	Adverse	Adverse	Adverse
VEG-2	Loss of Riparian and Wetland Habitat Associated with Irrigation Canals and Drains Caused by Decreased Water Flow	I	Minor	Minor	No Impact
VEG-3	Loss of Wetlands at South End of Walker Lake Caused by Increased Lake Surface Elevation	I	Minor	Minor	Minor
VEG-4	Loss of Submergent Wetlands in Walker Lake Caused by Increased Lake Surface Elevation	I	Minor	Minor	Minor
VEG-5	Loss of Wetland Communities in Irrigated Lands Caused by Curtailed Irrigation	I	Minor	Minor	No Impact
VEG-6	Increase in Riparian and Wetland Habitat along the Mainstem Walker River Downstream from Schurz as a Result of Increased Flow	I	Beneficial	Beneficial	Beneficial
VEG-7	Loss of Special-Status Plants Caused by Changes in Hydrology	I	No Impact	No Impact	No Impact
VEG-8	Spread of Noxious and Invasive Weeds Caused by Reduction of Irrigated Agricultural Land	I	Adverse	No Impact	No Impact
VEG-9	Spread of Tamarisk Caused by Increased Flow in Walker River	I	Minor	Minor	Minor
VEG-10	Loss of Riparian and Wetland Habitat along Irrigation Canals and Drains Caused by Construction Activities Associated with System Efficiency Measures	D	No Impact	No Impact	Adverse

Table ES-2. Continued

Chapter/ Impact Number	Impact Title	Type of Impact (Direct or Indirect)	Alternative		
			1 Purchase Alternative	2 Leasing Alternative	3 Efficiency Alternative
VEG-11	<i>Loss of Riparian Habitat along Irrigation Canals and Drains Caused by Decreased Flows Due to System Efficiency Measures</i>	I	No Impact	No Impact	Minor
VEG-12	<i>Loss of Wetland Communities within Irrigated Lands Caused by On-Farm Efficiency Measures</i>	D	No Impact	No Impact	Minor
CH 5: Biological Resources— Fish					
No Action Alternative					
	Lake surface elevation would continue to decline and TDS concentration would continue to increase, likely surpassing 20,000 mg/L before 2050 and ultimately reaching well over 35,000 mg/L by the 2200. TDS concentration would cause mortality of LCT and tui chub.				
Action Alternatives					
FISH-1	<i>Improved Native Fish Habitat as a Result of Increased Flow in Walker River</i>	D	Beneficial	Beneficial	Beneficial
FISH-2	<i>Decrease of Native Fish Fitness as a Result of Increased Sedimentation in the Walker River</i>	D	Minor	Minor	Minor
FISH-3	<i>Increase in Survival of LCT as a Result of Improved Water Quality in Walker Lake</i>	D	Beneficial	Beneficial	Beneficial
FISH-4	<i>Decrease in Water Temperature as a Result of Increased Flow in Walker River</i>	D	Beneficial	Beneficial	Beneficial
FISH-5	<i>Increase in Survival of Tui Chub as a Result of Improved Water Quality in Walker Lake</i>	D	Beneficial	Beneficial	Beneficial

Table ES-2. Continued

Chapter/ Impact Number	Impact Title	Type of Impact (Direct or Indirect)	Alternative		
			1 Purchase Alternative	2 Leasing Alternative	3 Efficiency Alternative
FISH-6	<i>Increase in LCT Spawning Habitat as a Result of Reconnection of Walker Lake to Walker River</i>	D	Beneficial	Beneficial	Beneficial
FISH-7	<i>Decrease of LCT Fitness as a Result of Increased Sedimentation in the Walker River</i>	D	Minor or Beneficial	Minor	Minor
FISH-8	<i>Increase in Growth and Survival of LCT as a Result of Increased Abundance of Prey Species</i>	I	Beneficial	Beneficial	Beneficial
FISH-9	<i>Potential Construction-Related Temporary Impairment of Fish Survival, Growth, or Reproduction by Accidental Spills or Polluted Runoff</i>	D	NA	NA	Minor
CH 6: Biological Resources—Wildlife					
No Action Alternative					
	Continued increase of TDS concentration would result in a decrease in the Walker Lake fishery, which would have an adverse impact on the feeding grounds for migratory birds that feed on fish. Widgeon grass beds have increased as the TDS concentration in Walker Lake has increased, but would likely disappear from Walker Lake with TDS concentration increasing to up to 39,500 mg/L.				
Action Alternatives					
WILD-1	<i>Loss of Foraging Habitat for Wildlife Species as a Result of Fallowing, Field Rotation, or Retirement of Agricultural Lands</i>	I	Adverse	Adverse	No Impact
WILD-2	<i>Loss of Bird Nests along the Shore of Walker Lake Caused by Increased Lake Surface</i>	I	No Impact	No impact	No Impact

Table ES-2. Continued

Chapter/ Impact Number	Impact Title	Type of Impact (Direct or Indirect)	Alternative		
			1 Purchase Alternative	2 Leasing Alternative	3 Efficiency Alternative
	<i>Elevation</i>				
WILD-3	<i>Loss of Bird Nests in Wetlands at the Southern End of Walker Lake Caused by Increased Lake Surface Elevation</i>	I	Minor	Minor	Minor
WILD-4	<i>Impacts on Bird Species That Feed on Fish in Walker Lake</i>	I	Beneficial	No Impact	Beneficial
WILD-5	<i>Increased Habitat for Wildlife Species Using Riparian and Wetland Habitat along the Mainstem Walker River Downstream of Schurz as a Result of Increased Flow</i>	I	Beneficial	Beneficial	Beneficial
WILD-6	<i>Impacts on Wildlife Species as a Result of the Loss of Riparian and Wetland Habitat Associated with Irrigation Canals and Drains Caused by Decreased Flow</i>	I	Minor	Minor	Minor
WILD-7	<i>Loss of Foraging Habitat for Shorebirds and Wading Birds at Alkali Lake WMA as a Result of Acquisitions in Smith Valley</i>	I	Minor	Adverse	Adverse
WILD-8	<i>Loss of Foraging Habitat for Waterfowl and Coots as Lake Elevation Increases at Walker Lake</i>	I	Minor	No Impact	Minor
WILD-9	<i>Potential Creation of Habitat for Pygmy Rabbit and Greater Sage Grouse as a Result of Retiring Agricultural Land</i>	I	Beneficial	No Impact	No Impact

Table ES-2. Continued

Chapter/ Impact Number	Impact Title	Type of Impact (Direct or Indirect)	Alternative		
			1 Purchase Alternative	2 Leasing Alternative	3 Efficiency Alternative
CH 7: Land Use and Agriculture					
No Action Alternative					
	Population growth could put pressure on agricultural land, but agriculture would continue to be an important part of the economy and culture in Mason and Smith Valleys. Population in Mineral County is expected to continue to decrease, which could reduce the number of occupied residences and commercial businesses. Use of public facilities would also be expected to decline. Land use conditions at the Walker Lake State Recreation Area (SRA) would also be expected to decline as the lake elevation dropped.				
Action Alternatives					
LU-1	Conflict with Requirements of the Farmland Protection Policy Act	D	No Impact	No Impact	No Impact
LU-2	Conflict with Lyon County and City of Yerington Land Use Policies	D	Adverse	No Impact	No Impact
LU-3	Conflict with Lyon County Master Plan Policies on Retaining Water Resources	D	Adverse	Adverse	Adverse
LU-4	Affect Productivity of Irrigated Agricultural Land	D	Adverse	Adverse	No Impact
LU-5	Comply with Land Use Goals in the Mineral County Master Plan	D	Beneficial	Beneficial	Beneficial
LU-6	Create Incompatible Land Uses as a Result of Invasive Plant Species Colonization on Retired Agricultural Land	I	Adverse	Adverse	No Impact



Table ES-2. Continued

Chapter/ Impact Number	Impact Title	Type of Impact (Direct or Indirect)	Alternative		
			1 Purchase Alternative	2 Leasing Alternative	3 Efficiency Alternative
CH 8: Air Quality					
No Action Alternative					
	<i>AIR-1: Change in Fugitive Dust Emissions from Declining Lake Elevation and Exposed Walker Lake Bed (Adverse)</i>  Walker Lake surface elevation would decline further, exposing more submerged lake bed and creating the potential for increased windblown dust.  No change in dust emissions would be expected from current farmland in Lyon County.				
Action Alternatives					
AIR-1	<i>Change in Fugitive Dust Emissions from Declining Lake Elevation and Exposed Walker Lake Bed</i>	D	Beneficial	Beneficial	Beneficial
AIR-2	<i>Increase Fugitive Dust as a Result of Reduced Irrigation</i>	D	Adverse	Minor	No Impact
AIR-3	<i>Short-Term Increase in Vehicle Exhaust Emissions as a Result of Construction</i>	D	NA	NA	No Impact
AIR-4	<i>Short-Term Increase in Fugitive Dust as a Result of Construction and Vegetation Removal</i>	D	NA	NA	No Impact

Table ES-2. Continued

Chapter/ Impact Number	Impact Title	Type of Impact (Direct or Indirect)	Alternative		
			1 Purchase Alternative	2 Leasing Alternative	3 Efficiency Alternative
CH 09: Cultural Resources					
No Action Alternative					
	Walker Lake surface elevation would continue to decline to an estimated 3,900 feet by 2200. Cultural resources would remain relatively unchanged from present conditions.				
Action Alternatives					
	Alternative 1: no direct or indirect impacts		N/A	N/A	N/A
	Alternative 2: no direct or indirect impacts		N/A	N/A	N/A
	Alternative 3: impacts from construction measures would be identified after construction activities were determined. All activities would be reviewed to determine impacts on historic properties or archaeological resources.		N/A	N/A	N/A
CH 10: Socioeconomics					
No Action Alternative					
	The amount of land in agricultural production in Mason and Smith Valleys is not expected to substantially increase or decrease, and 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				

Table ES-2. Continued

Chapter/ Impact Number	Impact Title	Type of Impact (Direct or Indirect)	Alternative		
			1 Purchase Alternative	2 Leasing Alternative	3 Efficiency Alternative
Action Alternatives					
SOC-1	Change in Total Employment in Lyon County as a Result of Changes in Agricultural Production	I	Minor	Minor	Beneficial
SOC-2	Change in Total Employment in Mason and Smith Valleys as a Result of Changes in Agricultural Production	I	Adverse	Adverse	No Impact
SOC-3	Change in Agricultural Employment as a Result of Changes in Agricultural Production	I	Adverse	Adverse	No Impact
SOC-4	Change in Employment as a Result of Changes in Recreation Opportunities at Walker Lake	I	Beneficial	Beneficial	Beneficial
SOC-5	Change in Income as a Result of Changes in Agricultural Production	I	Minor	Minor	No Impact
SOC-6	Change in Income as a Result of Changes in Recreation Opportunities at Walker Lake	I	Beneficial	Beneficial	Beneficial
SOC-7	Change in Tax Revenues	I	Minor	Minor	Beneficial
CH 11: Recreation					
No Action Alternative					
	The continued increase in TDS concentration would further reduce the Walker Lake fishery, and LCT could no longer be stocked, effectively ending all sport fishing in Walker Lake. The collapse of the fishery would reduce the food supply for migratory birds, which would negatively affect festivals and recreation activities that center on fishing and migratory birds. As more lake bottom became exposed the scenic quality of the lake environment would deteriorate. Fugitive dust				

Table ES-2. Continued

Chapter/ Impact Number	Impact Title	Type of Impact (Direct or Indirect)	Alternative		
			1 Purchase Alternative	2 Leasing Alternative	3 Efficiency Alternative
	would negatively affect the recreation experience at the lake, and access to recreation facilities would become more difficult. Achievement of Mineral County's recreation-related goals would be undermined.				
<b>Action Alternatives</b>					
REC-1	<i>Increase Consistency with Mineral County Recreation Policies</i>	D	Beneficial	Beneficial	Beneficial
REC-2	<i>Improve Sport Fishing Opportunities in Walker Lake as a Result of Improved Water Quality</i>	I	Beneficial	Beneficial	Beneficial
REC-3	<i>Improve Boating Access as a Result of Increased Inflow to Walker Lake</i>	I	Beneficial	No Impact	No Impact
REC-4	<i>Improve Shoreline Recreational Use as a Result of Increased Inflow to Walker Lake</i>	I	Beneficial	Beneficial	Beneficial
REC-5	<i>Increase in Other Recreational Experiences and Activities as a Result of Increased Inflow to Walker Lake</i>	I	Beneficial	Beneficial	Beneficial
REC-6	<i>Improve Sport Fishing Opportunities in East Walker River, West Walker River, and Mainstem Walker River as a Result of Increased Inflow to Walker Lake</i>	I	Beneficial	Beneficial	Beneficial
REC-7	<i>Decrease Hunting and Wildlife Viewing Opportunities on Farmland</i>	I	Adverse	Adverse	No Impact

Table ES-2. Continued

Chapter/ Impact Number	Impact Title	Type of Impact (Direct or Indirect)	Alternative		
			1 Purchase Alternative	2 Leasing Alternative	3 Efficiency Alternative
CH 12: Indian Trust Assets					
No Action Alternative					
	The decreasing water elevation and increasing TDS concentration in Walker Lake would adversely affect natural resources that the Walker River Paiute Tribe (WRPT) has historically relied upon (i.e., vegetation, fish, and wildlife). Water rights as established under the Walker River Decree (Decree C-125), or land assets such as farmland, rangeland, or recreational land would not be affected.				
Action Alternatives					
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	D	Beneficial	Beneficial	Beneficial
ITA-2	Potentially Reduce Flexibility to Manage Weber Reservoir for Irrigation Purposes	D	No Impact	No Impact	No 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	I	Adverse	Adverse	Adverse
ITA-4	Alter the Movement of the Anaconda Mine Groundwater Plume as A Result of Change in Groundwater Recharge	I	Minor	Minor	Minor
ITA-5	Reduce Incidental Availability of Water as a Result of Reduced Field Runoff, Seepage, or Return Flows	I	Minor	Minor	Minor

Table ES-2. Continued

Chapter/ Impact Number	Impact Title	Type of Impact (Direct or Indirect)	Alternative		
			1 Purchase Alternative	2 Leasing Alternative	3 Efficiency Alternative
CH 13: Environmental Justice					
No Action Alternative	There would be no direct environmental justice impacts under the No Action Alternative				
Action Alternatives					
EJ-1	Affect Employment of Minority and Low-Income Groups in Lyon County	I	Adverse	Adverse	Beneficial
EJ-2	Affect Use of Renewable Natural Resources for Subsistence	I	No Impact	No Impact	No Impact
CH 15: Climate and Climate Change					
No Action Alternative					
	Current pumping and delivery of water to land uses in the Walker River Basin would continue and could increase with anticipated increases in agriculture. Because greenhouse gas (GHG) emissions are associated with the energy used for pumping or diverting river water, GHG emissions could increase, and a minor impact could occur.				
Action Alternatives					
CC-1	Change Emissions of Greenhouse Gas	D	Undetermined	Undetermined	Undetermined
CC-2	Change Regional Carbon Sinks Contributing to Global Climate Change	I	Minor	No Impact	No Impact
CC-3	Change Regional Albedo Contributing to Global Climate Change	I	Minor	No Impact	No Impact

Notes: If impacts for full funding are different for those for funding of \$56 million, only the full funding impacts are given. Impacts for Alternative 2 are temporary.

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## Acronyms and Abbreviations

µg/L	microgram per liter
Acquisition Program	Walker River Basin Acquisition Program
af	acre-feet
af/yr	acre-feet per year
BAQP	Bureau of Air Quality Planning
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BP	Before Present
CARB	California Air Resources Board
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CO <sub>2</sub>	carbon dioxide
Corps	U.S. Army Corps of Engineers
Decree C-125	Walker River Decree
DEIS	Draft Environmental Impact Statement
DOD	U.S. Department of Defense
DOI	U.S. Department of the Interior
DRI	Desert Research Institute
EA	Environmental Assessment
EC	electrical conductivity
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ET	evapotranspiration
FEIS	Final Environmental Impact Statement

FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
GAP	Gap Analysis Program
GHG	greenhouse gas
GIS	geographic information system
GRR	groundwater recharge and return
ITA	Indian Trust Asset
IVC	International Vegetation Classification
LCT	Lahontan cutthroat trout
LESA	Land Evaluation and Site Assessment
LiDAR	light detecting and ranging
MBTA	Migratory Bird Treaty Act
mg/L	milligrams per liter
mm	millimeter
msl	mean sea level
NAAQS	National Ambient Air Quality Standards
NAC	Nevada Administrative Code
NDEP	Nevada Division of Environmental Protection
NDOW	Nevada Department of Wildlife
NDWP	Nevada Division of Water Planning
NDWR	Nevada Division of Water Resources
NEPA	National Environmental Policy Act
NFWF	National Fish and Wildlife Foundation
ng/g	nanograms per gram
NHPA	National Historic Preservation Act
NNHP	Nevada Natural Heritage Program
NNPS	Nevada Native Plant Society
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Services

NRHP	National Register of Historic Places
NRS	Nevada Revised Statutes
NSE	Nevada State Engineer
NVCRIS	Nevada Cultural Resources Information System
OHV	off-highway vehicle
PL	Public Law
PM10	particulate matter greater than 10 microns in size
PM2.5	particulate matter smaller than 2.5 microns in size
ppm	parts per million
Purchase Alternative	Walker River Basin Acquisition Program
Reclamation	Bureau of Reclamation
Revised DEIS	Revised Draft Environmental Impact Statement
ROD	Record of Decision
RV	recreational vehicle
SHPO	State Historic Preservation Officer
SRA	State Recreation Area
SWPPP	stormwater pollution prevention plan
SWRCB	California State Water Resources Control Board
TCP	traditional cultural property
TDS	total dissolved solids
TMDL	total maximum daily load
TSS	total suspended solids
University	University of Nevada System of Higher Education
USBWC	U.S. Board of Water Commissioners
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

WMA	Wildlife Management Area
WRID	Walker River Irrigation District
WRPT	Walker River Paiute Tribe
YPT	Yerington Paiute Tribe