RECLAMATION
*Managing Water in the West*

# Environmental Assessment

Lower Truckee River Restoration Projects at Tracy Power Plant, West McCarran Ranch, and Upper Mustang Ranch

**Mid-Pacific Region**
**Lahontan Basin Area Office**
**Carson City, Nevada**

In partnership with:

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The Nature Conservancy
Protecting nature. Preserving life.™

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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.

# Table of Contents

# Summary

## Introduction

The U.S. Bureau of Reclamation (Reclamation) has prepared this Environmental Assessment (EA) to analyze the impacts of the federal action of Reclamation allowing The Nature Conservancy (TNC) to use Desert Terminal Lakes (DTL) grant funding for a portion of TNC's costs of implementing ecosystem restoration projects at three sites along the lower Truckee River. Funding would be provided for acquisition of property at one of the project sites, for construction of the restoration projects, including project management (personnel, supplies and services), and for ecological effectiveness monitoring.

The three restoration projects on the lower Truckee River are located east of the cities of Reno and Sparks, south of Interstate 80, in Washoe County and Storey County, Nevada. The sites are identified as Upper Mustang Ranch, West McCarran Ranch, and Tracy Power Plant. The West McCarran site is owned by TNC and the Tracy Power Plant site is owned by NV Energy. The Upper Mustang Ranch site is being acquired by TNC for the purpose of restoration. The acquisition is part of the Proposed Action in this EA.

## Background

Over the past century, the ecological and physical environment associated with the lower Truckee River has been degraded from many human-caused changes, which have damaged the ecological integrity and functioning of the river. Included in this history is river channelization in the 1960s, which resulted in channel down cutting, depression of the local groundwater table, loss of riparian vegetation, proliferation of invasive plant species, and general degradation of the riparian and aquatic habitats.

Several large, coordinated efforts have been undertaken to reverse the degraded condition of the river and its floodplain. The work has involved many state and federal agencies, as well as private organizations, including TNC. The goals of the Truckee River Restoration Program include improving water quality and wildlife habitat, providing flood management and recreation opportunities, and increasing flows to Pyramid Lake. An important component in the program is restoring sections of the river through partnerships and agreements with landowners and land purchase.

The purpose of TNC's purchase of the McCarran Ranch property was to restore the river channel, wetlands, and riparian forest. In the past decade, two projects at McCarran Ranch, and projects at Lockwood (Washoe County), Mustang Ranch (Bureau of Land Management), and 102 Ranch (Bureau of Land Management), have resulted in a rebound of ecological integrity in these reaches of the river. The purpose of the Proposed Action is to continue the restoration program at three new sites, which would provide continuity with the previously restored reaches and a connected corridor of restored river and riparian habitat. The work

would continue the effort to undo previous environmental damage to the lower Truckee River and its terminus, Pyramid Lake.

Much of the past restoration work was accomplished by partial federal funding, including Desert Terminal Lakes (DTL) Program funds. The Proposed Action would allow federal funding, including DTL funds, to be used for restoration work at the Tracy Power Plant, West McCarran Ranch, and Upper Mustang reaches of the lower Truckee River, and for acquisition of the Upper Mustang site.

## Purpose and Need

The primary purpose of the three projects is to help restore basic physical and biological functions to a more natural condition so that the ecological systems and native organisms can depend on those functions. The projects are intended to undo previous environmental degradation at the three sites and, thus, contribute to the restoration of the lower Truckee River and Pyramid Lake, the river's terminus. The purpose and need for restoration at these sites is also related to providing flood flow attenuation, riverbank stabilization, public access, and recreation opportunities. The projects are a continuation of restoration projects by TNC, other entities, and government agencies to meet the above goals on the lower Truckee River. The proposed project would provide continuity with previously restored sites, reducing fragmentation, and magnifying the beneficial effects of earlier restoration projects.

The Proposed Action constitutes a federal action in accordance with CEQ NEPA Regulations (40 CFR 1508.18), under which "actions include new and continuing activities, including projects and programs entirely or partly financed, assisted, conducted, regulated, or approved by federal agencies."

## Proposed Action

The Proposed Action would allow the use of federal funding by TNC for a portion of restoration activities at three sites on the lower Truckee River: Upper Mustang Ranch, West McCarran Ranch, and Tracy Power Plant, and for acquisition of the Upper Mustang site. The proposed restoration work would involve a variety of activities that would restore the physical river channel and riverbed and improve habitat for native vegetation, fish, and wildlife.

Construction work at the three sites would create more natural meandering stream channel segments, raise the streambed of the channel, and lower portions of the floodplain to reconnect the river to the floodplain using both passive and active methods. Backwater wetlands would be left remaining in the abandoned river channel, and swales incorporated in the floodplain to provide floodwater attenuation and habitat. Riffles would be created to facilitate gas exchange (i.e., improve oxygen content and decrease $CO_2$) for fish and other aquatic species. Invasive plant species would be significantly reduced, controlled, and largely replaced with native forbs, grasses, shrubs, and trees. Restoration work in the Proposed Action would link several reaches of the lower Truckee River previously restored, and would create several miles of contiguous, high quality riparian and in-stream habitat.

## Environmental Consequences of the Proposed Action and Alternative

The consequences of the Proposed Action would be beneficial for the environment in the long term, considering the projects both individually and cumulatively. Short-term, temporary effects are foreseeable during construction. Measures to reduce adverse effects are provided. These measures are summarized in Section 2, Proposed Action, in the form of environmental commitments.

Under the No-Action Alternative, in which Reclamation would not allow use of DTL funds to fund restoration work at the Upper Mustang Ranch, West McCarran Ranch, and Tracy Power Plant sites, and to acquire the Upper Mustang restoration site, the current, limited fish and wildlife habitat values would continue to follow existing trends. Riverbank erosion and lateral instability would continue under the current hydrologic regime, and the river channel would likely become wider and shallower, possibly resulting in decreased willow and cottonwood densities and diminished native habitat that supports aquatic and terrestrial species.

Groundwater recharge needed to support and sustain riparian and wetland habitats would remain at a lower level and could decline further. Active management to control invasive plant species would likely be much less intensive and less effective. Flood attenuation benefits would not be realized. The No-Action Alternative would avoid the short-term adverse effects associated with the proposed construction work at the restoration sites, thus avoiding the construction-related effects related to air and water quality, fish habitat, and temporary increases in noise. However, longer-term consequences of the No-Action Alternative would not be beneficial for the environment.

## Purpose and Uses of This EA

This EA is a record of Reclamation's environmental review for the Proposed Action. It discloses to the public, agencies, and interested parties what Reclamation is considering approving, and identifies the potential environmental consequences of that action as well as measures to avoid or reduce adverse environmental effects. The EA is used by the federal lead agency (Reclamation) to inform decisions regarding the Proposed Action and to determine whether the agency should prepare an environmental impact statement (EIS) or issue a finding of no significant impact (FONSI).

Reclamation must consider Indian trust assets and the local Native American interests in the Proposed Action, including, among other matters, the protection of cultural resources and the future use of the restored sites as places to harvest and manage native vegetation for traditional purposes. Coordination among Reclamation, TNC, the Army Corps of Engineers (ACOE), the Pyramid Lake Paiute Tribe (PLPT), the Washoe Tribe of Nevada and California (Washoe Tribe), and the Reno-Sparks Indian Colony (Colony) occurred during the development of the restoration projects, and would continue during implementation.

# Section 1 Introduction

## 1.1 Purpose of this Document and Decisions to Be Made

Because the project would be supported in part by federal funds, the Proposed Action is subject to environmental review pursuant to the National Environmental Policy Act of 1969 (NEPA) (Public Law 91-90, 42 USC 4321 et seq.).

Reclamation is the federal agency under NEPA for the Proposed Action. The ACOE is a cooperating federal agency in this proposed project. Reclamation has prepared this EA in compliance with NEPA, Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500–1508) and related CEQ guidance, Department of the Interior Department Manual (DM) 516 DM 1-15, and Reclamation's NEPA Handbook.

This EA evaluates the potential environmental consequences of constructing and implementing the Proposed Action of allowing DTL grant funding to be used by TNC to restore three sites on the lower Truckee River, and to acquire one of the sites. It provides documentation to assist the federal agency in determining whether to prepare an environmental impact statement (EIS) or a Finding of No Significant Impact (FONSI). The EA and FONSI (or, if appropriate, the EIS), in conjunction with the overall administrative record, serve as the record of NEPA compliance for the Proposed Action. The EA also serves NEPA's fundamental purposes: to provide environmental information that informs federal decision making, to disclose the potential environmental consequences of a Proposed Action to the public, and to identify feasible ways to avoid and minimize adverse effects to the environment.

Reclamation will prepare findings regarding the environmental consequences of the Proposed Action, and those findings will be used in the agency's decision-making and implementation of the Proposed Action. Reclamation's primary involvement and decision making for the Proposed Action involves allowing the use of federal funds for the restoration work and acquisition of the Upper Mustang restoration site by TNC. The restoration projects proposed in this EA would receive a portion of their funding from Reclamation's Desert Terminal Lakes Program created under Public Law 101-171 in 2002.

## 1.2 Background

Over the past century, the lower Truckee River downstream from Vista has suffered from many human-caused changes, which have greatly altered the ecological integrity and functioning of the river. Truckee River flows are regulated by a number of agreements, decrees, and river operating requirements.

Under the authority of the Flood Control Act of 1954, the U.S. Army Corps of Engineers completed major flood control work on the Truckee River from 1959 to 1963 (State of Nevada 1997). The Truckee River and Tributaries Project was initiated by the ACOE to provide flood protection for the cities of Reno and Sparks. The ACOE modified the Truckee River by constructing low levees and making channel modifications between Truckee Meadows and Pyramid Lake. The river channel was straightened and widened in many sections. The straightening led to channel down cutting along the lower Truckee River and depression of the groundwater table. The lowered groundwater depth has disconnected the river from the riparian habitat and surrounding floodplains. Without access to groundwater, regeneration of native riparian vegetation has been impaired for decades, and invasive species have begun to dominate the riparian communities along the river's edge.

Land use practices along the Truckee River have altered the flow regimes and caused the condition of riparian vegetation to decline, resulting in a significant reduction of important habitat for birds, mammals, reptiles, and amphibians. Urban growth and development in the cities of Reno and Sparks have increased the amount of impervious surfaces, affecting water quality and the extent and timing of flooding.

Since 2003, TNC and its partner agencies have demonstrated river restoration techniques on the lower Truckee River through two projects at TNC's 305-acre McCarran Ranch, the Lockwood site, the lower Mustang Ranch site, and the 102 Ranch site. The three sites proposed for restoration in this EA are within the same reach of the lower Truckee River as the completed restoration sites. The restoration activities at McCarran Ranch included the creation of a new river meander; approximately one mile of new channel and riffle construction; revegetation of approximately 120 acres; creation of wetlands and ponds, including oxbow wetlands; and a variety of wildlife nesting, cover, and shelter improvements. The constructed riffles raised the water surface level and promoted more frequent overbank flooding within the project areas. The localized overbank flooding of these uninhabited floodplain areas improved soil fertility and ecological productivity, while attenuating downstream flooding.

These river and riparian restoration measures are correcting the undesirable side effects of channelization and river entrenchment associated with past flood control efforts occurring in the 1960s, while retaining the benefits of flood flow attenuation. Restoration at the McCarran Ranch sites is resulting in the recovery of the groundwater table in the project area, increased populations, and survivorship of native plants, and increased fish and native bird populations. The decreased channel width promotes improved hydraulic connection between the river channel and its floodplain to better support wetland habitat.

## 1.3 Purpose of and Need for the Proposed Action

The primary purpose of the project is to contribute to the ecological restoration of the lower Truckee River. Overall, the project is intended to help restore basic physical and biological functions to a more natural condition so that the ecological systems and native organisms can depend on those functions. Generally, the restoration project would involve the creation of new areas of aquatic and terrestrial habitat, including river channel realignment and modifications, wetlands, and areas of native vegetation, for the purposes of restoring the

degraded ecosystem to a more natural condition. Monitoring results support the effectiveness of TNC's restoration projects since 2003 and the need for continued, well-designed restoration projects at high priority sites on the lower Truckee River.

The Upper Mustang Ranch, West McCarran and Tracy sites were selected by TNC, Reclamation, and other cooperating agencies in order to restore the river channel, wetlands, and riparian forest and to undo the damage of the human-caused changes, including the effects of past flood protection channelization at those locations. The proposed channel-and-floodplain restoration work to be implemented at the three sites would create a variety of benefits in terms of long-term floodwater flow attenuation, water quality, habitats for native plants and animals including special-status species, biological productivity and diversity, noxious weed reduction and control, and restoration of native species. The proposed projects would continue TNC's program of restoration on key reaches of the lower Truckee River and provide linkage and continuity with the previously restored sites.

The decision to propose the current three sites, as well as previous projects for restoration, was based in part on their relatively high scores in a report prepared by Otis Bay Ecological Consultants (Otis Bay Ecological Consultants 2007) for the U.S. Army Corps of Engineers. The report includes a ranking of the ecological restoration potential of 20 sites along the lower Truckee River based on field and aerial observations. The criteria included flow regime, average floodplain width and potential for floodplain expansion, riparian forest and potential for recovery, existing aquatic habitat diversity and potential to increase hydraulic habitat diversity, encroachments into the channel and floodplain, existing entrenchment, floodplain reconnection potential, and connection to natural features.

### 1.3.1 Tracy Power Plant

The Tracy Power Plant reach is characterized by its deeply incised channel, channel instability, a disconnected floodplain, and backwater effects from several rock weirs. In spite of some infrastructure constraints, the Tracy reach has considerable potential to restore a functional floodplain, reduce channel instability, and create high quality habitat. The Tracy reach was identified as a priority for restoration on the lower Truckee River and is available for restoration implementation. The purpose and need for action in the Tracy reach is the opportunity to apply available funding to a high priority restoration site on private land that would result in multiple long-term environmental benefits to the lower Truckee River and Pyramid Lake. Restoration of the Tracy site would also provide habitat continuity with the two miles of river previously restored in the 102 Ranch project.

### 1.3.2 West McCarran

TNC acquired the McCarran Ranch riverfront with the purpose of restoring the health of the river and associated riparian and wetland habitats. The Truckee River at West McCarran has a deeply incised, straight and narrow channel, a disconnected floodplain, and backwater effects of a downstream weir. The site also contains existing elements such as functional historic swales, remnant late seral cottonwoods, and relict wetlands, which would accelerate the restoration process.

The West McCarran site is immediately downstream of the Lower Mustang project, where extensive restoration work was done in 2009 to lower the floodplain, realign the channel, and restore native riparian vegetation. The 1-mile West McCarran reach is the upstream segment of TNC's McCarran Ranch property, which totals five river miles. Most of the downstream portion of the river frontage was restored from 2003 to 2006. The purpose and need for restoration proposed at West McCarran Ranch is to provide river and ecological restoration, and to provide physical and biological continuity with previously restored sites upstream and downstream of the West McCarran reach.

### 1.3.3 Upper Mustang Ranch

The Upper Mustang Ranch site is characterized by a narrow, armored, incised channel disconnected and isolated from its historic floodplain. The existing floodplain is narrow and riparian vegetation is limited to the stream banks. The historic floodplain is an agricultural area (alfalfa field), transected by a paved access road. The historic floodplain (agricultural area) is currently separated from the river by a levee. The restoration project would include moving that levee back so that the river can again access that important piece of floodplain. Other relict features are limited to a few scattered cottonwood trees adjacent to the access road. Acquiring and restoring the Upper Mustang property would provide a level of continuity with the previously restored Lockwood and Lower Mustang sites. When complete, an almost continuous section of restored river would be in place from Lockwood to the downstream segment of TNC's McCarran Ranch, a distance of approximately 9 river miles.

## 1.4 Location of the Proposed Action

The three proposed restoration sites are shown in Figure 1.

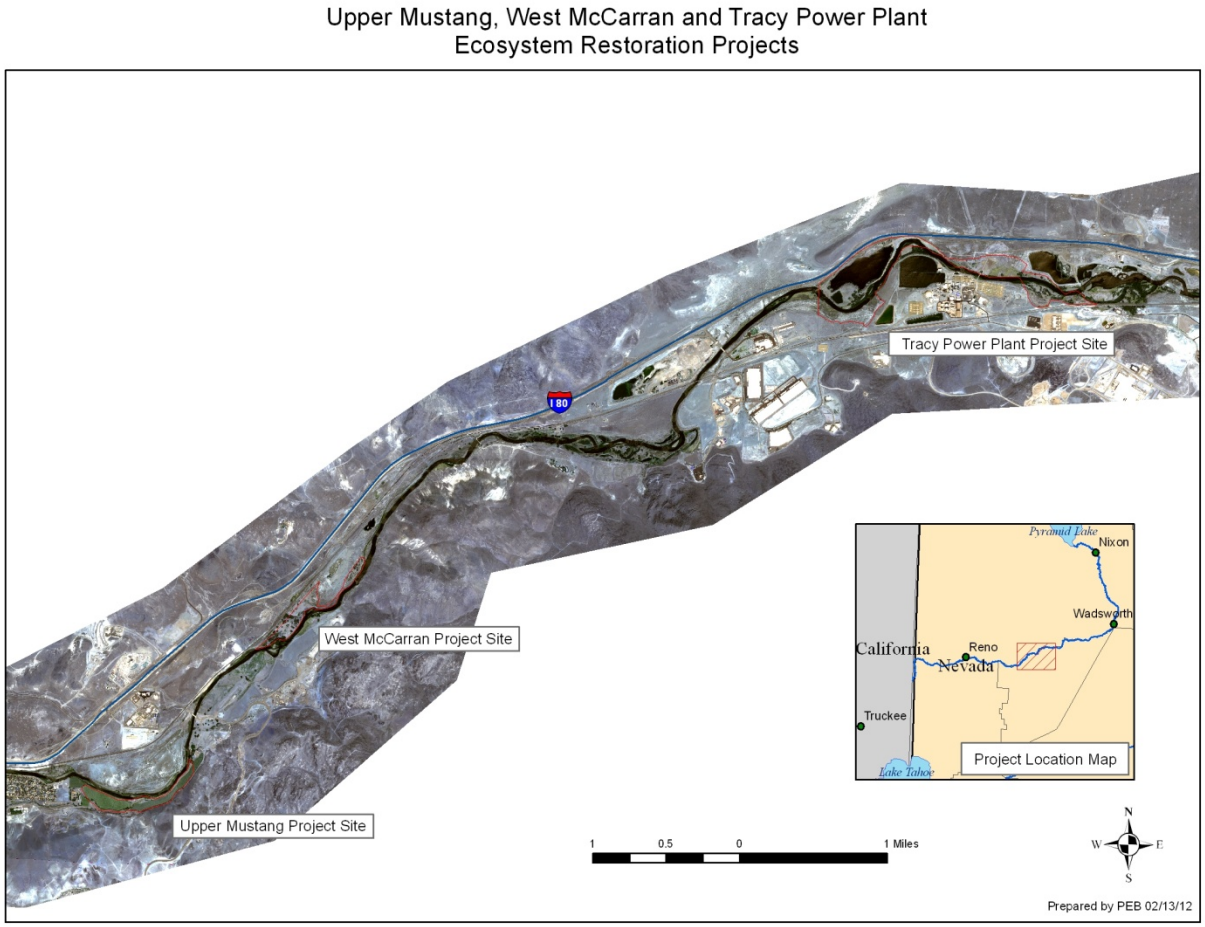


**Figure 1: Overview Map of Proposed Restoration Sites, Lower Truckee River**

### 1.4.1 Tracy Power Plant

The 113-acre Tracy Power Plant project site is located along the Truckee River approximately 12 miles east of Sparks, Nevada, in Washoe and Storey Counties. Latitude and longitude coordinates are 39˚33'38", 119˚32'11" referenced to North American Datum. The Tracy Power Plant site occurs in the Patrick, Nevada 7.5-minute USGS quadrangle, in Sections 20, 28, 29, 33, and 34; Township 20 North, Range 22 East, Mount Diablo Baseline and Meridian (MDBM) (see Figure 2). Restoration work would occur on lands owned by NV Energy. Approximately 1.2 miles of river would be restored. The entire site is within the Truckee River floodplain. The Tracy site is the farthest downstream site of the three restoration projects.

### 1.4.2 West McCarran Ranch

The 36-acre West McCarran Ranch project site is located in Washoe County along the Truckee River approximately 8 miles east of Sparks, Nevada. Latitude and longitude coordinates are 39˚31'46", 119˚36'20" referenced to North American Datum. The project site is located in the Patrick, Nevada 7.5-minute U.S. Geological Service (USGS) quadrangle, in Sections 10 and 11, Township 19 North, Range 21 East, MDBM (see Figure 3).

The West McCarran Ranch site is part of TNC's 305-acre McCarran Ranch property, purchased in 2002 for restoration purposes. McCarran Ranch has 5 miles of river floodplain, in which two restoration projects have been completed. The proposed West McCarran restoration project would affect one river mile. The entire project area is within the Truckee River floodplain. The West McCarran site is immediately downstream of the previously restored lower Mustang Ranch site (U.S Bureau of Reclamation and U.S. Bureau of Land Management. 2008b).

### 1.4.3 Upper Mustang Ranch

The 41-acre Upper Mustang Ranch site is located upstream of the West McCarran Ranch site on the south side of the Truckee River approximately 4 miles east of Sparks, Nevada, in Washoe and Storey Counties. Latitude and longitude coordinates are 39˚30'38", 119˚37'23". The project site is located in the Patrick, Nevada 7.5-minute U.S. Geological Service (USGS) quadrangle, in Sections 15 and 16, Township 19 North, Range 21 East, MDBM (see Figure 4).

The land would be acquired by TNC and approximately 1 mile of river would be restored. The entire site is within the Truckee River floodplain. The Upper Mustang Ranch site lies between the previously restored Lockwood and lower Mustang Ranch sites (U.S Bureau of Reclamation and U.S. Bureau of Land Management. 2008b) and is the farthest upstream of the three sites analyzed in this document.

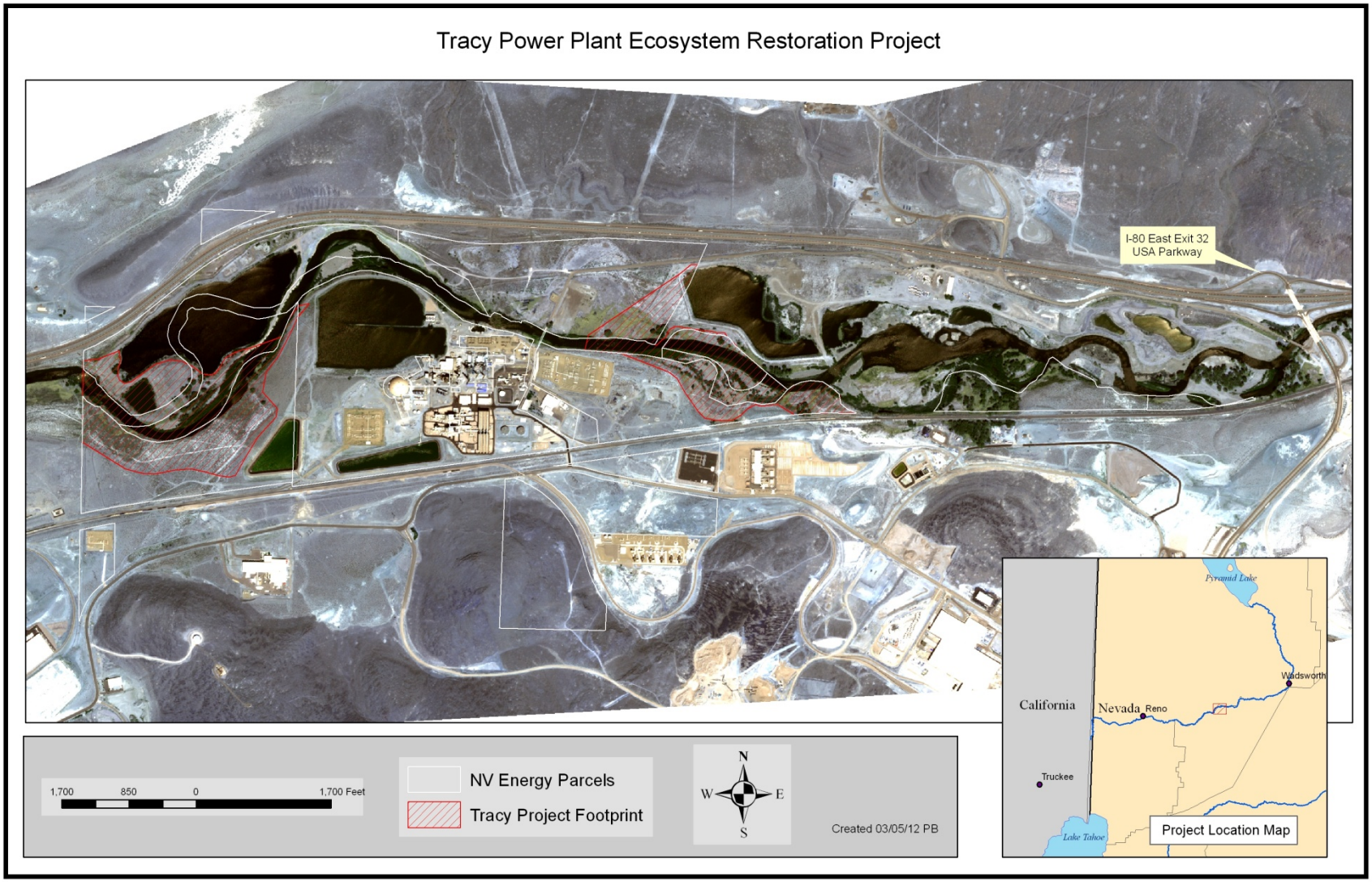


**Figure 2: Location Map, Tracy Power Plant Restoration Site**

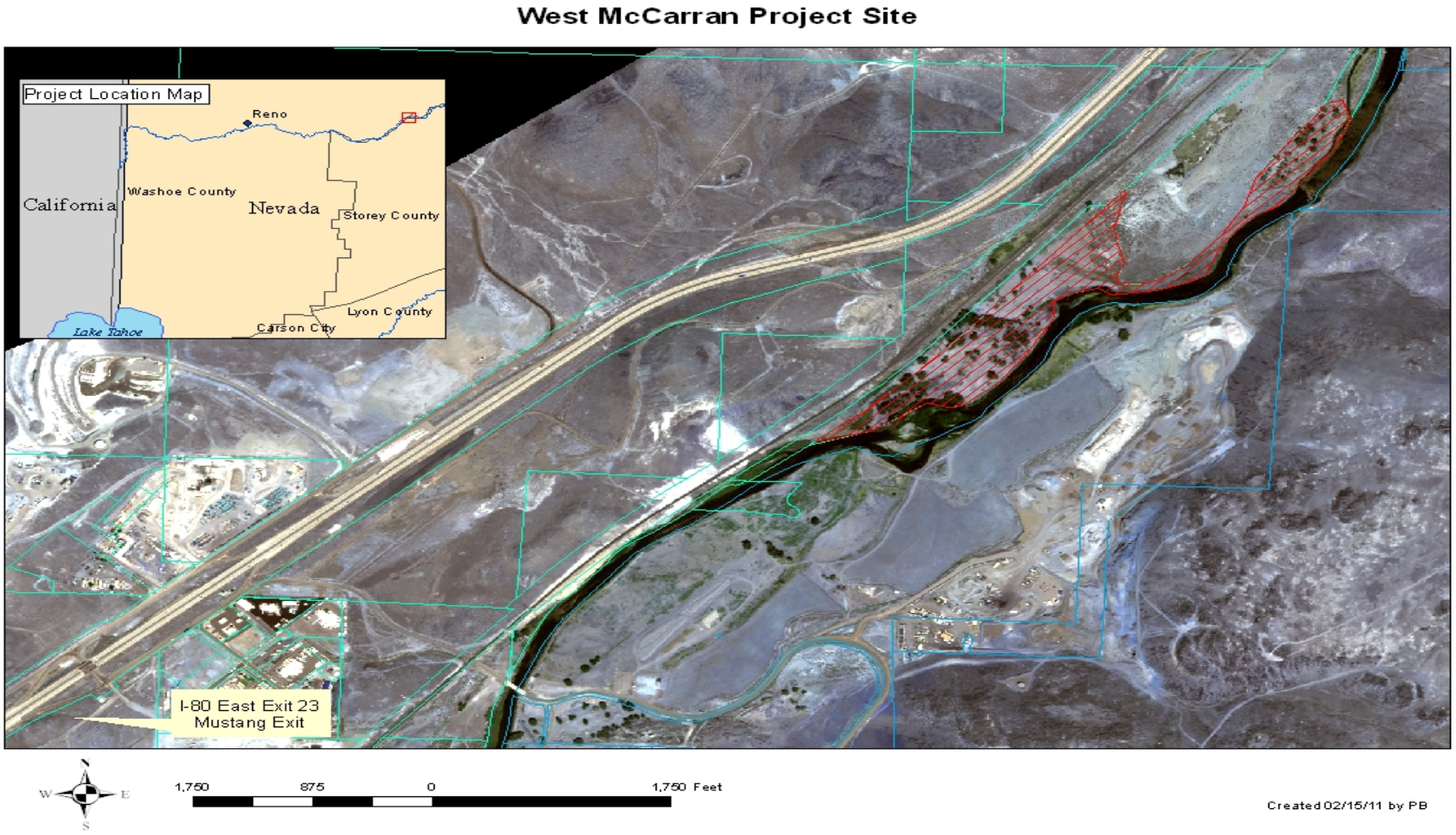


**Figure 3: Location Map, West McCarran Restoration Site**

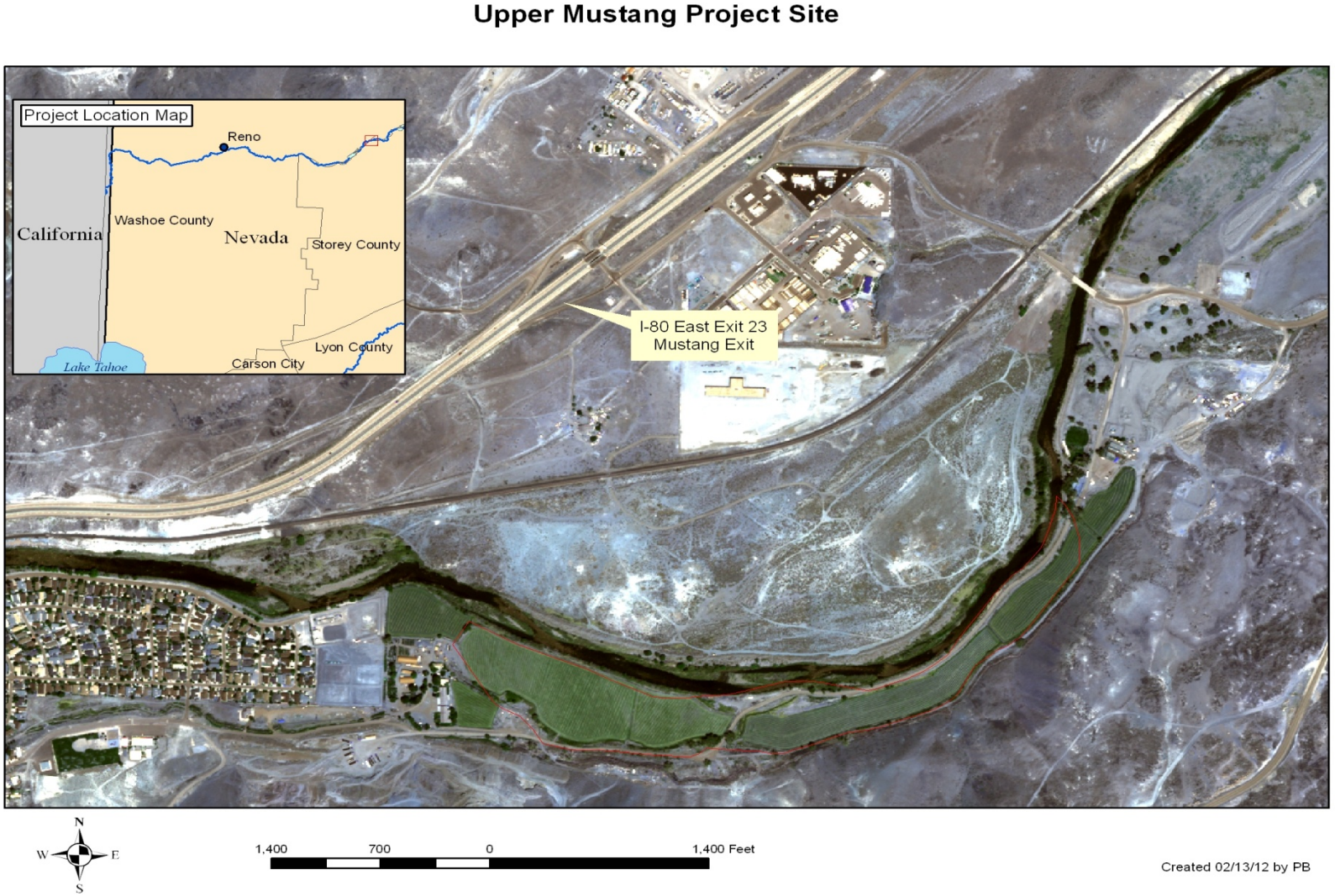


**Figure 4: Location Map, Upper Mustang Restoration Site**

## 1.5 Authority

Reclamation has provided grant funding to The Nature Conservancy for lower Truckee River restoration activities under the Desert Terminal Lakes Program through grants to the City of Reno and TNC.

The Truckee River Flood Management Authority provided non-federal grant funding to TNC for planning and design for the Tracy Power Plant site.

**City of Reno grant:**

- **Program authority and appropriation**: Public Law 107-171, the Farm Security and Rural Investment Act of 2002, Section 2507. Desert Terminal Lakes, appropriated $200 million to the Bureau of Reclamation to provide water to at-risk natural desert terminal lakes and to remain available until expended.

- **Additional authority for this proposal**: Public Law 108-7, Omnibus Appropriations Bill, enacted 2/20/03: "*SEC. 207. RESTORATION OF FISH, WILDLIFE, AND ASSOCIATED HABITATS IN WATERSHEDS OF CERTAIN LAKES. (a) IN GENERAL.--In carrying out section 2507 of Public Law 107 171, the Secretary of the Interior, acting through the Commissioner of Reclamation, shall-- (1) . . . provide water and assistance under that section only for the Pyramid, Summit , and Walker Lakes in the State of Nevada;"*

**TNC grant:**

- **Specific authority for this proposal**: Public Law 110-161, Consolidated Appropriations Act, 2008 (12/26/07): "*SEC. 208. (a) . . . **the Secretary of the Interior**-- . . . (1) acting through the Commissioner of Reclamation, shall use-- . . . (F) **$6,000,000 for Lower Truckee River restoration projects** identified by the cities of Reno and Sparks, Nevada, and Washoe County, Nevada*

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# Section 2 Alternatives Considered

## 2.1 Proposed Action

The Proposed Action would allow TNC to use Desert Terminal Lakes Program grant funding provided by Reclamation from federal appropriations, to implement three river restoration projects along the lower Truckee River and acquire one of the sites (Upper Mustang). The project sites are located on NV Energy lands adjacent to the Tracy Power Plant, at the upstream reach TNC's McCarran Ranch (West McCarran), and at Upper Mustang Ranch. As explained in Chapter 1, the purpose of the three river projects is to help restore basic physical and biological functions of the lower Truckee River and Pyramid Lake to a more natural condition along a semi-continuous river corridor. The three restoration sites would provide habitat continuity with other lower Truckee River sites restored within the past 10 years.

TNC's restoration work would involve acquiring the Upper Mustang site, and undertaking restoration at the three sites. Restoration work includes reconnecting the river to the floodplain; construction of meander sequences; removing invasive, non-native vegetation; restoring the floodplains and terrestrial areas with native wetland, riparian, or upland vegetation; creating instream habitat and hydraulic diversity for fish; and activities to promote the survival of the plantings and the natural re-establishment and recruitment of riparian vegetation on newly created floodplains. A combination of active and passive restoration methods would be used, specific to the needs for each project site. The funds would also be used for project management (personnel, supplies, and services) and for ecological effectiveness monitoring.

Various restoration design and construction options are possible for the restoration sites, but are not alternatives that are distinguishable from the Proposed Action in terms of major environmental consequences. Some design features and construction methods for the current proposed projects are based on the monitoring results of previous restoration projects undertaken by TNC since 2003 on the lower Truckee River at McCarran Ranch, Lockwood, lower Mustang Ranch, and 102 Ranch. By incorporating measures based on results from earlier projects, environmental impacts and costs of the new proposed projects are lessened and ecological benefits increased. Monitoring results from completed projects provide better predictions of the environmental effects of the proposed projects, including future conditions and timing of restoration goals.

The conceptual designs by Graham Matthews and Associates (GMA) for the sites are described in "Truckee River Restoration – Conceptual Design for the Tracy Reach" (GMA 2011a), "Summary of Restoration Objectives for the West McCarran Site, Truckee River, Nevada" (GMA 2010), and "Truckee River at West McCarran – Design Options and Alternatives (GMA 2011b), plus internal documents from TNC. The Proposed Action description in this EA incorporates the restoration design and construction methods from these reports and documents, as well as post-restoration monitoring results from TNC and other entities.

### 2.1.1 Tracy Power Plant

Consistent with infrastructure and regulatory constraints, the primary objectives in the Tracy Power Plant site are:

1. Create a channel which is allowed to function more dynamically and naturally (migrating within its floodplain, and creating and maintaining bars, pools, and riffles as it migrates);

2. Allow regular overbank flooding, which provides regeneration opportunities for riparian vegetation and creates and maintains important floodplain features such as swales and scour channels;

3. Reduce flood elevations and channel velocities that lead to bank erosion;

4. Improve the composition of floodplain vegetation by maximizing willow shrub cover and cottonwood forest, and minimizing the area occupied by non-native, invasive plants.

Design objectives are:

1. Reduce the side-slope of designed streambanks to no more than 6:1. This would allow inundation that is more frequent over a larger area, would provide more stability for survival of desired plants.

2. Selectively armor point bars, thereby allowing natural depositional processes to occur. By allowing a more dynamic channel, vegetation response would be improved and costs reduced.

3. Increase the floodplain area by a combination of constructed inset floodplains and floodplain areas created by minimal grading. Improved channel-floodplain interaction and a lower floodplain would allow more frequent inundation, which would lead to deposition of fine sediment and passive revegetation of desired riparian species.

4. Increase topographic complexity on floodplain so that existing swales would be reconnected to the main channel during high flow events and ecological variation and function would be improved. The final grading plan would incorporate these swales, which would act as future overbank channels or provide micro-topography.

5. Minimize disturbance to existing desired vegetation, such as areas of emergent wetland, wet meadow, early successional riparian vegetation, and mature cottonwood forests. These remnant patches would provide locally adapted sources for passive and active vegetation recruitment, as well as refugia for microorganisms and invertebrates.

6. Lay back side slopes on wetland and backwater features. Design gentle slopes (8 or 10:1) for these features.

7. Narrow the wetted channel from 150 to 200 feet wide to 80 to 100 feet wide, where allowable within FEMA and ACOE regulatory requirements. A narrower channel is consistent with historic maps and aerial photographs. A reduced cross sectional area would promote channel-floodplain connection and allow for a more dynamic channel.

8. Construct riffle features with appropriate size material. Riffles would be assessed individually on ability to contribute to the restoration process. Cobble blankets would be used as necessary on a site-specific basis.

9. Eliminate the relict upstream rock weir, which has constrained the channel, created an extensive backwater, and changed the energy gradient of the channel.

The Tracy Power Plant site is constrained by existing infrastructure ponds, pipelines, diversions, power lines, and a bridge, which bisect the project area. Upstream and downstream reaches are available for more extensive excavation and channel realignment. A design was selected which would maximize floodplain function and establish as much riparian vegetation as possible (see Figures 5 and 6).

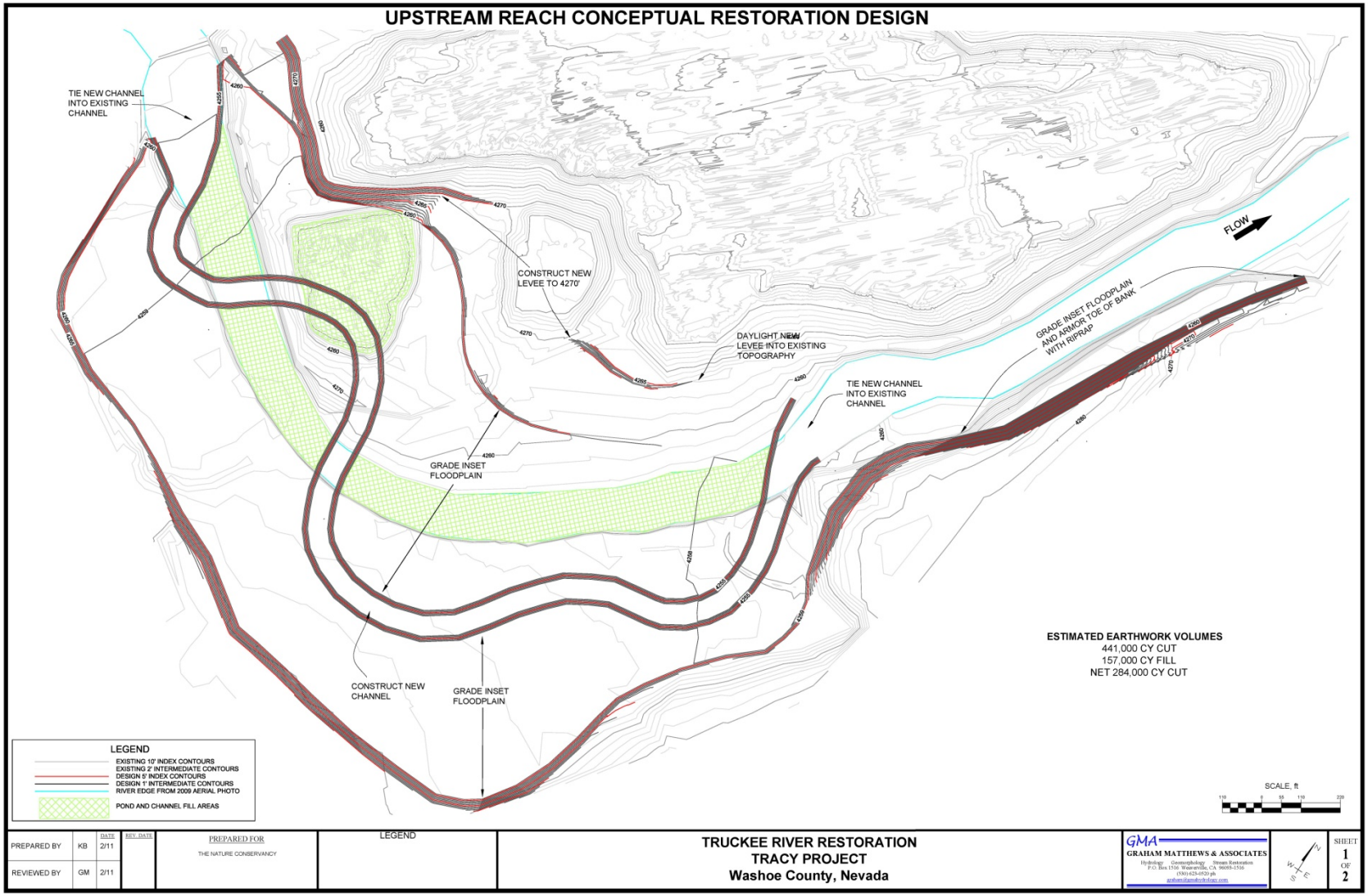


**Figure 5 – Tracy Power Plant restoration site conceptual design – upstream reach**

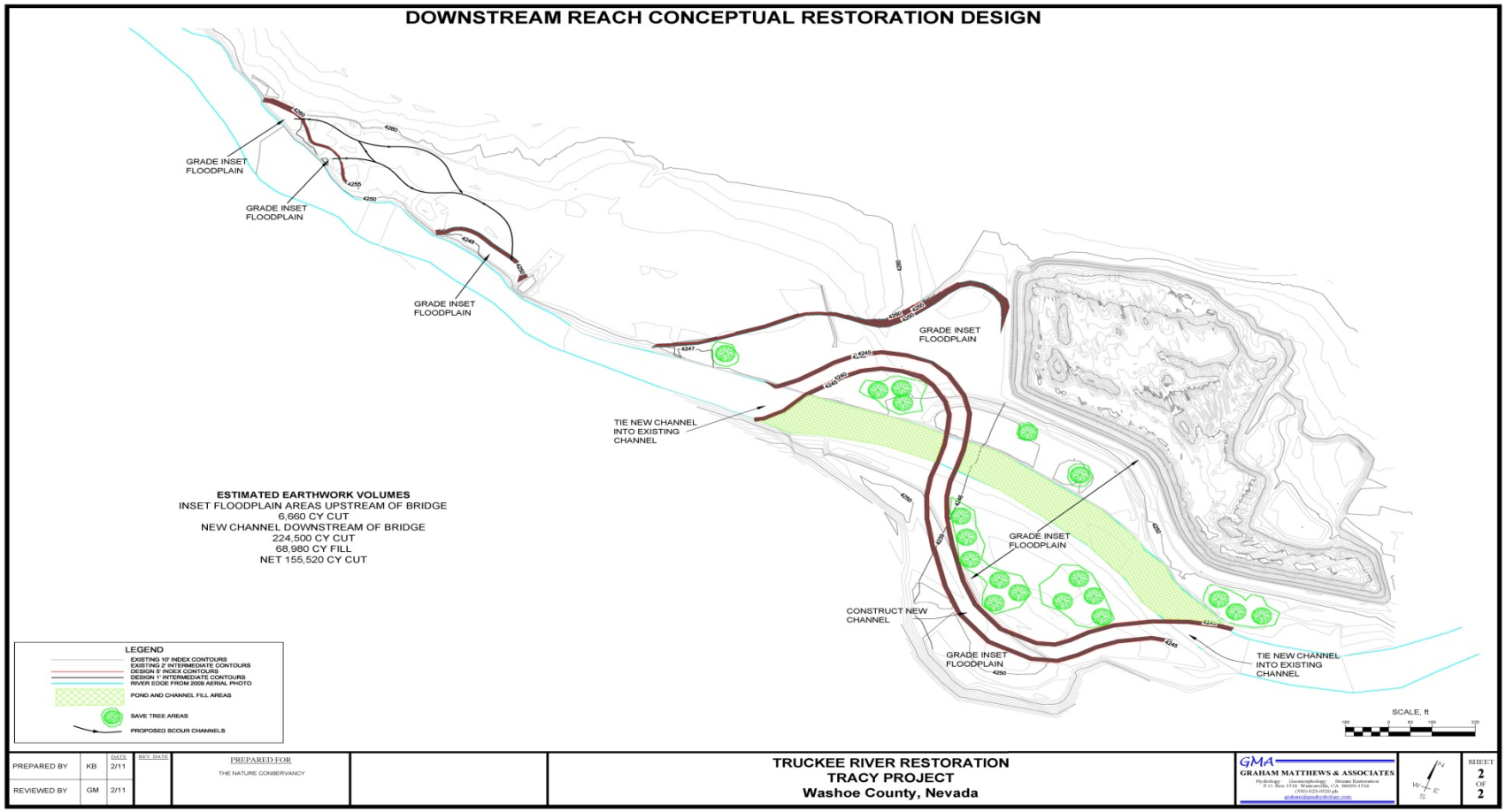


**Figure 6 – Tracy Power Plant restoration site conceptual design – downstream reach**

The key design features are described below.

*Lower the Floodplain:*
Approximately 5 to 6 feet of floodplain material would be excavated and removed. Spoil material would be used for backfilling the original channel or sequestered at the toe of the slopes adjacent to the project area. Proper placement, grading, and revegetation would reduce potential erosion and water quality risks. Late-seral cottonwoods and some existing riparian and wetland areas would be avoided during grading, creating islands for potential natural regeneration.

Swale patterns, traced and enhanced from existing patterns, would be cut into the new floodplain surface. Swales would vary longitudinally in depth and width to provide topographic complexity and the biologic diversity such complexity supports. Some swales would provide year round surface expression of groundwater and others would only get wet during overbank events. Swales would create a dynamic setting for riparian regeneration while others would be primarily depositional, possibly supporting the development of wetland communities.

For the upstream reach, maximum earthwork volumes were computed to be approximately 441,000 cubic yards of cut and 157,000 cubic yards of fill. The remaining cut volume would need to be stockpiled in upland areas nearby. Earthwork would create an additional 35 acres of functional floodplain in the upstream reach.

For the downstream reach, a considerably smaller area is available for floodplain lowering due to infrastructure (transmission towers and guys) downstream of the bridge. Earthwork in this area would involve an approximate maximum of 224,000 cubic yards of cut and 69,000 cubic yards of fill. The remainder would go to stockpiles in upland areas. This earthwork would create about 17 acres of functional floodplain.

*Provide Additional Cross-Sectional Area at Confined Reach*
Between station 35+00 and 42+00, an inset floodplain about 75 feet wide would be created along the right bank that would add as much as 30% to the cross sectional area in this highly confined area. Rip rap would be placed at the toe of the inset floodplain, as well as on the high bank to protect the right bank cooling pond from any future erosion damage.

*Re-Align the Channel:*
Historical analysis showed that a more sinuous channel existed prior to incision and channel widening in both the upstream and downstream reaches. The design is based on re-creating the historic sinuosity to these reaches. The length of the more sinuous historic channel was measured and then a new channel alignment was developed with that same length. Creating a new channel alignment allows the slope of the upstream rock weir to be distributed through the first 3000 feet of the Tracy Reach. The constructed channel through the upstream portion of the Tracy Power Plant site would be narrower (100 feet versus the 150+-foot width of the existing channel), would provide five new meander bends and six new riffles. Constructed point bars (keyed to the riffles) would provide surfaces for passive recruitment of riparian species while constructed (or enhanced) backwaters would provide opportunities for wetlands to develop.

Constructed riffles in the upstream portion will elevate the water table and reduced channel capacity (and a lower floodplain) will allow frequent (> once per year) floodplain inundation. The revised channel alignment facilitates the development of about 35 acres of floodplain along the left and right banks. One small pit would be filled and the existing channel would be backfilled.

In the downstream reach, two new meander bends and three new riffles would be constructed.

Farther downstream between stations 68+00 and 76+00, small inset floodplains would be created where possible to create additional patches of riparian vegetation. Swales would connect these features. These small inset floodplains would require about 6,600 cubic yards of cut, all of which would need to be hauled to an upland spoil site nearby.

The alignment of the Tahoe-Pyramid Bikeway would follow a temporary road used in the restoration work.

The estimated maximum quantity of materials from the conceptual design for the Tracy restoration site (GMA 2011a) is shown in Table 1 below:

| Design Item | Quantity (cubic yards) |
|---|---|
| Upstream floodplain lowering | 441,000 |
| Downstream floodplain lowering | 231,000 |
| Floodplain swales excavation | 35,000 |
| Point bar fill gravel | 22,000 |
| Riffle fill gravel | 6,000 |
| Riffle fill cobble | 9,000 |
| Riprap | 4,000 |
| Material screening | 25,000 |

**Table 1 – Maximum Quantity of Materials Estimated for the Tracy Power Plant Restoration Site.**

### 2.1.2 West McCarran Ranch

The primary goal of restoration in the West McCarran site is reconnecting the floodplain with the main channel. This would increase overbank flow frequency (restoring geomorphic function in the wet season) and raise the water table relative to the floodplain elevation (enhancing riparian and wetland opportunity in the dry season). The existing straight, incised channel would be restored to a more functional alluvial state by introducing greater sinuosity and adding alternating bar-riffle sequences. In addition, swales would be reactivated or planned along the left bank floodplain, and non-native, invasive vegetation replaced by desired native vegetation through a combination of active and passive vegetation management activities.

Project goals and design objectives for the West McCarran project site include:

- Maximizing the area of willow shrubland and cottonwood forest;
- Minimizing the area of non-native invasive forbs;

- Channel realignment in which the channel naturally migrates within its floodplain, creating and maintaining bars, pools and riffles as it migrates; and
- Regular overbank flooding to provide for regenerative riparian processes and to create and maintain floodplain features such as swales and scour channels.

The design incorporates a combination of engineered stabilizing features, as well as passive elements that will allow natural fluvial processes (e.g. flooding, erosion, deposition, channel migration) to occur within unconfined reaches with minimal threat to infrastructure. Figure 7 shows the location of the design elements in the West McCarran site.

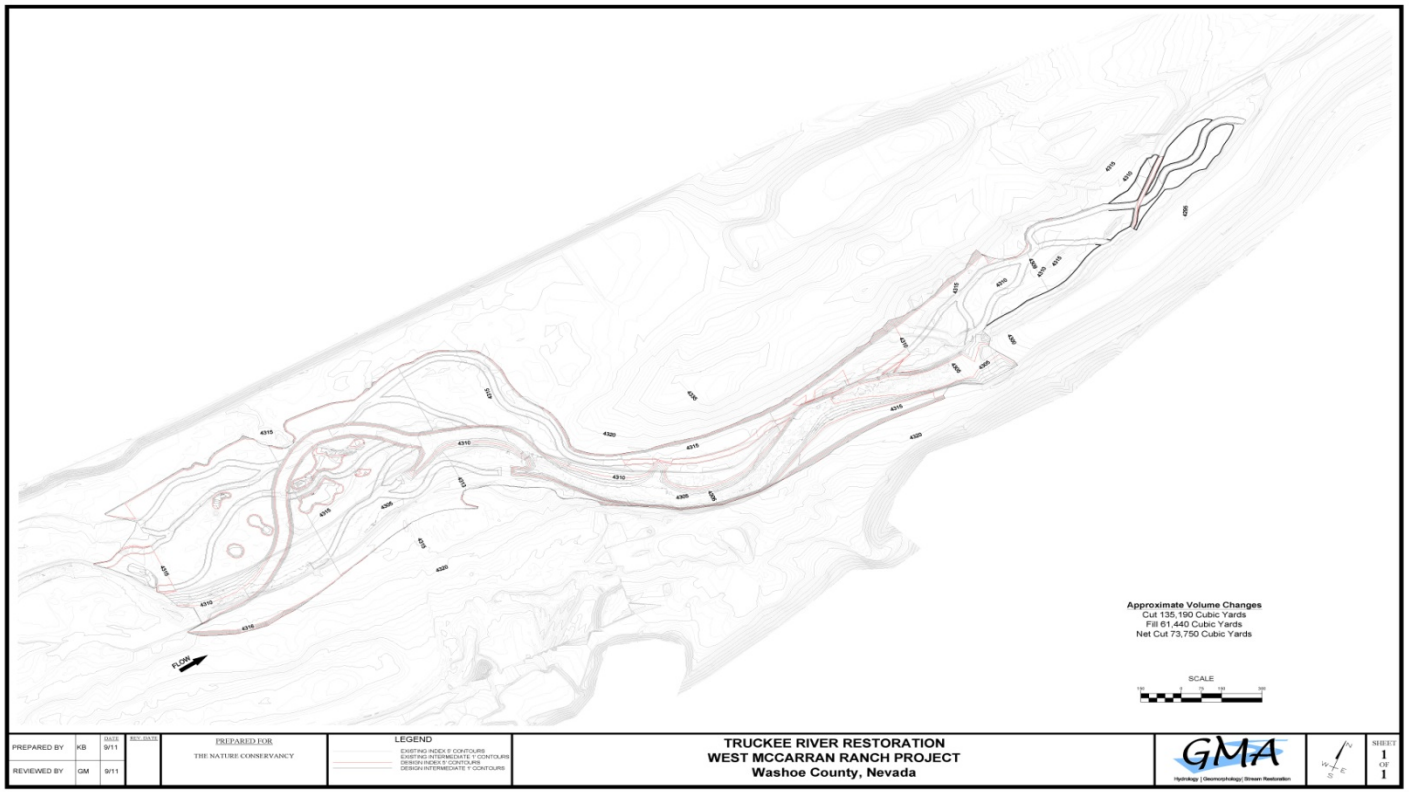


**Figure 7 – West McCarran restoration site conceptual design**

Specific objectives are listed below. Differences from previous restoration projects are noted.

1. **Reduce the side-slope of designed streambanks**. Relaxing the banks to no more than 6:1 side-slopes facilitates:
   a. More frequent inundation over a larger area,
   b. A more stable setting for plantings and passive recruits to survive, and
   c. Evolution toward steeper banks -- as vegetation becomes established, thereby reducing channel capacity and increasing scour at the toe.

2. **Minimize armoring of point bars**. These features are depositional in nature and can be expected to evolve naturally, as the channel migrates. Minimizing armoring of point bars facilitates channel dynamism, as the channel will be less locked into place.

3. **Increase floodplain area**. Increased floodplain area, in the appearance of an inset floodplain, provides improved channel floodplain interaction, as well as increased potential for areas that should be able to develop the target native vegetation communities without need for as extensive revegetation efforts. Floodplain can be created in some areas with a relatively minor amount of grading. Lower floodplains will be inundated more frequently, accommodating overbank deposition of fine sediment for restorative riparian processes to occur.

4. **Increase topographic complexity on floodplain.** Complexity in floodplain areas provides for significantly increased ecological variation and function. Numerous swales are present which may or may not be connected to the main channel as a high flow channel. Such features would be included in the final grading plan, some of which would function as overbank channels and some of which would provide micro topography.

5. **Minimize disturbance to desired vegetation communities**. Areas of emergent wetland, wet meadow and early successional riparian exist in some reaches. Remnant mature cottonwood forests exist in patches. Channel alignments would be chosen to minimize disturbance to such areas, which would provide increased resiliency and sources of recruitment from established “islands” of vegetation.

6. **Alter side slopes on wetland and backwater features.** Side slopes for these features would be laid back to 8:1 or 10:1.

7. **Narrow the wetted channel**. Using evidence from historic channels, a narrower channel width would be used in this project compared to earlier restoration projects. A narrower channel would promote connection with its floodplain and channel dynamism. Reduced cross sectional area would be balanced with FEMA and US Army Corps of Engineers regulatory requirements.

8. **Reduce the grain size of riffle features**. Assessment of the active features along depositional reaches of the Truckee River shows considerably finer grained riffle

features, which are actively being reworked. The use of cobble blankets at riffle would be selective.

9. **Eliminate rock diversion structures when feasible**. The Truckee River has numerous rock diversion structures, which have significantly altered channel attributes by constraining the channel with a large structural feature, creating an extensive backwater, and changing the energy gradient of the channel, with much of the energy being dissipated in the drop of the structure. The West McCarran project site has such a feature within its project area. The restoration project would remove the structure and re-distribute the gradient along the channel.

The project objectives would be met with the following construction steps.

**Lower the Floodplain:**
Approximately two and a half feet of floodplain material would be excavated and removed. Spoils would be used for backfilling the original channel or potentially sequestered at the toe of the slopes adjacent to the project area. Proper placement, grading, and re-vegetation would reduce potential erosion and water quality risks. All late seral cottonwoods and some existing riparian and wetland areas would be avoided during grading, creating islands for potential natural regeneration.

Swale patterns, traced and enhanced from existing patterns, would be cut into the new floodplain surface. Swales would vary longitudinally in depth and width to provide topographic complexity and the biologic diversity such complexity supports. Some swales would provide year round surface expression of groundwater and others would only get wet during overbank events. While swales are floodplain features that once established do not scour as rapidly as in-channel areas, some swales would be more vulnerable.

**Re-align the Channel**
The design sinuosity would be similar to the upstream Mustang Ranch reach, which would allow the slope of the lowest Mustang riffle to be distributed through the West McCarran reach. The constructed channel would be narrower than the existing channel (70-80 feet versus the 100+ foot width of the existing channel), which would provide three new riffles through one complete meander bend sequence and a sinuosity of approximately 1.28. Constructed point bars (keyed to the riffles) would provide surfaces for passive recruitment of riparian species, and constructed (or enhanced) backwaters would provide opportunities for wetlands to develop. The channel would be routed through the mature cottonwood forest, which would provide the opportunity for shading some of the reach and increasing nutrient inputs in the short-term, and introduction of large woody debris as an additional structural component in the future as the channel migrates.

Riffles would be constructed to elevate the water table and reduce channel capacity (and a lower floodplain), which would facilitate frequent (> once per year) floodplain inundation. The new channel alignment would allow the development of 24.4 acres of floodplain along the left bank and 3.7 acres along the right bank and 6,800 lineal feet of new swale channel (both banks). Excavation along the right bank would be done to relax the initial bend into the reach. The right bank is heavily armored with riprap, which would be used as an on-site source for construction

materials. The highly unstable and rapidly eroding area near the island would be graded into a point bar with the main channel taking a much longer route to the north (See Figure 7).

The estimated maximum quantity of materials from the conceptual design for the West McCarran restoration site (GMA 2010) is shown in Table 2 below:

| Design Item | Quantity (cubic yards) |
|---|---|
| Left bank floodplain lowering | 100.000 |
| Right Bank Floodplain Lowering | 15,000 |
| Floodplain swales excavation | 17,000 |
| Channel excavation | 18,000 |
| Point bar fill gravel | 5,000 |
| Riffle fill gravel | 1,800 |
| Riffle fill cobble | 4,500 |
| Existing channel backfill | 22,000 |
| Riprap | 2,000 |
| Material screening | 10,000 |

**Table 2 – Maximum Quantity of Materials Estimated for the West McCarran Restoration Site.**

### 2.1.3 Upper Mustang Ranch

The Upper Mustang site currently consists of mainly irrigated agricultural fields, used primarily for alfalfa production, and is artificially separated from the river by an earth and salvaged construction debris (broken up concrete and asphalt) levee with a paved road running along the side of the levee opposite the river. Restoration would involve

- Acquiring the restoration site;
- removing the existing levee and road;
- relocating the levee to the edge of the floodplain and constructing a new road along the top of it, entirely out of the floodplain (the road serves as secondary and emergency access for the Rainbow Bend community); and
- reconnecting the river to its floodplain through the construction of two new meanders, lowering the surrounding floodplain, and creating riffles in the river.

Initial work on the Upper Mustang project would involve design and implementation of the removal and relocation of the levee, and construction of the new road. TNC would contract with a civil engineering firm to develop the site plan for the relocated road. Based on information from a consulting engineering company, removing the levee would involve excavation and hauling of approximately 150,000 cubic yards of earth, rock, and construction debris. Most of the material would be sorted and screened on site to separate the usable and unusable materials.

Approximately 90% of the material would be moved to the south of the current levee location to build a new levee on the edge of an elevated road surface, which would be above the 117-year floodplain. The remaining 10% of the material would be hauled off site for disposal. The new levee would be engineered to withstand potential flood flows, and the elevated roadway along it would be engineered and built to accommodate a standard 24' wide road paved with asphalt.

The earth, rock, and construction debris levee continues upstream from the section that would be removed for the road relocation. Approximately 1,500 linear feet of the remaining levee would be removed as part of the effort to reconnect the river to its floodplain. This material would be sorted and screened on site to recover material for construction of a new levee on the edge of the floodplain to protect neighboring property and the western end of the road through the site.

As part of the ecosystem restoration work, new meanders would be built, totaling approximately 2,960 linear feet and averaging 125 feet wide. Four riffles would be constructed as part of the channel work to improve in-stream habitat. This work would positively influence hyporheic flows (region beneath and lateral to a streambed, where there is mixing of shallow groundwater and surface water), and the surrounding groundwater table level, and further aid in reconnecting the river to its floodplain. Much of the associated floodplain would be lowered to further reconnect the river to its floodplain and increase floodwater storage capacity. The work detailed above would all be implemented on the south side of the river.

On the north side of the Truckee River, a strip 50 feet wide and running the full length of the project site, the bank would be lowered. This work would further reconnect the river and floodplain through the project reach, increasing the reach's capacity for riparian habitat and floodwater storage. Figure 8 shows the preliminary design of the Upper Mustang project site.

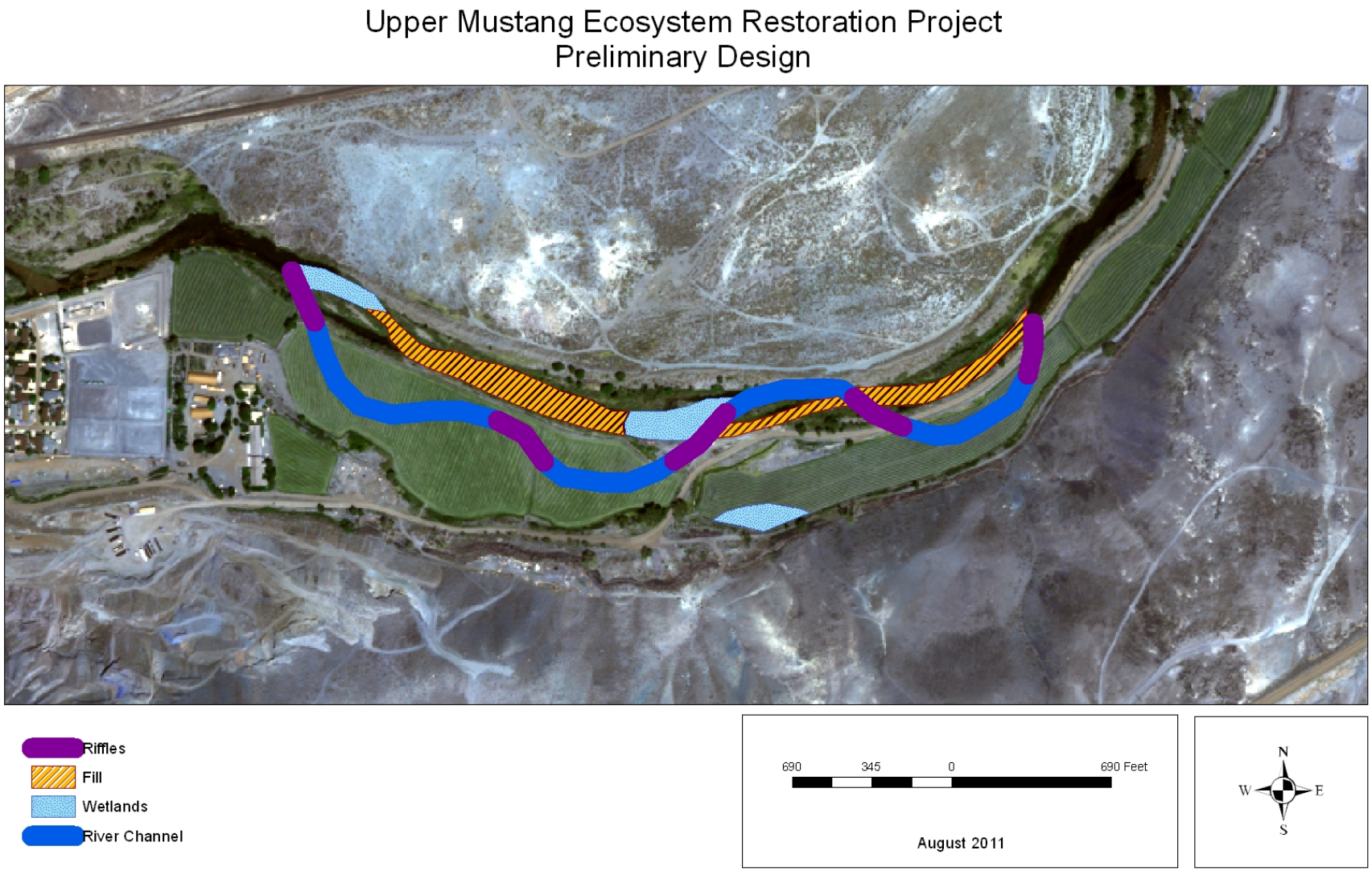


**Figure 8 – Upper Mustang restoration site preliminary design**

### 2.1.4 Design Features Common to All Restoration Sites

The proposed restoration work includes the creation of new areas of wetlands, meanders, riffles, habitat features, and revegetation. Best Management Practices (BMPs) are incorporated into the Proposed Action and can be expected to reduce adverse effects on the environment. Resource conservation measures developed for the Proposed Action are based on the Truckee Meadows Construction Site Best Management Practices Handbook (Kennedy/Jenks Consultants 2008).

#### *New Meanders*

The channel and floodplain restoration proposed for the sites entails excavating new meanders to restore sinuosity, decrease slope, reconnect the river to the floodplain, and reestablish native habitat conditions. New meanders would be constructed in the floodplain by excavating new channel segments with heavy equipment, such as bulldozers and excavators. The new meanders would be connected to the active river channel by damming and backfilling the adjacent active river channel with rock and earth, diverting the flow into the new segments.

Prior to any in-channel work, construction crews would place a silt curtain across the existing channel at the lower end. To isolate the construction area and prevent sediment contamination, crews would also place a silt curtain at the lower confluence of the old and new channels. Turning flows into the newly constructed channel would consist of placing large clean rock into the existing channel. Once flows are directed toward the new channel, the second silt curtain will be placed into the existing channel before completion of the cutoff dam with more large, clean rock and covering the rock-filled segment of the abandoned channel with soil to create conditions suitable for re-vegetation.

#### *Riffles*

Riffle structures would be constructed by purchasing rounded river rock and transporting the rock to the sites. The rock would be moved into the river with articulated dump trucks and worked into place with an excavator. Riffle structures would help restore the complex set of hydraulic conditions that existed before the channel was altered in the 1960s and improve healthy levels of oxygen in the water for aquatic species.

#### *Wetlands*

Aerial photos and remnant scars in the floodplain indicate that the lower Truckee once had many acres of functional wetlands; some were leveled and filled for agricultural purposes. The wetlands that remain are dry due to the depressed water table. In addition, the difference in elevation between the floodplain and the river is currently unnaturally high. The restoration activities would entail the use of excavators to lower the floodplain to aid in reconnecting the river to the floodplain. Swales would be incorporated into the floodplain during this excavation that may become wetlands as the hydrology and natural processes of the river are restored. Portions of the abandoned channel would also be left open as backwater wetland areas.

### *Habitat Features*

The excavation of floodplain and construction of new meanders is expected to produce suitable earth material, which would be placed and shaped in suitable areas outside of the floodplain to create more natural undulations and topographic variation. This would increase habitat variability for terrestrial species. Existing mature cottonwood/willow forest, riparian shrubland, emergent/wet meadow vegetation, and sagebrush shrubland would be preserved to the maximum extent possible to reduce revegetation costs and improve project success.

### *Revegetation*

Revegetation plans for the riparian corridor and associated upland areas at the sites would be developed to improve the overall condition of the vegetation and wildlife habitat. Revegetation may be accomplished by passive or active intervention, depending on site-specific needs, existing vegetation, and projected vegetative response to physical changes in the floodplain following restoration work. Vegetation management (mechanical treatment, burning, or herbicide application) may take place prior to construction or post-construction to control non-native, invasive plants.

Some level of active revegetation work would be implemented at each of the three restoration sites. After planting, 3 years of intensive management (i.e., irrigation, weed control, and general maintenance of the revegetation area) would be required for effective plant establishment.

Plant materials for each vegetation community type would be selected with an emphasis on establishing the desired native vegetation communities as well as plant species of value to Native American traditional practitioners. Past results from vegetation response (passive and active) at other restoration sites would be considered in final plans for plant species, stock type, spacing, density, and other revegetation requirements.

Active revegetation of riparian and upland areas would require a variety of planting techniques. Upland seeding would require ripping and/or harrowing of areas to be planted. Planting cottonwood poles and willow cuttings would require digging holes with a backhoe or using a handheld water jet stinger in fine-grained soils where these methods are effective Planting bare root and containerized plants would require hand digging holes with shovels and planting bars.

### *Irrigation*

Active revegetation (planting and seeding) would require supplemental watering to ensure successful seedling establishment and to reduce transplant stress. Irrigation systems would be installed as necessary and maintained for two to three growing seasons. Watering would be reduced as plants are established. Irrigation would be implemented using hand line and agricultural high pressure / high volume pumps.TNC intends to acquire temporary irrigation water leases from the cities of Reno and Sparks for temporary irrigation during the plant establishment period of 3 to 5 years following the initial revegetation efforts. This arrangement was used successfully for the McCarran Ranch restoration project, and the cities,

as partners in these three projects, have indicated they will extend the arrangement to include these three sites. After the plant establishment period, TNC will no longer renew the leases, and the cities will maintain control of the water rights.

***Monitoring***

Similar to previous restoration projects along the lower Truckee River, TNC would monitor the effectiveness of the restoration work in terms of reaching the ecological goals of the project.

**Construction Methods**

The three river restoration designs involve constructing one or more new river meanders. After the meanders are finished, flows from the existing river channel would be permanently diverted into the newly constructed channel. The construction method would be similar at all three sites. The work would begin with the stockpiling of rounded cobble, boulder, and gravel rock materials near the work site. The new meander channel would then be excavated, leaving earthen plugs at both ends to prevent water from entering the channel prematurely. Concurrently, crews would excavate floodplain areas, cutting in the swales as designed.

After channel excavation, crews would place channel-bed cobble and boulder rock to the finished elevations. When the new channel is ready, crews would excavate the soil plugs, starting first with the exit plug on the downstream end. After the plugs are removed, crews would start moving flows by placing boulders along the alignment of the new bank, which will act as a cutover dike to dry the existing channel. When the boulders are built up, gravel and then a sandy material would be placed sequentially on the downstream side of the dike, which would complete the river diversion from the old channel to the new meander.

### 2.1.5 Environmental Commitments, Mitigation Measures, Best Management Practices and Permit Terms

A number of environmental protection measures and BMPs have been incorporated into the Proposed Action to minimize environmental impacts. Additionally, several construction-related permits and authorizations from federal, state, and local agencies are anticipated that would likely require similar and/or additional protective measures for implementation of the Proposed Action. Permits that would likely be required include:

(1) Nationwide 27 Permit for Stream and Wetland Restoration Activities, administered by the USACE, which regulates discharge of dredged or fill materials into waters of the United States;

(2) CWA Section 401, administered by the State of Nevada, which regulates state water quality standards related to discharges of fill or dredged materials into waters of the United States;

(3) NPDES stormwater pollution prevention permit program, administered by the State of Nevada, which regulates all point and non-point source pollutant discharges; and Washoe County special use and/or grading ordinance compliance permits;

(4) Reciprocal flood conveyance authorizations in the form (a) a flowage easement granted by the landowner to the State of Nevada to allow for the Truckee River to flow through and flood appropriate areas of the project sites and (b) an easement from the State of Nevada to the landowner to use and occupy the land currently within the bed and banks of the Truckee River, whether existing or historic, for restoration purposes;

(5) Temporary Working in Waterways Permit from the State of Nevada Division of Environmental Protection.

(6) Special Use Permit from Storey County.

(7) Grading Permit from Washoe and Storey Counties.

(8) Dust and Vector Control Permits from Washoe County.

(9) Letters of Permission from the Nevada State Engineer, Nevada Department of Wildlife.

Prior to construction, a "Worker Environmental Awareness Program" for construction workers shall be conducted by a qualified biologist. The program shall provide all workers with information on their responsibilities with regard to sensitive biological resources in the project vicinity.

Phased construction would occur at each of the restoration sites, combining various activities and BMPs to minimize surface water contact with exposed cuts and fills, and reduce or prevent associated impacts. In general, erosion control and maintenance measures (e.g., hydromulch, erosion control blankets, and sediment logs) would be installed along newly constructed riverbanks; new riverbanks would also use bioengineering techniques that combine plants and rock as needed. Certified weed-free straw mulch would be applied where needed. The following activities and BMPs are incorporated into the proposed restoration design and would be included in project plans and specifications and implemented during construction:

- Install safety fencing to protect at-risk vegetation and existing vegetation located near the river access corridors during construction (in addition to constructing a project area boundary fence to control off-highway vehicle access).

- Grade haul roads, clear, and grub restoration areas of invasive weeds (e.g., whitetop species) and dispose of by burning or transporting to a landfill.

- Execute site access BMPs, including vehicle and equipment cleaning and washing pads and contained fueling and maintenance areas.

- Execute BMPs at stockpiles, including silt fences around the perimeters of fill stockpiles and along the existing channel banks, to entrain wet, excavated material. Install fiber rolls or silt fencing around the perimeters of rock stockpiles if needed.

- Load rock from the top of rock-stock piles down until it is no longer possible to load rock without picking up soil from the bottom of the stockpile to avoid scooping of fines when loading rock material into trucks. Bottom layer of rock can be used for upland project needs or re-washed.

- Inspect frequently the performance of all BMPs and immediately correct through adaptive management and contingency planning, e.g., install fiber rolls or gravel filtration berms where silt fences are not performing adequately; install gravel filtration berms down gradient of wetlands if dewatering rates exceed wetland infiltration rates.

- Apply other environmental controls, e.g., dust control and sanitation, as required by other permits.

- Channel migration barrier and berm construction: Channel migration barriers would be constructed, where needed, to prevent the new meander from migrating into utility easements or other infrastructure. The migration barrier will consist of an excavated trench filled with boulders and cobbles and covered with soil.

- TNC and their contractors would independently, and in cooperation with the responsible fire agency, take all reasonable action to prevent and suppress fires on the restoration sites as referenced in the Truckee River Restoration Wildland Fire Mitigation Plan.

## Vegetation

Construction would be designed to avoid or minimize adverse effects as much as possible. The installation of safety fencing around at-risk vegetation and existing vegetation located near the river access corridors would be installed prior to groundbreaking activities. Appropriate mitigation measures would be used to prohibit the spread or colonization of non-native seeds. Methods such as using fill material that is free of non-native seeds and requiring that all rock and cobble materials used be pre-washed will help prevent the introduction of invasive plant species. If straw or hay bales were used for sediment and erosion control, the bales would be weed-free to reduce establishment or reestablishment of non-native plant species. Wash stations would be used to clean construction equipment prior to conducting work in waterways to help prevent the transport of invasive seed material downstream. Any non-native vegetation removed would be disposed of by burning or transporting to a landfill.

In order to discourage invasive weeds such as hoary cress and tall whitetop in the Proposed Action area, the methods described in the *Lower Truckee River Restoration: Re-vegetation and Weed Control Applied Methods and Best Practices Manual* (TNC 2005) would be implemented as needed, including the following:

1. Prior to removing noxious weeds adjacent to the river, barriers would be installed to prevent weeds from entering the river and moving downstream

2. Whitetop species and other invasive perennials would be treated as appropriate in order to facilitate revegetation efforts.

3. Weed-infested soil would be scraped away and buried in the bottom of fill areas on other parts of the project in order to isolate noxious weed seed..

4. The site would be monitored for new infestations of noxious weeds. New infestations would be controlled in a timely manner to prevent further propagation.

Chemical contamination of the river and surrounding uplands is possible when using herbicides. To minimize potentially adverse effects due to herbicide applications at the restoration sites, the mitigation measures outlined in the Water Quality section below would be implemented.

**Water Quality and Hydrology**

The contractors would comply with all required federal, state, and local permits, and implement the associated erosion control and other BMPs. The following management measures will be implemented to avoid and minimize the potential for adverse effects of turbidity or suspended sediments during in-water and upland construction:

1. TNC and its contractors will prepare and implement a water quality and sediment control plan for the Proposed Action. The plan will identify BMPs for the projects, including silt fences, sediment filters, watering, and routine monitoring to verify effectiveness. Proper implementation of erosion and sediment controls shall be adequate to minimize sediment inputs into the Truckee River until construction ends. All sediment containment devices and erosion control devices will be inspected daily during the construction period to ensure that the devices are functioning properly. Silt curtains will be installed in order to minimize the amount of turbid water escaping the construction site and to prevent settleable solids from drifting outside of the immediate project work site. Silt curtains shall be kept in good working order; they shall be designed to allow fish that may enter the curtained area adequate passage to exit freely.

2. Any new or previously excavated gravel material placed in the Truckee River channel shall be cleaned of foreign materials prior to installation. Water containing mud or silt from aggregate washing or other operations shall be treated by filtration or retention in a settling pond or ponds adequate to prevent muddy water from entering the river.

3. The contractor shall not perform any clearing and grubbing or earthwork on the project until the State Water Pollution Prevention Plan (SWPPP) has been accepted.

4. All work within the river channel will occur when the river has low flows.

Construction plans and specifications shall include measures to reduce potential impacts on water quality associated with accidental spills of pollutants (fuel, oil, grease, etc.) in the Proposed Action area, including the following:

5. Equipment and materials shall be stored away from wetland and surface water features.

6. Vehicles and equipment used during construction shall receive proper and timely maintenance to reduce the potential for mechanical breakdowns leading to a spill of materials. Maintenance and fueling shall be conducted in an area at least 150 feet away from waters of the Truckee River or within an adequate fueling containment area.

7. The contractor will develop and implement site-specific Best Management Practices (BMPs), a water pollution control plan, and emergency spill control plan. The contractor will be responsible for immediate containment and removal of any toxins released.

8. Concerning dewatering activities, all material and water required for excavation and installation will be contained and disposed of in accordance with the required regulatory permits.

To minimize potentially adverse effects due to herbicide applications at the restoration sites, the following mitigation measures will be implemented:

1. All mixing and transfers of herbicides from one container to another shall be done over plastic tarp in an upland location greater than 100 yards from riparian, wetland, or river areas;

2. A spill kit containing shovels and absorbents shall be readily available to contain and soak up any leakage or spills;

3. In the event of a spill, soil contaminated with product will be immediately excavated and placed in leak-proof containers;

4. Personnel applying herbicides will be instructed on their environmental hazards, the importance of keeping the product out of and away from the river and wetlands, and will be provided with notification and containment procedures if an accidental spill occurs;

5. Empty containers shall be disposed of according to label directions and plastic bags shall be used to dispose of any waste materials in contact with herbicides;

6. To avoid consequences of overspray onto native plant species or onto water surfaces, spray activities shall be conducted on non-windy days and any herbicide application shall be ceased if windy conditions arise; and

7. Herbicide application shall not be conducted if precipitation is forecast within 72 hours and application shall be suspended for at least 24 hours subsequent to a precipitation event.

## Fish and Aquatic Organisms

The following mitigation measures will be implemented for fish, with emphasis on Lahontan cutthroat trout and cui-ui sucker.

*Injury and Mortality of Juvenile and Adult LCT*
The following mitigation measures will be implemented to minimize injury and mortality of juvenile and adult fish for LCT during all in channel work including, but not limited to, construction of riffle habitat, excavation of earthen or soil plug, and installation and excavation of the silt curtains.

1. In-water work may occur from July through December. During most of this period water temperatures, and dissolved oxygen levels are typically unsuitable for LCT, and LCT would not be expected to be in this reach of the river during this season.

2. No in-water construction and stream diversion actions would occur during the spring migration (April to July).

3. Equipment shall be operated slowly and deliberately to minimize potential injury and mortality of juvenile and adult fish during excavation and placement of fill materials within the active channel. The contractor shall be instructed that before submerging an excavator bucket, or placing fill gravel below the water surface, the excavator bucket or equipment will be operated to "tap" the surface of the water.

4. Dewatering of the existing channel would be conducted slowly and deliberately to prevent the mortality of juvenile or adult LCT. The downstream end of the channel being abandoned would be left open, with the filling of the channel occurring from upstream to downstream, so that any fish present are able exit the channel as fill is occurring.

*Increased Turbidity and Suspended Sediment*
The construction site management measures outlined in the Water Quality environmental commitments shall be implemented to avoid and minimize the potential for adverse effects of turbidity or suspended sediment during in-water and upland construction to the LCT and cui-ui.

*Potential Spill of Hazardous Materials*
Construction specifications shall include the measures outlined in the Water Quality environmental commitments section to reduce potential impacts associated with accidental spills of pollutants (e.g., fuel, oil, grease, etc.).

## Terrestrial Wildlife

1. Land clearing, burning, and mowing would be conducted outside of the avian breeding season if possible; otherwise, a qualified biologist would survey the area prior to land clearing or mowing. If nests of native, non-invasive species are located or if evidence of nesting of such species is observed, a protective buffer would be delineated and the entire area avoided, preventing the destruction or minimizing disturbance of the nest until the species are no longer active. The size of the protective buffer would depend on the habitat requirements of the particular species. Additional mitigation measures for nesting birds include:
2. Removal of potential nesting substrate (e.g., trees, shrubs) that may be affected by construction must occur between November 1 and February 28 (i.e., outside the nesting season) to ensure that active nests are not removed as a result of construction activities, and;
3. A qualified biologist in consultation with the Nevada Department of Wildlife would determine the extent of a construction free buffer zone to be established if an active nest (a nest containing eggs or young) is found. A qualified biologist shall monitor the nest(s) to determine when the young have fledged and submit status reports to the Nevada Department of Wildlife, as appropriate, throughout the nesting season. An active nest may only be removed after the young have fledged (based on field verification).

Potential herbicide impacts to wildlife should be minimized by implementing the mitigation outlined in the Water Quality environmental commitments section regarding herbicide impacts.

## Air Quality

The following mitigation measures should be implemented to reduce adverse effects pertaining to air quality; these include, but are not limited to:

1. Properly maintain all equipment and engines.
2. As a rule, keep all equipment and engines idling below 10 minutes.
3. Encourage workers to carpool to the construction area.
4. Schedule the movement of construction materials during off-peak hours for travel.
5. Use water trucks to reduce airborne dust from leaving the project site. Require increased water frequency whenever wind speeds exceed 15 miles per hour. Emphasis would be placed on watering unpaved roadways during periods of high vehicle movement.
6. Limit the speed for all construction equipment to 10 miles per hour on any unpaved surface.

7. Do not excavate or grade soils during periods in which wind speeds are greater than 20 miles per hour averaged over one hour.

8. Maintain at least 2 feet of freeboard on trucks hauling loads of excavated materials, and cover loads of all haul/dump trucks securely on days with high winds or when traveling at speeds to cause dust to be released from the vehicles.

9. All equipment would enter and leave the construction site by the same designated route to reduce airborne dust.

10. Use BMPs with excavated soil stockpiles to reduce wind erosion; measures include, but are not limited to, covering with tarps or spraying with water to control dust.

**Cultural Resources**

The restoration projects will be designed to avoid significant cultural resources and construction and project activities will be conducted to avoid disturbance of such resources. Mitigation of adverse effects may be required if unknown cultural resources are inadvertently encountered during project implementation. In the event that previously unknown cultural resources are identified during construction, Reclamation, with TNC and in consultation with the Nevada State Historic Preservation Officer (SHPO), will ensure that any adverse effects will be resolved, as required. Information on the location and nature of cultural resources in the project areas will be held confidential to the extent provided by the National Historic Preservation Act (NHPA) of 1966, as amended (16 U.S.C. 470 et seq.).

Mitigation measures for newly discovered sites are listed below.

1. Any cultural (historic or prehistoric site or object) resources discovered by TNC, or any person working or using the project lands on their behalf, shall be immediately reported to Reclamation. TNC shall suspend all operations and uses within a 100-yard vicinity of the discovery. Reclamation shall ensure that any cultural resource discovery is treated pursuant to the NHPA, 16 U.S.C. § 470 et seq., and its implementing regulations, 36 C.F.R. Part 800, to document and evaluate the discovery relative to eligibility for listing in the National Register of Historic Places (NRHP), to determine effect, and, as necessary, to develop appropriate mitigation measures to resolve any adverse effects. Mitigation measures necessary to resolve any adverse effect(s) will be prescribed and/or implemented by Reclamation in consultation with the SHPO, TNC, and other consulting parties. TNC will be responsible for the cost of the documentation, evaluation, and any subsequent resolution of adverse effect(s). Project operations following such discoveries may resume only upon written authorization from Reclamation.

2. Prior to construction activities within the Proposed Action areas, Reclamation will be provided with a list and schedule of employees authorized to halt all activities in a discovery situation and who will be responsible for notifying Reclamation of any discoveries. At least one of these employees shall be present during all construction activities.

3. Should buried cultural resources such as chipped or ground stone, historic debris, building foundations, or human bone be discovered inadvertently during ground-disturbing activities, work will cease immediately in that area and within 100-yards of the find until a Reclamation-approved professional archaeologist can assess the significance of the find. Within two days, Reclamation shall evaluate the discovery pursuant to the NHPA and its implementing regulations (36 CFR Part 800) to document and evaluate the discovery relative to its eligibility for listing in the NRHP, to determine effect, and, as necessary, to develop appropriate mitigation measures to resolve adverse effects to the discovery. Reclamation shall solicit concurrence on its decision for necessary actions from the SHPO, tribes, and interested persons. Mitigation measures necessary to resolve any adverse effect(s) will be prescribed by Reclamation in consultation with the SHPO and consulting parties. Construction following such inadvertent discoveries will resume only upon written authorization from Reclamation.

4. Human remains and associated grave goods found on state or private land will be handled according to the provisions of Nevada revised statute, Chapter 383–Historic Preservation and Archeology.

5. Any areas that Reclamation identifies as sensitive, through consultation with local tribes, will be monitored by an appropriate tribal expert during construction activities that may affect the area. Monitors shall have the authority to stop work if necessary to protect cultural resources.

## 2.2 No Action Alternative

Under the No-Action Alternative, TNC would not be allowed to use federal Desert Terminal Lakes Program grant funds provided by Reclamation for the restoration projects or the acquisition of the Upper Mustang site. The federal funding is necessary to implement the ecosystem and river restoration projects, and no restoration activities would occur at the sites unless sufficient non-federal funding was obtained by TNC. The No-Action Alternative is essentially equivalent to continuing the existing conditions and management approach at the Tracy Power Plant, West McCarran Ranch, and Upper Mustang Ranch sites along the lower Truckee River. The No-Action Alternative provides a baseline against which the benefits and adverse effects of the Proposed Action can be compared.

# Section 3 Affected Environment and Environmental Consequences

## 3.1 Affected Environment Overview

The following subsections provide general information about the existing physical, biological, and human environmental conditions at each lower Truckee Restoration Project sites.

### 3.1.1 Tracy Power Plant

The 113-acre Tracy Power Plant site is owned by NV and is located about 12 miles downstream from Vista. The primary development within the site is the Tracy Power Plant and associated infrastructure. Most of the restoration construction work would occur in reaches upstream and downstream of the power plant where infrastructure would not be affected by restored ecological processes such as seasonal overbank flooding. The Tracy Power Plant site encompasses approximately two river miles, all within the floodplain.

The existing Tracy Power Plant site is characterized by a straight, deeply incised, and partially armored channel, a disconnected floodplain, and several rock weirs. Remnant patches of desirable vegetation exist, as well as extensive stands of invasive species such as tall whitetop.

Bank erosion is the primary sediment source within the Tracy segment. The channel width increased significantly in the past 70 years based on historical aerial photography. The average entrenchment within this segment is approximately 3 feet (Otis Bay 2004).

### 3.1.2 West McCarran Ranch

The proposed 36-acre West McCarran Ranch site is located on the north side of the Truckee River on TNC's McCarran Ranch property. The project site is downriver and adjacent to the lower Mustang Ranch reach, which was restored in 2009. The site is approximately two miles upstream from the restoration work previously done in 2006 at McCarran Ranch.

The site consists of a relatively wide section in the upstream (southwestern) reach and a narrow section downstream (northeastern) reach. The latter reach is confined by property boundaries and topographic features. Approximately one river mile would be restored, all within the floodplain.

The 2004 report by Otis Bay Ecological Consultants was prepared for the U.S. Army Corps of Engineers (ACOE) to provide the ACOE and the Truckee Meadows Flood Damage Reduction and Ecological Restoration Project with information needed to establish priorities for restoration sites along the lower Truckee River (Otis Bay 2004). The report described the proposed West McCarran Ranch project site (Segment 10, "Upper McCarran"): "Large

boulders on the riverbed control the elevation of the channel and the river forms a drop pool channel in this segment. The channel appears to be vertically stable due to the presence of the large boulders. Although lateral stability appears relatively high, the potential for limited lateral migration exists on the north side of the channel. A narrow floodplain is present on the north, and steep hills and small alluvial fans are present to the south. Within this segment, colluvial slopes adjacent to the channel are the primary source of sediment. The entire channel is straight with the exception of two confined meanders on the upstream end and a single confined meander on the downstream end. Due to the confined nature of the channel, very little change in channel location has occurred since 1939.

Riparian vegetation is present in a narrow zone along the channel. The overall relative score for vegetative cover is low to moderate. The channel bed and banks are armored with coarse-grained material. Average entrenchment within this segment is 4.2 feet."

### 3.1.3 Upper Mustang Ranch

The 41-acre Upper Mustang Ranch reach is downstream of the Lockwood development. This reach was described in the Otis Bay report (Otis Bay 2004) as part of the "Mustang" segment, as follows: The river channel was channelized in the 1960's and thus is straight and entrenched. This segment consists of a single broad meander containing several gravel bars within the channel, which appear to be the initiation of meander development in post-channelization time. The channel appears both vertically and laterally stable. Within the single large meander mentioned above, the river flows around a coarse-grained, erosion-resistant alluvial deposit. A large, relic floodplain area is present along the southern side of this segment; however, levees and channel entrenchment have disconnected the river channel from the floodplain. The disturbance from gravel mining activities within the channel, and the presence of levees, exert the greatest anthropogenic control within the segment. Bank height and slope are moderate to high. The channel banks are largely composed of, and armored by, materials from either dredge piles or constructed levees. The banks and levees are composed primarily of cobble-sized coarse material. The overall erodibility rating is moderate and average entrenchment is 4.8 feet.

## 3.2 Affected Environment and Environmental Consequences

### 3.2.1 Vegetation

**Affected Environment**

The current vegetation at Upper Mustang is predominately agricultural (hay fields), with a narrow strip of riparian vegetation on the riverbanks and scattered remnant Fremont cottonwood *(Populus fremontii)* adjacent to the access road. At the Tracy Power Plant site and West McCarran Ranch, big sagebrush *(Artemisia tridentata),* greasewood *(Sarcobatus vermiculitus),* and four wing saltbush *(Atriplex canescens)* dominate the terraces to the north and south of the river; whereas, Fremont cottonwood, willow *(Salix spp.),* and cattail *(Typha spp.)* are the primary vegetation in riparian zones. Various low-lying forbs and grasses such as buckwheat *(Eriogonum spp.),* and cheat grass *(Bromus tectorum)* inhabit the area as well.

The uplands surrounding the Truckee River Canyon are primarily sagebrush scrub; however, pinyon-juniper forests do thrive in the Virginia Range to the south (ASM 2011).

Similar to other restored sites along the lower Truckee River, pre-restoration (current) vegetation composition, pattern, and cover at the Tracy Power Plant, West McCarran, and Upper Mustang Ranch sites is largely a product of human activities in the past 150 years, including water diversions, agricultural practices, and introduction of non-native, invasive species. Extensive wetlands, dense willow shrubland, and Fremont cottonwood forests with mixed age classes have been reduced to remnant patches and replaced by native upland vegetation, and non-native, invasive forbs, including tall whitetop, hoary cress, and tumbleweed. The lower Truckee River is typical of desert systems in the southwest, where about three-quarters of the riparian forests have been eliminated because of human-caused changes (Johnson and Haight 1984, as cited in Rood 2003).

The historic change in vegetation species composition, cover, and pattern was also a result of changes to the lower Truckee River flow regime (amount, pattern, and timing of flows) and the channelization of the river from the flood control projects, which disconnected the river from its floodplain in most reaches. The lower Truckee River became wider, shallower, and straighter, with a lowered water table, which, along with the flow regime, led to the degradation or local elimination of healthy native riparian and wetland vegetation.

Research by Rood et al (2003) demonstrated how positive changes in the flow regime could lead to dramatic vegetative responses in the lower Truckee River, most notably the quick recruitment of Fremont cottonwood and willow shrubs. Cottonwoods and willows can be considered "keystone" vegetation species because they play critical roles in providing complex vertical and horizontal structure, which leads to rapid recovery of wetland- and riparian-dependent bird species. Recruitment and reestablishment of cottonwoods and willows also produce changes to the channel and floodplain morphology by changing sediment deposition and scour patterns (Rood et al 2003).

Channel restoration projects undertaken by TNC in the lower Truckee River since 2003, combined with experimental flow regimes, have produced dramatic recovery of desired riparian and wetland vegetation at the restored sites. In the future, utilizing prescribed "fish flows" from Stampede Reservoir and uncommitted water from Prosser Reservoir in high water years (U.S. Bureau of Reclamation 2008), and managing those flow patterns to enhance cottonwood and willow recruitment, will provide a favorable mix of age and size classes in riparian forests. Since these flow regimes are expected to continue into the future, it is possible to have greater reliance on passive methods for cottonwood and willow recruitment, and less use of more costly intensive treatments (planting, relocation) to achieve desirable results.

## Environmental Consequences

### *Proposed Action Alternative*

The Proposed Action would change the vegetation species composition, pattern, and cover from its present degraded condition to a condition that more resembles a functional riparian and wetland system. The restoration work would increase the amount of critical natural

habitats, which would promote an increase in biodiversity and improve ecological functions along the river. It would restore the hydrologic and soil conditions necessary for the long-term, natural regeneration of cottonwoods, willows, and other native plants, and enhance or create wetland areas. The Proposed Action would provide continuity with adjacent completed restoration projects, creating a more complete, functioning riparian corridor.

Construction of the Proposed Action would generate short-term adverse effects on existing vegetation in the project area. Mowing and burning in selected areas to control competing and invasive non-native plants would affect both invasive and native plants. Although mowing and burning would help control growth of invasive weeds, it may also harm or kill individual native plants in these areas. There is also a chance that native plant species could be harmed by herbicide application if native plants are mixed with non-native plants selected for spraying with a non-selective herbicide. Construction activities could also disturb or damage vegetation during the movement of equipment in and around the site. To reduce invasive plant colonization of revegetated areas the restoration project would include management techniques such as seeding, containerized plantings, pole plantings, and supplemental watering, as needed, that are designed to minimize weed colonization.

Restoration of the floodplain would eliminate mature sagebrush stands in some areas. While sagebrush is an important vegetation type in the natural upland areas of the lower Truckee River, dense sagebrush adjacent to the river occurs because it invaded areas previously occupied by riparian vegetation when the water table was lowered and the floodplain was disconnected from the river channel.

The riverbanks within the proposed project area provide limited riparian vegetation and natural features that contribute to riparian habitat. Most of the riparian habitat function within the project sites is provided by relatively young, narrow, low-density willow stands adjacent to the channel and a small number of decadent cottonwood trees and galleries. Construction activities associated with the Proposed Action would result in short-term, temporary disturbances to some of this vegetation, but no permanent impacts to this habitat are anticipated.

Using active and passive methods, riparian vegetation disturbed or removed by construction activities would be rehabilitated or replaced during an extensive post-construction revegetation effort that would recreate a larger, natural, multi-dimensional riparian plant community. At each site, there would be an overall increase in post-project native riparian vegetation. While construction would result in short-term temporary effects to some riparian habitat in the project area, the Proposed Action would have long-term beneficial effects by increasing the total area of riparian vegetation, removing non-native plant communities, and allowing additional riparian communities to re-establish themselves in greater quantities.

Construction at the three sites would be designed to avoid or minimize adverse effects as much as possible. The installation of safety fencing around important existing vegetation located near the river access corridors would be installed prior to ground disturbing activities. Appropriate mitigation measures would be used to prohibit the spread or colonization of non-native seeds. Methods such as using fill material that is free of non-native seeds and requiring that all rock and cobble materials used be pre-washed would help prevent the introduction of

invasive plant species. If straw or hay bales were used for sediment and erosion control, the bales would be certified weed-free to reduce establishment or reestablishment of non-native plant species. Wash stations would be used to clean construction equipment prior to conducting work in waterways to help prevent the transport of invasive seed material downstream. Any non-native vegetation removed would be disposed of by burning or transporting to a landfill. Additionally, if necessary, any area temporarily impacted during construction would be revegetated with native species.

In order to discourage invasive weeds such as hoary cress and tall whitetop, in the Proposed Action area, the methods described in the *Lower Truckee River Restoration: Re-vegetation and Weed Control Applied Methods and Best Practices Manual* (TNC 2005) would be implemented, including the following:

- Whitetop species and other invasive perennials would be treated with herbicide prior to any revegetation efforts.
- Weed-infested soil would be scraped away and buried in the bottom of fill areas on other parts of the project in order to isolate noxious weed seed.
- Prior to replanting, undesirable vegetation and litter would be removed or minimized.
- The site would be monitored for new infestations of invasive weeds. Any new infestations would be controlled and, to the extent possible, eradicated in a timely manner to prevent further propagation.

Chemical contamination of the river and surrounding uplands is possible when using herbicides. To minimize potentially adverse effects due to herbicide applications at the restoration sites, the mitigation measures outlined in Section 2, Proposed Action, Environmental Commitments - Water Quality, would be the implemented.

***No Action Alternative***

Without restoration of native riparian vegetation and aggressive treatment of invasive weed species, the sites would remain in their current degraded condition indefinitely, or possibly deteriorate further with increasing dominance of invasive weeds and declining riparian vegetation. Linking to previously restored areas would not occur, thereby limiting the overall benefits of a contiguous restored corridor of habitat.

### 3.2.2 Hydrology, Geomorphology, Water Quality, and Water Resources

**Affected Environment**

The Truckee River basin encompasses approximately 3,100 square miles, from its headwaters in the Sierra Nevada mountains to the terminus at Pyramid Lake. Flows in the Truckee River are the result of surface runoff, snowmelt, and the operation of multiple flood control features, hydroelectric generation projects, water storage reservoirs, and agricultural and municipal diversions. Flows are typically highest during the spring months as the snow pack in the

Sierra Nevada melts, and decrease to annual base levels through the summer and fall months. Flows and water diversions are regulated by the Truckee River Operating Agreement (Bureau of Reclamation 2008).

The climate of the Truckee River basin is generally dry and is characterized by cycles of flood and drought, in which precipitation and runoff can vary widely from year to year (U.S. Bureau of Reclamation 2008). The majority of the yearly precipitation occurs between October and March. Precipitation is mostly in the form of snowfall and averages 7.8 inches per year (Weatherbase 2012). Based on records from the USGS gage located closest to the Proposed Action area (located at Vista, Nevada upstream of the Upper Mustang site), the daily mean discharge has recently averaged 816 cfs, ranging from a minimum of 7 cfs to a maximum of 17,400 cfs, respectively (U.S Bureau of Reclamation and U.S. Bureau of Land Management 2008b).

The existing 100-year flood flow (sometimes referred to as the "base flow" for flood management purposes) at the Vista gage is reported to be 20,171 cfs (Montgomery Watson Harza 2002). By comparison, the largest recent flood event that occurred in January 1997 was measured to peak at 20,691 cfs at this same site (Montgomery Watson Harza 2002).

Water quality in the Truckee River is affected by a variety of sources, including sediment releases from land use practices and geomorphic processes, agricultural runoff, urban runoff, land development, mining, flood control features, and wastewater treatment plant discharges. The State of Nevada determined that in various reaches of the Truckee River the river is impaired under the provisions of Section 303(d) of the CWA because of excessive temperature, total phosphorus, and turbidity. However, the level of impairment to beneficial uses of the Truckee River caused by these parameters varies along the length of the river (Nevada Division of Environmental Protection 2005).

Within the potentially affected area (Upper Mustang to Derby Dam), the lower Truckee River is listed as impaired due to excessive phosphorus and turbidity levels (Nevada Division of Environmental Protection 2005). The primary adverse impacts associated with excessive nutrients and turbidity in the Truckee River pertains to degradation of habitat for aquatic organisms. The NDEP has established Total Maximum Daily Loads (TMDLs) for total nitrogen, total phosphorus, and total dissolved solids for the Truckee River (Nevada Division of Environmental Protection 2005). Availability of elevated phosphorus and nitrogen in the Truckee River provides suitable conditions for excessive algal growth during the summer months, which can lead to reduced dissolved oxygen levels and in turn affect the health of sensitive fish species.

The proposed restoration sites at Tracy Power Plant and West McCarran Ranch were analyzed by TNC's design contractor Graham, Matthews and Associates (GMA) reports (Graham, Matthews & Associates 2011a, 2011b). The sites were also covered in a geomorphic assessment and preliminary design by Otis Bay Ecological Consultants (2004). GMA's geomorphic assessments highlighted changes to the reaches that occurred as modifications of the river corridor were made over the past 140 years. The geomorphic analysis was used to provide initial guidance on channel horizontal alignment (sinuosity and meander wavelength), channel vertical alignment (potential profile adjustments to spread energy from existing grade

controls over a much wider reach, and channel geometry (width, width/depth ratio). GMA's reports contain literature reviews, which served as background and context for the site-specific data and findings.

## Tracy Power Plant Reach

Three rock weirs, constructed in the river channel for agricultural water diversion, water intake, and erosion prevention following a 1997 flood, have likely prevented some channel incision, but have also created backwater effects. Three off-channel ponds were created during aggregate mining operations. Two of these ponds are currently in use as primary and reserve cooling ponds for the power plant. The third pond is within the project area and is incorporated in the proposed restoration plan.

For 500 feet below the upstream weir the channel is 150 to 180 feet wide, straight, and incised about 10 to 11 feet. The next 0.4-mile (23 acres) consists of a large former floodplain, now disconnected, on the actively eroding right bank. A desert shrub community replaced the historic riparian plant community of cottonwoods and swales after the groundwater table was lowered. On the left side of the river, a riparian forest has developed on an active point bar as the river has migrated to the right bank. Immediately downstream is a highly confined reach between an older terrace (about 30' above the present channel bed) and a levee protecting the large cooling water pond on the left side of the river. Major erosion in this confined reach during the flood of 2006 required a large repair project and placement of extensive riprap. Continued instability on the right side of the river is slowly undercutting the high bank.

At the approximate mid-point of the Tracy reach, opposite the downstream portion of the riprap is another healthy point bar, where the active floodplain widens considerably. The channel and edges of this point bar are thickly vegetated, while the central portion is open and dry. Another confined reach occurs in the next 0.4-mile segment, between the main power plant cooling water pond on the river's right bank and concentrated infrastructure . Downstream from the bridge, the floodplain widens, but most of floodplain on the left bank is disconnected from the channel in all but the highest flows. Along river's right side, opposite the lower pond, is a relatively healthy area of former channels and bars with considerable vegetation.

Channel incision is a primary characteristic of the current conditions in the Tracy reach. The expected difference between the streambed and the general floodplain is about 5 feet at riffles, which would allow the channel to contain about 6,000 cubic feet per second (cfs) at bank full level. In most of the Tracy Power Plant reach, GMA found an elevation difference of 9 to 11 feet, indicating channel incision of 5 to 6 feet. This degree of channel incision has lowered water tables in floodplains, which led to the decline and elimination of riparian vegetation through much of the proposed project area.

The most common effects of channel incision are unstable channel form, increased or decreased flow capacity, and decreased floodplain function. Channel incision results in greater stream power and scour potential, which can lead to further incision, banks undercutting, and destruction of stabilizing vegetation. As banks erode, channels widen and sediment is distributed downstream, thereby potentially affecting water quality. Elimination

of riparian bank vegetation also reduces sediment entrapment potential, bank storage, and groundwater recharge, while increasing water temperature.

Channel confinement in levees is designed to contain large flood events for protection of human life and property, but often results in unnaturally wide channels and areas of sediment deposition. The natural process of bank (floodplain) storage during flood events is eliminated. Full storm runoff proceeds downstream, which can result in downstream flooding. The rapid movement of peak flow runoff reduces the ability of groundwater recharge in the adjacent floodplain.

### West McCarran Ranch Reach

The channel in the West McCarran reach is straight, deeply incised, and entrenched, with partial armoring. The floodplain is generally disconnected from the channel. A downstream weir causes a backwater effect. A topographic constriction in the channel in the downstream segment reduces options for restoration. However, the upstream segment benefits from remnant features that potentially could speed restoration and reduce the amount of intervention. These features include moderately functional historic swales, remnant cottonwood galleries, and traces of wetlands.

### Upper Mustang Ranch Reach

The Truckee River at the Upper Mustang reach, which was channelized in the 1960s, is straight and entrenched. The reach has a single broad meander containing several gravel bars within the channel, which appear to be the initiation of meander development in post-channelization time. The channel appears both vertically and laterally stable (Otis Bay 2004).

Within the single large meander, the river flows around a coarse-grained, erosion-resistant alluvial deposit. Levees and channel entrenchment have disconnected the river channel from the floodplain. Bank height and slope are moderate to high. The channel banks are largely composed of, and armored by, materials from either dredge piles or constructed levees. The banks and levees are composed primarily of cobble-sized coarse material. The overall erodibility rating is moderate and average entrenchment is 4.8 feet (Otis Bay 2004).

The current land use of the historic floodplain on the south side of the river is agricultural production, a flat irrigated alfalfa field, which extends to the riverbank. Runoff from the field and groundwater connection to the river is presumed.

## Environmental Consequences

***Proposed Action Alternative***

Implementing the Proposed Action would cause long-term changes to the current geomorphology and hydrology through construction that reconnects the river channel to its floodplain and reestablishes a more natural, dynamic channel pattern at the restoration sites. The changes would be relative to the existing condition and the degree and type of restoration work at a particular reach. Constraints such as infrastructure and land ownership patterns

limit restoration options in some reaches, while other reaches are available for more intensive and extensive treatments.

Permanent changes to the water flow, sinuosity, surface and groundwater depth, and wetland areas would occur. Construction of new meanders would reroute the channel, ultimately narrow the riverbanks, and increase the water depth within the channel. The design objectives include more frequent localized overbank inundation (where appropriate), creation of wetlands, and raising the groundwater table. The Proposed Action is expected to provide an overall long-term benefit to river hydrology and water quality, as well as improve habitat quantity and quality, while maintaining the benefits of existing and proposed flood control management features.

The potential effects of the Proposed Action on localized flood damage risk are being evaluated from post-project modeling of four completed restoration sites. The analysis will provide information on the actual effects of the prior projects and the efficacy of the design criteria for the proposed project. Based on the results of the analysis, the proposed design could be modified to meet flood protection goals. No significant change in flood potential is expected to result from proposed channel and floodplain restoration at the three restoration sites.

TNC conducted detailed water quality monitoring and reporting for compliance with their Nevada Department of Environmental Protection (NDEP) Temporary Working in Waterways Permits for the Lockwood, 120 Ranch, and Lower Mustang projects (TNC 2009, 2010). In those projects, BMPs were used effectively, and water quality was maintained with only a few exceedences, which were relatively minor and corrected rapidly. Experience on the Lockwood and 102 Ranch projects (2008) was used to improve operations on the Lower Mustang project (2009) and further reduce impacts to water quality. BMPs and other mitigation measures used in the 2008 and 2009 projects would be used for the Proposed Action, with minor changes incorporated from experience with those earlier projects. Based on the monitoring data of the prior projects, BMPs are expected to be effective in minimizing water quality impacts from work in the active channel and the new meanders during the proposed project.

No adverse changes to water resources are expected because of the proposed project. Temporary water rights would be obtained from the cities of Sparks and Reno to support construction and post-construction revegetation work. Over time, the landscape's resilience to flood flows is expected to improve as banks are revegetated, the channel deepens, and the historic floodplain once again becomes functional. Groundwater recharge is expected to improve because of the floodplain restoration.

### *No Action Alternative*

Existing hydrology, geomorphology, and water quality would not be affected by proposed restoration work, but could change from natural events or unrelated human-caused effects. It is likely the river would remain in its current channel and there would be few or no changes in the groundwater system and floodplain size and function, or the ability to withstand high flow events.

### 3.2.3 Fish

**Affected Environment**

Fish species listed under the federal Endangered Species Act as threatened or endangered, or candidate species which may occur in the project vicinity were identified in a letter received from the U. S. Fish and Wildlife Service dated August 30, 2011. Two fish species were included on this list, the endangered cui-ui, and the threatened Lahontan cutthroat trout (LCT).

Information for both species is excerpted, in part, from the Revised Draft Environmental Impact Report for the Truckee River Operating Agreement [TROA] (U.S. Bureau of Reclamation 2008), the Biological Assessment and Biological Opinion for the lower Truckee River Restoration Projects at Lockwood, Mustang Ranch, and 102 Ranch, (U.S. Bureau of Reclamation and Bureau of Land Management 2008a, U.S. Fish and Wildlife Service 2008), and the Lahontan cutthroat trout 5-year Review (U.S. Fish and Wildlife Service 2009).

***Lahontan cutthroat trout (Oncorhynchus clarki henshawi)***

Lahontan cutthroat trout (LCT) was federally listed as an endangered species in 1970 (35 FR 13520). In 1975, this designation was changed to threatened to facilitate management and to allow for regulated angling (40 FR 29864). In 1995, the U.S. Fish and Wildlife Service released its recovery plan for LCT, encompassing six river basins within the historic range of LCT, including the Truckee River basin. The Lahontan Cutthroat Trout Recovery Plan (U.S. Fish and Wildlife Service 1995) identified the need to develop ecosystem plans for the Truckee and Walker River Basins. The Short-term Action Plan for LCT in the Truckee River Basin was released in 2003 U.S. Fish and Wildlife Service 2003). The 5-Year Review for LCT was completed in 2009 (U.S. Fish and Wildlife Service 2009). Critical habitat has not been designated for LCT.

Lahontan cutthroat trout is an inland subspecies of cutthroat trout endemic to the Lahontan Basin of northern Nevada, eastern California, and southern Oregon. LCT historically occupied large freshwater and alkaline lakes, small mountain streams and lakes, small tributary streams, and major rivers of the Lahontan Basin of northern Nevada, eastern California, and southern Oregon (U.S. Fish and Wildlife Service 1995). In northern California and western Nevada, LCT were presumed to occupy over 600 miles of stream habitat within the Truckee River watershed (U.S. Fish and Wildlife Service 2009).

Historically, populations in Pyramid and Winnemucca Lakes migrated more than 100 miles up the Truckee River into its headwaters and tributaries to spawn (Sumner 1940; Peacock and Kirchoff 2007, as cited in U.S. Fish and Wildlife Service 2009). The most important LCT spawning habitat in the Truckee River was upstream of Verdi, Nevada.

Generally, stream-dwelling LCT inhabit small streams characterized by cool water, pools in close proximity to cover and velocity breaks, well vegetated and stable stream banks, and relatively silt-free, rocky substrate in riffle-run areas (U.S. Fish and Wildlife Service 1995).

Streams should have a variety of habitats including areas with slow deep water, abundant instream cover (*i.e.*, large woody debris, boulders, undercut banks), and relatively stable streamflow and temperature regimes. Streambanks should be well vegetated to provide cover, shade, and bank stabilization (U.S. Fish and Wildlife Service 2009).

Optimal river habitat is characterized by the following: (1) clear cold water with an average maximum summer temperature of less than 22 ºC (72 ºF), and relatively stable summer temperature regime averaging about 13 ºC (55 ºF) plus or minus 4 ºC (7 ºF); (2) pools in close proximity to cover and velocity breaks to provide hiding cover and spawning areas; (3) well vegetated, stable stream banks; (4) 50 percent or more of stream area providing cover; and (5) a relatively silt free rocky substrate in riffle-run areas (U.S. Fish and Wildlife Service 1995). Nonnative fish, especially salmonid species, are currently the greatest threat to LCT range wide (U.S. Fish and Wildlife Service 2009). Unlike most freshwater fish species, some LCT tolerate relatively high alkalinity and total dissolved solid levels (Dickerson and Vinyard 1999a, as cited in U.S. Fish and Wildlife Service 2009). LCT are noted for their ability to live in streams where water temperatures during the summer may exceed 27 C for short periods and fluctuate as much as 14-20 °C daily (Dunham et al. 1999; U.S. Fish and Wildlife Service 1995).

LCT is an obligatory stream spawner and predominantly use tributary streams as spawning sites. Spawning typically occurs from April through July throughout the range of LCT, depending on stream elevation, stream discharge, and water temperature (U.S. Fish and Wildlife Service 1995).

LCT populations have high year-to-year variability that is consistent with highly variable environmental conditions. Recruitment is associated with average stream flow in the spring (Dunham 1996, Ray et al. 2007, as cited in U.S. Fish and Wildlife Service 2009). Seasonal and annual changes in climatic conditions and stream discharge can lead to dramatic population expansions or contractions (Dunham 1996, Neville and DeGraaf 2006, Ray et al. 2007, as cited in U.S. Fish and Wildlife Service 2009).

The severe decline of Lahontan cutthroat trout throughout its range is attributed to a number of factors including hybridization and competition with nonnative trout species; invasive aquatic species, population isolation and habitat fragmentation, habitat condition, drought, water quality, water management (amount and timing of flows), fish movement and migration barriers, effects of-wildfire, alteration of stream channels and morphology; loss of spawning habitat due to pollution and sediment from land uses, and loss of habitat due to channelization (U.S Fish and Wildlife Service 1995, 2009).

Self-sustaining populations of LCT are now extirpated from their historically occupied lakes with the exception of Independence and Summit lakes. Many of the stream populations occupy isolated segments of larger river systems with no opportunity for natural recolonization. The highly fragmented, isolated habitat of lake and stream populations is a factor causing LCT to be at risk for extinction (U.S Fish and Wildlife Service 1995). Stream length and habitat connectivity are important for population viability because trout move throughout stream networks searching for a variety of habitats necessary to complete their life

cycle. Longer stream reaches generally have more complexity and a higher probability that habitat types are not limiting (U.S. Fish and Wildlife Service 2009).

The current distribution and abundance of LCT in the lower Truckee River is a function of habitat quality and quantity, presence of non-native fish species, water quality, flow regimes, and structural barriers to fish passage. LCT density is generally low because of the limited extent of suitable, connected habitat. Currently occupied stream habitat in the Truckee River watershed is estimated at 97 miles, less than 15% of the historical stream habitat (U.S. Fish and Wildlife Service 2009). This occupied habitat includes populations that were established by hatcheries, and are being maintained by hatcheries. For instance, the Pyramid Lake and lower Truckee River fishery is sustained by hatchery stocking.

The original Pyramid Lake LCT population was extirpated in the 1940s because of loss of spawning habitat. The construction of Derby Dam, pollution, competition with non-native fish species, and overfishing led to the elimination of LCT spawning in the lower Truckee River. Since the extirpation of the original Pyramid Lake strain of LCT, the fishery has been maintained by a hatchery-stocking program currently operated by the Pyramid Lake Paiute Tribal Fishery Program and the U.S. Fish and Wildlife Service. The hatchery program was expanded to include a hatchery in Wadsworth at Big Bend Ranch, dedicated to raising trout imprinted on Truckee River water. This program has successfully produced LCT that utilize suitable historic Truckee River spawning habitat.

Currently, there are 17 structural barriers to fish in the Truckee River between the Washoe/Highland Diversion and Pyramid Lake, which significantly limits the movement of LCT. Derby Dam, downstream of the proposed restoration sites, has blocked upstream habitat passage of lacustrine LCT, resulting in an 85 percent decrease in the potential trout spawning and rearing habitat area (R. J. Behnke, cited in Coleman and Johnson 1988). A fish passage structure was built at Derby Dam, but it is not yet in use. Currently, the Pyramid Lake population does not have access to enough suitable spawning habitat downstream of Derby Dam to support itself.

NDOW data from 2001-2005 indicate the presence of LCT in the reach of the lower Truckee River that contains the proposed restoration sites (U.S Bureau of Reclamation and U.S. Bureau of Land Management. 2008a). Capture rates were very low (5%) compared to other species (rainbow and brown trout) and LCT were detected in only 2 of 5 years, thereby indicating the amount of suitable LCT habitat at the time was quite limited.

LCT in and near the restoration sites are from planted hatchery stock. No known spawning activities occur in these reaches. LCT are likely to be seasonal occupants, which may use the river for migration to rearing and holding areas. As more reaches of the river are restored, LCT may begin to spawn and use the area year-round.

### *Cui-ui Sucker (Chasmistes cujus)*

The cui-ui sucker was listed as a federally endangered species in 1967 (32 FR 4001). In 1992, the U.S. Fish and Wildlife Service released its updated recovery plan for cui-ui. The second

revision of the cui-ui recovery plan, released in 1992, provides a quantifiable recovery objective (based upon probabilistic analysis of simulated cui-ui response to various hydrologic conditions) with site-specific tasks which, if implemented, are expected to achieve recovery (i.e., eventual delisting) of cui-ui (U.S. Fish and Wildlife Service 1992). Critical habitat has not been designated for cui-ui.

Cui-ui occupied ancient Lake Lahontan, which covered much of northwest and west-central Nevada during the Pleistocene era. Lake level declined as the climate changed, until only fragmented, remnant waters—Pyramid, Winnemucca, Walker, and Honey lakes—remained. At the beginning of the twentieth century, cui-ui inhabited Pyramid Lake and Winnemucca Lake. The species was eliminated from Winnemucca Lake when it dried in the 1930s.

Greatly reduced flows into Pyramid Lake in the 1930s caused the lake level to drop rapidly and a large delta to form at the mouth of the Truckee River. The delta prevented stream spawning cui-ui from leaving Pyramid Lake in most years and served as a barrier to LCT as well. A long-lived species (40+ years), cui-ui was able to survive in spite of only being able to spawn successfully in two years from 1950 to 1970. The situation improved after 1980, in large part due to cooperative efforts among the Pyramid Lake Paiute Tribe, U. S. Fish and Wildlife Service, and Reclamation. The construction of new fish passage facilities, river flow management regimes, storage and release of water at Stampede Reservoir, habitat restoration, and reduced diversions from the Truckee River to the Newlands Project led to successful spawning seasons in most years.

Cui-ui is a large, omnivorous lake sucker. Cui-ui is an obligate stream spawner, congregating in March and April near the mouth of the Truckee River in Pyramid Lake. The spawning runs begin in April or May, depending upon runoff, river access, and water temperature. Spawning occurs during March and June, after which spawners immediately return to and remain in Pyramid Lake (U.S. Fish and Wildlife Service 1992). Although, adult cui-ui may spend up to 16 days in the river, most spawners only spend a few days. Spawning runs may continue for 4 to 8 weeks, but most fish migrate during a one to two week period (Coleman 1986).

The regulation of Truckee River flows, in combination with restrictions on the harvest of cui-ui, hatchery supplementation programs, provision of fish passage at Marble Bluff Dam, and subsequent wet water years, has led to increasing cui-ui numbers (Rood et al. 2003). Although the fish lock at Marble Bluff Dam can transport the numbers of spawning cui-ui during low water years, spawning runs tend to be larger during wet, higher flow years and fish using the fish lock tend to experience crowding stress and mortality under such conditions (U.S. Fish and Wildlife Service 1992).

Cui-ui are currently restricted to Pyramid Lake and in the lower Truckee River downstream from Derby Dam, approximately 39 river miles. Adults generally use the lower 12 miles of the Truckee River only during the spawning season and only in years in which there is sufficient attraction flow for them to pass above or around the delta at the mouth of the Truckee River (Scoppettone et al 1986). In recent years, because of improved passage and increased flows, cui-ui larvae have consistently been captured near Wadsworth. Fish passage

improvements were completed by the Bureau of Reclamation at Derby Dam in 2003; however, the rock-channel fish passage has not yet been placed into operation.

The Tracy Power Plant restoration site is approximately five river miles upstream from Derby Dam, which is closest point cui-ui could be present because of existing fish passage barriers (i.e., Derby Dam). The West McCarran Ranch restoration site is upstream of the Tracy site and the Upper Mustang site is the farthest upstream from Derby Dam.

At least 12 non-native fish species are found in the lower Truckee River. Carp and mosquito fish are the most abundant introduced species. Others include brown trout, rainbow trout, largemouth bass, green sunfish, Sacramento perch, black crappie, channel catfish, brown bullhead, goldfish, and golden shiners. A number of these species are omnivorous and are likely to feed on the eggs, fry or juvenile cui-ui and LCT. The non-native trout have the potential to compete with LCT, displace, or hybridize with the native LCT.

## Environmental Consequences

### Proposed Action

Effects to federally listed species are generally considered adverse if they result in any one of the following:

- Direct mortality;
- Loss of occupied habitat;
- Temporary impacts to habitats such that the species suffer increased mortality or lowered reproductive success;
- Permanent loss of habitat determined to be critical and/or essential to the species;
- Substantial reductions in the size of a population of a species; and/or
- Substantial reduction in the quantity or value of habitats in which populations occur.

No direct effects to cui-ui are anticipated. The closest restoration site (Tracy Power Plant) to potentially occupied cui-ui habitat is almost 5 miles upstream of Derby Dam, which currently functions as a fish barrier to cui-ui. The other two restoration sites are even farther upstream. Under current conditions, cui-ui would not be present at or near any of the restoration sites. The long stretch of river and Derby Dam would prevent any construction-related sediment into occupied cui-habitat.

Cui-ui would be unlikely to have indirect effects from the project because they do not have access to the action area because of Derby Dam (a fish barrier), they are more than five miles downstream from the nearest restoration site (Tracy Power Plant), and cui-ui would not be in the Truckee River at the time of construction. Conservation measures and BMPs would minimize potential impacts to water quality.

Direct, short-term effects to LCT are possible from construction and construction-related activities in mid- to late-summer. These impacts could result in direct mortality, stress, injury, behavioral avoidance, and temporary loss of habitat. Quality habitat for LCT is limited or does not occur in the proposed project area currently, but juvenile and adult LCT may be present.

The primary impact to LCT from the proposed project would be mobilization of sediment (silt and sand) into the newly constructed channel when sediment plugs are removed and the new segments are connected to the main channel. The method of removing the plugs and watering the new sections of channel gradually from downstream is expected to reduce sediment mobilization, but some sediment movement after plug removal is unavoidable.

In-channel construction, including placement and removal of silt fences, would also mobilize sediments. Some existing banks would be temporarily destabilized by construction work and equipment access. Disturbed areas would be subject to erosion from heavy rain events and seasonal high flows. Erosion control measures and prompt site rehabilitation and revegetation is expected to minimize the length of time and severity of these effects. Monitoring at similar restoration sites has demonstrated a post-construction duration of 3 years or less until satisfactory bank stabilization has occurred and sediment discharge returns to baseline levels.

Construction-related sedimentation and turbidity effects are expected to be localized, temporary, and minimized by the use of a Storm Water Pollution Prevention Plan and BMPs. Based on several previous restoration projects, sediment and turbidity impacts are expected to be limited to the project area and be of relatively short duration. The lower Truckee River has preexisting high sediment levels and is listed under Section 303(d) of the Clean Water Act for excessive turbidity. The construction-related increase in sediment from the Proposed Action is not expected to contribute significantly to the pre-existing levels.

In-channel construction could cause other potential direct effects to LCT that could result in stress, injury, or mortality to fish if present. Fish could be entrapped or stranded during silt fence placement and dewatering the channel. LCT could be harmed by impact with construction equipment or materials (cobbles, riprap).

These direct effects are expected to be minimized by a late-summer (low flow) construction timeframe, in which LCT are less likely to be present because of high water temperature. Implementing BMPs and conservation/mitigation measures (Section 2, Proposed Action, Environmental Commitments) would minimize direct and indirect effects to LCT and other aquatic species of concern. Any effects would be localized and temporary, and offset by long-term benefits from the restoration work.

Some temporary disturbance to existing riparian vegetation would occur during construction, but no permanent impacts would take place. Existing vegetation is in poor condition, with a high amount of cover in non-native plant species, agricultural crops (Upper Mustang), and upland species that have colonized the historic floodplain. The undesired vegetation would be replaced over time by healthy, diverse riparian plant communities, and much larger functional floodplain.

With the use of heavy equipment within the river corridor, some risk of a minor spill of hazardous materials exists. The spill could occur from equipment leaks or refueling. If LCT were present, a spill would create poor water quality and potentially harmful effects to LCT at

all life stages. The planned on-site monitoring by TNC and strict adherence to the spill plan will minimize the potential for a spill and adverse effects from a spill.

No long-term loss of LCT habitat would occur. The Proposed Action would create approximately three miles of high quality restored river habitat, which is expected to result in significantly increased LCT use over time.

Habitat for LCT could be affected by poor water quality or loss of food sources from high levels of sediment. On-site construction oversight and water quality monitoring by TNC, as well as conservation measures and construction BMPs would minimize the possibility of this occurring, but it cannot be completely dismissed.

**No Action**
Under the No-Action Alternative, the two federally listed fish species discussed, and their habitat, would likely remain unchanged or possibly decline as riparian vegetation diminishes, water quality and habitat degrades, and water temperatures possibly increase. Because flows in the river are highly regulated, changes in regulated flow regimes, particularly sustained increases, could result in some positive environmental effects independent of the Proposed Action, including improved cottonwood recruitment and cooler water temperatures.

### 3.2.4 Terrestrial Wildlife

**Affected Environment**

The proposed restoration sites contain vegetative communities and complexes typical of the lower Truckee River east of Vista, including remnant wetlands, cottonwood-willow riparian forest, riparian shrubs, ponds (Tracy), and freshwater marshes, as well as upland shrubs (sagebrush, rabbit brush), agricultural fields, and extensive areas of non-native plants such as tall whitetop and cheat grass.

Riparian vegetation and associated wildlife habitat has been severely degraded by human activities over the past 150 years, including conversion to agricultural uses, livestock grazing, commercial and residential development, water diversions, and flood control modifications. An estimated 87% loss of riparian vegetation between Sparks and Pyramid Lake has occurred (U.S. Bureau of Reclamation 2008, U.S. Fish and Wildlife Service 1995) and a 70% decrease in riparian forest cover since 1939 (U.S. Fish and Wildlife Service 1995). With the exception of recently restored areas, much of the existing quality riparian wildlife habitat in the lower Truckee River has been reduced to relict patches. In many areas, including the proposed restoration sites, the herbaceous cover in the riparian areas is dominated by non-native invasive species such as tall whitetop.

Riparian habitat accounts for a very small percentage of land area in the Great Basin region, but contains a majority of the total native wildlife species, including many rare species. For this reason, restoration of riparian habitat is a priority and emphasis for the proposed project. Appendix A contains a list of special status species that may be found in or near the proposed project area.

Two species that are candidates for federal listing under the ESA and may occur in or near the proposed project area were mentioned in the August 30, 2011, letter from the U.S. Fish and Wildlife Service to Reclamation. Those species are the greater sage grouse *(Centrocercus urophassianus)* and the yellow-billed cuckoo *(Coccyzus americanus)*. In addition, the U.S. Fish and Wildlife Service requested consideration of the bald eagle, golden eagle, and migratory birds in the project design or this analysis. Each of these species or species groups is discussed in this section.

**Yellow-billed Cuckoo**

The yellow-billed cuckoo, western U.S.DPS was petitioned for listing on February 9, 1998. A 12-month petition finding published on July 25, 2001 (66 FR 38611), determined that the western populations comprised a Distinct Population Segment (DPS) and placed the species on the candidate list for future action under the Endangered Species Act. The most recent Federal Register citation is the November 10, 2010, annual review (75 FR 69222 69294). The listing priority number is 3, magnitude is High, and immediacy is Imminent.

The yellow-billed cuckoo west of the Rocky Mountains is associated with large blocks of multi-story riparian forest. A dense understory and the presence of Fremont cottonwoods and willows appear to be critical factors. The birds apparently require the relatively moist and cool conditions of large (50 to 200+ acres), dense (>50% canopy closure) stands of riparian forest adjacent to water. Fragmentation of suitable habitat limits efforts to recolonize this species (GBBO 2012).

Western yellow-billed cuckoos historically bred throughout riparian systems of western North America, inhabiting the deciduous riparian woodlands adjacent to rivers and streams. Populations declined to remnant levels following 20$^{th}$ century loss, degradation, and fragmentation of riparian habitat from activities including conversion to agriculture, urban development, flood control construction, reservoir inundation, water diversion, livestock grazing, and non-native plant invasion. Habitat loss on wintering grounds may have also contributed to the dramatic population decline. In Nevada, breeding populations are limited to a few locations in southern Nevada. Sightings in western and northeastern Nevada are sporadic and attributed to nomadic non-breeding individuals (GBBO).

Conservation strategies include restoration of Great Basin lowland riparian habitats (including the Truckee River), natural recruitment of cottonwoods and willows, and removing cattle (GBBO 2012), actions conducted by TNC and partners on the lower Truckee River since 2003 and proposed in the current project.

The 1868 study (Ridgeway 1877) recorded the yellow-billed cuckoo as rare. No lower Truckee River detections were documented from 1972 to 1976 from Klebenow and Oakleaf (1984, as cited in U.S. Bureau of Reclamation 2008), for 1998 and 2001 - 2003 from the Great Basin Bird Observatory (GBBO) baseline study (GBBO 2006), or from the ongoing (through 2010) annual GBBO surveys on the lower Truckee River, which includes an intensive survey at TNC's McCarran Ranch. Nonetheless, the yellow-billed cuckoo remains on the 2006 priority list of birds used to evaluate the condition of Truckee River riparian areas. Large-scale restoration of contiguous suitable habitat along multiple reaches of the

lower Truckee River will be needed before the yellow-billed cuckoo colonizes the lower river, and is regularly detected in surveys, but it is an important goal of the TNC's restoration program.

**Greater Sage-grouse**

The greater sage grouse was placed on the candidate list for future action under the Endangered Species Act following a 12-month status review which was published in the Federal Register (75 FR 13910). The following information is largely excerpted from the 2004 Nevada Department of Wildlife's Greater Sage Grouse Conservation Plan for Nevada and Eastern California (Nevada Department of Wildlife 2004).

Sage grouse occurs throughout the northern two-thirds of Nevada in sagebrush-dominated vegetation communities. Sagebrush and potential sage grouse habitat occurs in the proposed project area, generally on former floodplains where historic riparian vegetation was replaced by sagebrush communities following human-caused changes to the river channel.

Sage-grouse are considered a sagebrush ecosystem obligate species. Obligate species are those species that are restricted to certain habitats or to limited conditions during one or more seasons of the year to fulfill their life requirements. Sage-grouse are only found where species of sagebrush exist. Sagebrush species provide nesting, brood, and fall/winter cover as well as forage throughout the year.

Male sage-grouse congregate in late winter through spring on leks to display their breeding plumage and to attract hens for mating. As defined by Connelly et al. (2003), a lek is a traditional display area where two or more male sage-grouse have attended in two or more of the previous five years. The area is normally located in a very open site in or adjacent to sagebrush-dominated habitats. Taller sagebrush on the outskirts of the leks is necessary as a food source, escape cover, nesting cover for females, and loafing cover during the day.

Sage-grouse habitat, when considered over the period of a year, consists of a variety of habitats or habitat conditions over a large area. A mosaic of these habitat types or conditions must be available on the landscape to provide all of the sage-grouse seasonal cover and nutritional needs. Adequate grass and forb cover is an important component to nesting and early brood rearing habitats for both forage and concealment from predators.

The risk factors affecting sage-grouse and sage-grouse habitat include habitat quantity, habitat quality and nutrition, wildfire, habitat fragmentation, livestock grazing, wild and free roaming horses, predation, changing land uses, hunting and poaching, disturbance, disease, pesticides, cycles, and climate/weather. Of these risk factors, habitat quantity, habitat quality, and wildfire have affected Nevada sage-grouse populations the most (Nevada Department of Wildlife 2004).

Habitat quantity has been reduced because of pinyon-juniper encroachment and changes in the plant community from sagebrush to annual grasses due to high severity wildfire. Habitat quality has been reduced due to invasion of exotic annuals and other invasive weed species,

improper grazing management systems, and wild horse over-utilization (Nevada Department of Wildlife 2004).

Limited areas of sagebrush occur in the Tracy Power Plant and West McCarran proposed project sites. These areas are in historic floodplains that were colonized by sagebrush when the Truckee River became disconnected from the floodplain. Bureau of Land Management records indicate a Population Management Unit north of Interstate-80, but no sage-grouse leks within seven miles of the proposed project area (John Wilson pers comm. 2011).

Birds show a greater preference for specific types of riparian habitats than do other wildlife species on the Truckee River (U.S. Bureau of Reclamation 2008) and are an indicator of response to restoration efforts. Riparian corridor width and riparian forest patch size are apparent thresholds for some species. The latter may explain, in part, why the yellow-billed cuckoo has not recolonized the lower Truckee River. The small, narrow patches of riparian forest along the Truckee River, with little to no understory, may also make it easier for brown-headed cowbirds to locate and lay their eggs in the nests of other birds (obligate brood parasitism). Brown-headed cowbird brood parasitism has the potential to impact populations of the host species (Mayfield 1977, as cited in U.S. Bureau of Reclamation 2008). The abundance of cowbirds has increased sharply in the past 100 years, and they are now common throughout the lower Truckee River (Ridgeway 1877; Lynn et al., 1998). Ten songbird species observed along the lower Truckee River in 1992 and 1993 are frequent or common cowbird hosts (Lynn et al., 1998). Three of these (willow flycatcher, chipping sparrow, rufous-sided towhee) appear to have declined in abundance or disappeared along the river since 1868.

Certain species require large-diameter trees for nesting and/or roosting. Along the Truckee River, sapsuckers, downy woodpeckers, and northern flickers require large cottonwoods in which they excavate their own nest cavity (primary cavity nesters). These species are important because their nest sites are subsequently used by secondary cavity nesters (occupy cavities excavated by another species). Along the lower Truckee River, native secondary cavity nesters compete with introduced (non-native), secondary cavity nesting species (house sparrow and European starling).

TNC has collaborated with the Great Basin Bird Observatory for a landbird baseline inventory on the lower Truckee River and annual monitoring reports (GBBO 2006). This on-going, intensive study, which began in 1998, is providing valuable information about bird habitat relationships and population trends. GBBO is also providing TNC with focused data for TNC's McCarran Ranch property and other TNC restoration sites, which tracks species recovery trends following restoration projects. Ten species were prioritized for evaluating the condition of lower Truckee River riparian areas. Nine of the species are indicators of improved habitat conditions, each with varying degrees of difficulty to restore and different habitat requirements. Three species (willow flycatcher, yellow-billed cuckoo, and western bluebird) are likely to be detected only when large, connected mosaics of high quality riparian habitat are restored to the lower river.

GBBO used historic data sets, including the 1868 Clarence King expedition (Ridgeway 1877) and the approximate resurvey of Ridgeway's sites in the 1970s by Klebenow and Oakleaf

(1984, as cited in U.S. Bureau of Reclamation 2008). Birds that experienced the greatest losses during that 100-year period were species whose life history is closely linked to riparian and wetland habitats. For instance, American widgeon, gadwall, western and eared grebes, American bittern, long-billed curlew, American avocet, black-necked stilt, black-chinned hummingbird, marsh wren, common yellowthroat, yellow-breasted chat, and song sparrow were absent in the 1970s after being ranked "common" or "abundant" in 1868 (GBBO 2006).

In a mid-1990s survey, Morrison (1993, as cited in U.S. Bureau of Reclamation 2008) reported 87 species. In 1998, and 2001 to 2003, GBBO recorded 120 species. The more recent surveys detected 75% of the 1868 species, but also found new species, many of which are associated with human landscapes and agriculture. However, improvement in flow regimes in the past decade has led to new areas of early successional riparian forest and emergent wetlands, with an apparent genuine response in birds associated with those habitat types. Thus, the majority of species that have begun to recover since the 1970s are linked to habitat changes from supplemental in-stream flows.

The rich historic data sets and current intensive surveys by GBBO provide an unusual opportunity to trace changes to the river environment over time to changes in breeding and migratory bird populations. These studies are valuable to TNC in gaging the effectiveness of restoration projects to overall recovery of riparian-dependent species and species of special concern.

The 2010 GBBO inventory found 79 species, including 45 riparian-associated species, on point counts covering much of the lower Truckee River, and 18 and 20 breeding species at each location (GBBO 2011). The most abundant birds in the point count surveys were species known to be tolerant of disturbance. The results from the past four years have showed relatively little change, possibly because of a drought that ended in 2010 and the aftereffects of West Nile virus introduction. However, 2010 results included breeding yellow warblers, wood ducks, and common mergansers. The 2009 survey included a breeding season sighting of willow flycatcher at Mustang Ranch (restored that year). Absent from McCarran Ranch prior to restoration, breeding yellow warblers are consistently being detected in recent surveys, a positive indicator of restoration.

The fall migration bird banding in 2009 and 2010 at McCarran Ranch showed similar results, providing documentation that the restored riparian areas provide important stopover areas for about 40 species of birds that migrate to Mexico, Central and South America. The area also appears to provide an altitudinal migration corridor for coniferous birds of the Carson Range. Appendix B contains a list of migratory birds captured on the lower Truckee River in GBBO's 2010 migration banding study (GBBO 2011).

Riparian areas provide open water, cool temperatures, and moist soils and microclimates that are important for amphibians (Brode and Bury, 1984; Jennings, 1996, as cited in U.S. Bureau of Reclamation 2008). Riparian areas provide breeding sites, areas of escape, and foraging sites for amphibians. In wet years, high flows may inundate areas away from the main river channel and provide temporary breeding ponds for amphibians if the water persists during egg and larvae development. The relative amount of emergent wetlands and pond-like areas is indicative of potential amphibian breeding habitat along the Truckee River.

The reach between Derby Dam and Pyramid Lake contains the highest observed species diversity of amphibians in the Truckee River system because of sufficient breeding and adult habitat, including ponds for egg and larvae development and a diversity of aquatic and emergent vegetation for cover (Panik, 1992; Panik and Barrett 1994; Ammon 2002, as cited in U.S. Bureau of Reclamation 2008). Bullfrogs, Pacific tree frogs, and western toads are found in this reach. Northern leopard frogs, once common in Nevada, were recorded at only one field site in 1992 (Panik, 1992, as cited in U.S. Bureau of Reclamation 2008). The species is currently known to occur at McCarran Ranch.

Northwestern pond turtles inhabit the Truckee River downstream from Reno in off-channel wetlands, such as permanent oxbows that have been disconnected from the river (Ammon, 2002). Other reptile species are thought to occur in the riparian scrub community. Western terrestrial garter snake, western fence lizard, and western aquatic garter snake are the most common. The abundant invertebrate population associated with the riparian scrub plant community provides an important food source for these animals.

Wetland mammals known or expected to occur along the Truckee River and tributaries include muskrat, mink, water shrew, beaver, and river otter. Other mammals, including shrews, insectivorous bats, raccoons, and skunks, may forage on the abundant invertebrates associated with emergent wetlands. Historically, river otters occurred throughout the Truckee River system; however, they are currently believed to be present only along the Truckee River near Wadsworth. Deer also use scrub-shrub wetlands along the Truckee River for cover, forage, and fawning. A number of small, scattered resident mule deer herds occur from Reno to Pyramid Lake.

The cottonwood forest along the lower and middle Truckee River provides habitat for mammals that otherwise would not be expected to occur at this elevation, including the mountain cottontail, western harvest mouse, long-tailed vole, western jumping mouse, bushy-tailed woodrat, porcupine, raccoon, long-tailed weasel, and skunk.

Cavities in cottonwood snags (dead trees) serve as den or resting sites for mammals, such as bats, spotted skunks, raccoons, and weasels. Rodents, rabbits, foxes, raccoons, weasels, skunks, and otters use downed logs as hiding, feeding, and/or nesting areas. Riparian forests along the lower Truckee River provide cottonwood snag and log habitats. Recruitment and retention of large cottonwood trees is an important consideration in riparian forest restoration because of the habitat requirements for a variety of bird, reptile, amphibian, and mammal species.

The riparian zone provides an important corridor for wildlife moving from one habitat or geographic area to another and for seasonal movements between high- and low-elevation areas. Connectivity between reaches of the river with functional riparian habitat is an important component of restoring new areas, as the riparian corridors will be more quickly colonized by native wildlife species if they are able to move into the new areas from adjacent habitat.

Bald eagles, except for those that occur in the Sonora Desert in central Arizona, were removed from protection under the Endangered Species Act on August 8, 2007 (72 FR

37346). However, they are still protected under the Bald Eagle and Golden Eagle Protection Act and are listed as a protected species under the Migratory Bird Treaty Act. Bald eagles nest in large trees and on cliffs, often near large water bodies. Winter roosts commonly are large trees and other sheltered sites. Bald eagles feed primarily on fish but will prey on injured waterfowl, various small mammals, and carrion.

In the Great Basin Bird Observatory baseline report for the lower Truckee River (GBBO 2006) bald eagles were considered rare in the historical 1868 survey and were not reported in the more recent surveys documented in the baseline study (1972-1976, 1998, 2001-2005). Bald eagles were not detected in the GBBO's 2007 or 2008 survey, but in the 2009-2010 survey, one bald eagle was sighted on January 10, 2010, and at least one individual was seen or heard incidentally between surveys (GBBO 2010). Bald eagles would be unaffected or possibly positively affected by longer-term effects of the restoration work by preserving existing large cottonwood trees and providing future riparian forest recruitment.

Golden eagles were not detected in the 1868 or the 1972-1976 surveys, and were noted as 'rare" in the 1998 and 2001-2003 surveys (GBBO 2006). At least one individual was seen or heard incidentally between surveys as noted in the 2009-2010 report (GBBO 2010). It is possible that a combination of insufficient cliff habitat and prey base exists in the lower Truckee River corridor limits golden eagle use. A high level of human disturbance is also present (Interstate 80 and the railroad) along most of the reach, which could also limit golden eagles.

The Migratory Bird Treaty Act (MTBA) (16 U.S. C. 703 et seq.) enacts the provisions of treaties between the United States, Great Britain, Mexico, Japan, and the Soviet Union and authorizes the Secretary of the Interior to protect and regulate the taking of migratory birds. It establishes hunting seasons and capture limits for game species and protects migratory birds, their occupied nests, and their eggs (16 USC 703, 50 CFR 21, 50 CFR 10).

Many bird species currently and historically found in the lower Truckee River are migratory. Comprehensive lists can be found in the GBBO baseline and annual reports (GBBO 2006, 2010, 2011). Recent data from the 2009 and 2010 fall migration study at McCarran Ranch are in Appendix B. In general, migratory birds are slowly returning to the restored areas of the lower Truckee River.

In their 2010 report, the GBBO discussed fall migration bird banding results from recently restored sites at McCarran Ranch (GBBO 2010). The report points out that the fall migration period highlights the importance of intact lowland riparian habitat for not only the species that use them for nesting, but also their equal or greater significance to species that require them for fuel-up during migration. Species such as yellow-rumped, orange-crowned, and Nashville warblers, Cassin's vireo, and ruby-crowned kinglet, nest in habitats and geographic regions that are long distances away from McCarran Ranch, and they stop over at the ranch for rest and fat accumulation during their journey to Mexico and Central America. Also notably, some of the restoration target species, such as yellow warbler and willow flycatcher are stopping over during their migration from other regions. Their presence during migration is

important, because it is generally assumed that this is the time when a bird learns of newly available habitat patches that can be used for nesting once they become suitable.

## Environmental Consequences

***Proposed Action alternative***

Restoration work would result in major change to existing wildlife habitat. Based on the results of similar restoration projects in the lower Truckee River, large areas of historic floodplain currently supporting upland plant communities, non-native invasive plants, and agricultural fields, would be converted to a mosaic of riparian habitats. The changes to early successional vegetation would be relatively rapid, within one to three years, depending on weather, river flows, and the intensity and success of active (artificial) regeneration methods. Changes to mid- and late-seral vegetation would take decades, especially if relict patches of riparian forest were not present or at a very low level.

Most special status species discussed in the Affected Environment section or listed in Appendix A would benefit from habitat restoration over the long-term. Some individual animals could be impacted. Expected impacts to terrestrial species would be temporary and primarily related to construction-related activities such as noise and disturbance. Impacts to the sensitive species are expected to be minimal if BMPs and mitigation measures are implemented. Adverse effects may occur to individuals, but no significant adverse effects would be expected to accrue to populations, or would the Proposed Action create trends toward the listing of species as threatened or endangered. Displaced or disturbed animals are expected to return to the area after construction is completed. Further, the proposed restoration and enhancement activities are expected to increase the quality of the foraging habitat and the quality and quantity of the species' prey base. The creation of variable habitats, such as wetlands, grasslands, and the shrub and woodland areas, for example, would benefit the majority of the special status species.

Bird response to positive change in riparian vegetation is being tracked by intensive surveys by the GBBO in previously restored areas. The results reflect changes to vegetation from TNC restoration projects, but also from more favorable river flows that also have resulted in improved riparian vegetation. Within five years following restoration work or altered flow patterns, consistent positive changes in bird species composition are being detected, including increased use by breeding birds and migrating birds.

Response of birds requiring late-seral habitat or large, connected patches of complex riparian habitat has not yet been detected, as expected. The return of species such as the willow flycatcher, yellow-billed cuckoo, and western bluebird are anticipated when sufficient contiguous habitat has been created. That condition is more likely to occur when restoration is completed on the "gap" reaches in the Proposed Action, and riparian vegetation has had time to mature and increase in complexity.

Restoration of the proposed sites would be unlikely to affect golden eagles. In past TNC restoration projects, high levels of vole damage to riparian vegetation have been prevented by a variety of cultural and mechanical methods, but sometimes by baiting with zinc phosphide,

a rodenticide (TNC 2005). Zinc phosphide is a non-anticoagulant rodenticide with few adverse secondary effects (U.S. Environmental Protection Agency 2004).

The response by species other than birds has not been documented by the TNC studies. However, anecdotal evidence shows most native amphibian, reptile and mammal species recolonize relatively soon, especially if refugia exist and restored areas are connected sufficiently to allow safe movement.

***No action alternative***
Wildlife populations and habitat would remain the same or change in ways unrelated to the proposed restoration work. Riparian habitat would remain limited and of generally poor quality. Desired wildlife species, particularly those dependent on riparian communities, would not be expected to increase in diversity and numbers. Historic floodplains would continue to be dominated by upland desert vegetation, agricultural crops, and non-native weeds, and would be used by wildlife species adapted to these vegetation types. Species dependent on large contiguous areas of riparian vegetation would not benefit from the connectivity that would have been created by the three proposed restoration sites.

### 3.2.5 Air Quality and Greenhouse Gases

A comprehensive air quality analysis of the affected environment and environmental consequences for the 2008 and 2009 restoration projects was done by North State Resources (NSR) in their work on the EA (U.S. Bureau of Reclamation and the Bureau of Land Management 2008b). Monitoring did not show any unexpected deviations from the projected equipment use and air quality impacts.

The three sites in the Proposed Action of this EA would be within the same reach of the lower Truckee River as the prior projects, would involve fewer river miles and floodplain acres, and would utilize more passive methods for some aspects of the restoration work (i.e., fewer equipment hours). Therefore, the 2008 NSR analysis is incorporated by reference for this project.

The 1977 federal Clean Air Act (CAA) requires the Environmental Protection Agency (EPA) to identify National Ambient Air Quality Standards (NAAQS) to protect public health and welfare. NAAQS have been established for the following criteria air pollutants: ozone ($O_3$); carbon monoxide (CO); nitrogen dioxide ($NO_2$); sulfur dioxide ($SO_2$); suspended particulate matter ($PM_{10}$ and $PM_{2.5}$); and lead (Pb). Washoe County is currently designated moderate non-attainment for CO and serious non-attainment for the 24-hour $PM_{10}$ standard. EPA has not designated Storey County non-attainment for any of the criteria air pollutants.

Construction-related emissions would come from diesel and gasoline-powered vehicles and equipment. A short-term increase in pollutants, including reactive organic gases, particulate matter, ozone, nitrogen oxide, and sulfides, would occur from use of equipment and vehicles during construction and follow up revegetation work (e.g., irrigation pumps). The Proposed Action is not expected to violate any air quality standards or expose sensitive receptors to significant levels of air pollution. Construction vehicles and equipment, however, would

temporarily contribute to existing problems with CO and $PM_{10}$, and diesel-powered motors and generators, other equipment, and vehicles would generate pollutants after construction. Accordingly, the mitigation measures listed in the air quality section of the Environmental Commitments (Section 2, Proposed Action alternative) should be implemented to minimize air quality emissions during construction and subsequent maintenance activities.

Climate change implies a significant change having important economic, environmental, and social effects in a climatic condition such as temperature or precipitation. Climate change is generally attributed directly or indirectly to human activity that alters the composition of the global atmosphere, additive to natural climate variability observed over comparable periods.

Greenhouse gases in the atmosphere allow short wavelength solar radiation to pass through the atmosphere to reach the earth's surface, but absorb the longer wavelength heat that is radiated back into the atmosphere from the earth. The concentration of greenhouse gases in the atmosphere has an effect on the average temperature at the surface of the earth. If the atmospheric concentration of greenhouse gases decreases over time, then more heat will escape through the atmosphere, and the average temperature at the earth's surface will go down. If the greenhouse gas concentration in the atmosphere increases, however, less heat will escape to outer space and the average temperature at the earth's surface will increase.

The greenhouse gas of interest in the proposed project is carbon dioxide ($CO_2$) because it is a combustion product of vehicle and equipment fuel burning.

Based on methodology in the 2005 document for a 100-acre restoration project at TNC's McCarran Ranch (U.S. Army Corps of Engineers and The Nature Conservancy 2005), the total number of engine hours by equipment type and miles driven by service trucks and worker vehicles was estimated for the 190 acres in the proposed project. Using the GreenDOT spreadsheet calculator (AASHTO 2010) the amount of $CO_2$ was projected for a "high level" (active, intensive restoration methods) and "low level" (less intensive, more passive restoration methods). Mitigations for idling and preventive maintenance were used as assumptions.

Projected total $CO_2$ emissions over the length of the project (2 to 3 years) for all three sites are estimated to be approximately 836 metric tons for the "high level" project and 172 metric tons for the "low level" project.

The estimated carbon dioxide generated by the construction activities in the restoration project would be similar to that of construction on 190 acres. The amount of $CO_2$ would be lessened by mitigation measures such as minimizing equipment idling and keeping equipment well maintained. Emissions would be short-term in duration and significantly outweighed in the long term by growth and preservation of vegetation that stores (sequesters) carbon, such as large gallery forests of cottonwood, and dense patches of willow and other riparian vegetation.

### 3.2.6 Climate and Geology

**Affected Environment**

The climate of the lower Truckee River basin is characterized by long, dry winters, and short, dry summers. Temperatures in the lower basin are moderate, with a yearly average temperature of 52 degrees Fahrenheit (ºF), which includes an average high of 68 ºF and average low of 36 ºF. The hottest months are June through September with an average temperature of 67 ºF. The eastern slopes of the Sierra Nevada are drier than the western slopes, with an annual average precipitation level of 8.5 inches. Precipitation and snowfall are greatest during the months of December through March.

Summer wildfires are common in the lower Truckee basin because of combination of several risk and hazard factors. Dry lightning is an ignition source in late summer when thunderstorms pass through the area with wind and no precipitation. Interstate 80, the railroad, and residential areas (wildland-urban interface) are examples of human factors that contribute to ignition risk. A major hazard is the widespread invasion of disturbed Great Basin shrub areas by cheatgrass, an introduced annual grass. Areas dominated by cheatgrass tend to burn more frequently and have more rapid rate of fire spread, often causing fires to move quickly into other vegetative types, such as riparian areas. Cheatgrass is present in areas proposed for restoration and in adjacent upland shrub stands.

The lower Truckee River is located in a transitional region between the Basin and Range Province and the Sierra Nevada Province. The proposed project area is a valley, where elevations of the valley bottoms range from 4,000 to 6,000 feet, and the elevation of the adjacent mountains range from 6,000 to 10,000 feet. Elevations in the project area along the river are 4,200 to 4,300 feet.

The geological setting north of the Truckee River in the Pah Rah Range is mostly basalt, rhyolite, and sedimentary rocks with some outcroppings of Kate Peak Formation that includes flows, flow breccias, tuff breccias, mudflow breccia, agglomerate, volcanic conglomerate and associated intrusive ranging in composition from pyroxene andesite to rhyodacite (Bonham 1969). The northern section of the Virginia Range south of the River contains large amounts of the Kate Peak Formation, as well as basalt, andesite, and rhyolite flows. River shore deposits in the narrow section of the Lower Truckee River Canyon near the West McCarran Ranch Parcel include basalt and andesite flows; whereas, the Tracy Parcel contains stream deposits, talus, slope wash, alluvial fans, and aeolian deposits as well as lake deposits, clay, silt, sand, gravel and calcareous tufa (Bonham 1969, as cited in ASM 2011).

Seismic activity in the project area is considered moderate. Thirteen earthquakes of magnitude 6 or greater have occurred in the region since 1850. The dominant seismic feature is the Walker Lake fault zone, a major northwest-trending tectonic system that includes Owens Valley and Death Valley, and is characterized as a right-lateral strike-slip shear zone (dePolo et al. 1997 as cited in Otis Bay Ecological Consultants 2007; Bell et al.1999).

**Environmental Consequences**

The Proposed Action is influenced by the geologic and topographic conditions of the region; however, these environmental areas would not be associated with significant effects affecting

implementation of the Proposed Action. Construction activities would temporarily disturb soils during excavation of new meanders, construction of wetlands and riffle structures, and channel reconstruction. Erosion control and maintenance measures, incorporated in the Proposed Action and identified in this EA in Section 2, would reduce adverse impacts.

### 3.2.7 Transportation and Traffic

The major transportation routes near the project sites are Interstate-80 and the Union/South Pacific Railroad located due north of the Proposed Action project sites. This section of I-80 had an average annual daily traffic volume of an estimated 28,000 vehicles in 2010 (Nevada DOT 2012).

Current access to the West McCarran Ranch site is mainly by foot or authorized vehicles. Access from the east is through BLM's Mustang Ranch property (from the I-80 Mustang exit), which is fenced to vehicular traffic; access from the west is via the I-80 Patrick exit, along the frontage road to the railroad tracks, then across the private railroad crossing and a gravel road which parallels the river.

Current public access to Tracy is limited. Access from the south is via Waltham Way and through the NV Energy security gate. Access from the north is on the frontage road and through a locked NV Energy gate. Both access routes are via the USA Parkway exit from I-80. The gravel roads at both sites are used by a limited number of authorized personal and commercial vehicles, and by users of the Tahoe-Pyramid Bikeway at the Tracy site.

I-80 access to the Upper Mustang site is from the Mustang exit, then south and west along a road south of the river or from Lockwood to the west. The property would not have public access until it is acquired by TNC and restoration work is complete. The existing road would be relocated farther south as part of the restoration plan.

Construction activities would require a number of trucks and worker vehicle trips on I-80 and the gravel roads leading to and from the proposed restoration project areas. Prior to construction, loads of rock, cobble, and other material would be delivered to the project sites and stored at the staging areas and designated on-site storage areas. Material would be hauled for the first few months of construction. During construction, most of the construction equipment would be kept on-site. Any increase in vehicular traffic would be small (10 to 15 vehicles). Because the work would be conducted near the stream channel and away from roadways, little to no disruption of traffic flow would occur. Current access locations from public roadways would be adequate for construction. No new permanent access roads would be needed for construction, operation, or maintenance purposes. Most temporary access roads at the restoration sites would be abandoned and revegetated after project restoration work has been completed, unless needed for long-term (controlled) access and maintenance. Post-construction activities (i.e., revegetation, maintenance, and monitoring) would require intermittent access for 3 years.

TNC expects to open the West McCarran property to the public following restoration work in 2012 or 2013. A trail would go through the west portion of the McCarran Ranch property, connecting the BLM-owned Mustang Ranch property on the west with the rest of the trail system on the east half of the McCarran Ranch property. The trail will be part of the Tahoe-

Pyramid Bikeway project, part of a nine-mile stretch of the bikeway project through this reach of the river.

The Upper Mustang property is expected to be open to the public following restoration. Recreation opportunities would be primarily hiking and wildlife observation. Unlike the Tracy and West McCarran sites, the developed Tahoe-Pyramid Bikeway would not traverse the Upper Mustang site.

Post-restoration, the Tracy site would remain open to users of the 9-mile stretch of the Tahoe-Pyramid Bikeway. The Bikeway passes through NV Energy land at the Tracy Power Plant site, but similar to the current situation, no additional public access is planned.

Restoration would make the sites more attractive to visitors such as hikers, birders, and bicyclists, particularly at West McCarran. This could result in a minor increase in bike and foot traffic, but little or no change to vehicle traffic patterns. The increase in traffic from construction would be temporary, generally less than 3 years. The Proposed Action would not be associated with significant transportation or traffic issues.

### 3.2.8 Visual Quality

Visual quality is determined by aesthetic attributes such as form, color, line, mass, and texture that comprise the overall visual character of a scenic vista. High visual quality typically exists in areas where views are rare, unique, or in other ways notable, such as in remote or pristine environments. Highly sensitive views would include landscapes that consist of landforms, vegetation, water bodies, rock formations, or other features of unusual or outstanding quality (i.e., natural coastlines, streams and other river corridors, designated historic districts, and designated scenic vistas and byways). How frequently a scenic vista is viewed and whether the views are short-range, mid-range, or long-range are also importance determinants of viewshed sensitivity.

According to the Washoe County Comprehensive Plan (Washoe County 1994), the project area is designated as a scenic corridor. The Truckee River flows through a valley characterized by dry grasslands and sagebrush scrub; the slopes of the mountains are dry and barren. Stands of cottonwoods are located near the river, but non-native herbaceous vegetation such as tall whitetop dominates the area. The general visual quality near the West McCarran and Upper Mustang restoration project is moderate, based on natural landscapes, the low-level of development, proximity to I-80, and presence of utility lines, roads, and other signs of human occupation. The visual quality at the Tracy Power Plant site is low because of the dominance of the power plant infrastructure midway between the two areas proposed for major restoration work. Primary views of the project areas are from I-80 and, to a lesser extent, from local gravel access roads.

Implementation of the Proposed Action would be associated with changes in the visual environment. Construction vehicles and activities would be associated with minor, temporary changes in views, including the potential creation of air-borne dust. Over the longer term, the increase in vegetation and habitat structure would improve the local viewsheds. The Proposed Action can be expected to improve the visual quality by replacing tall whitetop, agricultural fields, and scrub-shrub fields with riparian forest, wet meadows, and emergent

wetlands. The environmental consequences in the long term (for example, in terms of views from I-80) are expected to be beneficial.

### 3.2.9 Noise

The primary sources of noise in the project area are traffic on Interstate-80 and freight and passenger trains on the Union/South Pacific Railroad. Sensitive receptors in the project vicinity include industrial employees who work at the Tracy Power Plant, a ranch house adjacent to the Upper Mustang project site, and wildlife.

Construction activities would result in short-term increases in noise levels that could affect nearby sensitive receptors. In order to minimize noise impacts, construction equipment would be equipped with standard noise-reducing devices. Construction contractors would be responsible for providing personnel with required hearing protection during operation of construction equipment. Hearing protection would comply with federal and state standards. Wildlife affected by the noise may be temporarily displaced, but would be expected to return following completion of the restoration work.

Both Washoe County and Storey County specify noise standards in their planning documents and zoning codes, and temporary construction activities are exempt in both counties. Construction activities in Storey County are exempt from the decibel limits found in the county ordinance as long as human health is not adversely affected. Construction activities associated with the Proposed Action would not cause health problems because of the limited number of sensitive receptors in the project area. Washoe County's Development Code (Washoe County 2004) specifies that temporary construction, repair, or demolition activities occurring between 7:00 a.m. and 7:00 p.m. on any day except Sunday are exempt. Construction activities would occur on weekdays between 7:00 a.m. and 7:00 p.m.

No significant adverse effects from noise are anticipated. The project sites are located in relatively isolated areas with moderate levels of ambient noise from the railroad, interstate highway, and power plant. The construction-related noise would be limited to weekdays during daylight hours, over a period of weeks. Several similar projects in the same general area since 2003 did not result in complaints about excessive noise.

### 3.2.10 Land Use

TNC's McCarran Ranch was purchased in 2002 with the expressed purpose and intention to restore the channel, wetlands and riparian forest, and undo the damage of the 1960s flood control project. The proposed West McCarran project site is fully compatible with that purpose. Following the initial restoration work, conservation, preservation, and compatible recreation activities (e.g., hiking, wildlife watching, environmental education, biking) would become the predominant land use emphasis.

The current land use of the Upper Mustang site is agriculture. After acquisition of the Upper Mustang property by TNC and subsequent restoration work, land use would be comparable to McCarran Ranch (conservation, preservation).

The Tracy Power Plant site is owned and operated by NV Energy. The public has access only via the Tahoe-Pyramid Lake Bikeway corridor through the property. Using a restoration easement with NV Energy, a portion of the power plant site would be restored by TNC. Access to the Tahoe-Pyramid Lake Bikeway would remain, but the trail would be relocated as part of the restoration work. Public recreation access would remain limited to the bike path.

### 3.2.11 Socioeconomics and Environmental Justice

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (59 Federal Register 7629, 1994) requires that federal agencies analyze their programs to assure that they do not disproportionately affect minority, low-income populations, or Indian tribes.

The project area is located east of the cities of Reno and Sparks, within Storey County and Washoe County. The West McCarran Ranch site is located on lands owned by TNC, the Tracy Power Plant site on lands owned by NV Energy, and the Upper Mustang site is in the final stages of acquisition by TNC. No publicly owned lands are proposed for restoration in this EA. None of the sites is located adjacent or near an established community or individual residences. Two Indian reservations and one Indian colony are located relatively near the restoration sites in the Proposed Action. The Reno-Sparks Indian Colony is located in Reno within city limits, with a unit in the Hungry Valley area. The Pyramid Lake Indian Reservation surrounds Pyramid Lake and the lower reach of the Truckee River and includes the communities of Sutcliffe, Nixon, and Wadsworth. The Fallon Paiute-Shoshone Indian Reservation is located in Churchill County in west-central Nevada, approximately 10 miles northeast of Fallon.

According to the U.S. Census Bureau, the 2006 estimated population for Washoe County is 396,428. The majority of people live in the cities of Reno and Sparks. Reno and Sparks have a total population of 205,327 and 84,723 respectively. Approximately 14.4 percent of individuals in Reno and 9.8 percent of the individuals in Sparks fall below the poverty level. The ethnic demographic of Washoe County is 76.4 percent White, 5 percent Asian, 2.3 percent Black or African American, 2.0 percent American Indian and Alaska Native, and 0.1 percent Native Hawaiian and other Pacific Islander. The Hispanic or Latino population in Washoe County is 20.3 percent (because the Census Bureau reports race and Hispanic origin separately, totals do not equal 100.).

Using census data from 2010, Storey County has a total population of 4,010, of which 5.6 percent of individuals fall below the poverty level. The ethnic composition of Storey County is 92.1 percent White, 1.6 percent American Indian and Alaska Native, 1.6 percent Asian, 1.0 percent is Black or African American, and 0.4 percent Native Hawaiian and other Pacific Islander. The Hispanic or Latino population in Storey County is 5.1 percent (U.S. Census Bureau 2010).

The Proposed Action would be beneficial to several tribal interests, such as improvements in water quality and quantity, fisheries, and availability of native plant species for traditional uses. Restoration work would generally benefit the surrounding communities by providing construction-related jobs, future access to recreational opportunities and possible minor

increases in visitor-support services. No disproportionate effects on minorities or low-income populations are associated with the Proposed Action or No-Action alternatives, and no adverse effects related to environmental justice are predicted.

### 3.2.12 Cultural Resources

"Cultural Resources" is a broad term that includes prehistoric, historic, architectural, and traditional cultural properties. Those cultural resources that are included in, or eligible for inclusion in, the NRHP are referred to as historic properties. The criteria for NRHP eligibility are outlined at 36 CFR Part 60.4. Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on historic properties. Compliance with Section 106 of the NHPA follows a series of steps outlined at 36 CFR Part 800. These steps are used to identify and consult with interested parties, determine the area of potential effects (APE) for an undertaking, determine if historic properties are present within the APE, assess the effects the undertaking would have on historic properties, and resolve any adverse effects to historic properties before the undertaking is implemented. The Section 106 process also requires consultation with the SHPO, Indian tribes, and other interested parties. While the ACOE has a role in permitting for the Proposed Action, Reclamation has been designated as lead federal agency for fulfilling the agencies' collective Section 106 responsibilities.

#### Affected Environment

A cultural resources inventory, consisting of a pre-field records search and intensive pedestrian survey, was conducted for the Tracy Power Plant and West McCarran Ranch restoration sites by ASM Affiliates of Reno, Nevada. The purpose of this inventory was to identify cultural resources in the APE and to evaluate the eligibility of those resources for inclusion in the NRHP. This inventory, which was conducted in May 2011, covered a total of approximately 246 acres, an area larger than the current project APE as the final restoration project boundaries had not been determined at that time. A more recent adjustment of the project boundaries at the Tracy Power Plant site has resulted in a smaller overall project footprint and APE (a total of approximately 149 acres) for the purposes of Section 106 compliance.

ASM's inventory of the Tracy Power Plant survey parcel resulted in the identification of two prehistoric archaeological sites, four historic-era archaeological sites and/or features, and one multi-component site. Within this survey parcel, the prehistoric component of the multi-component site and one historic linear feature have been recommended as NRHP-eligible. All other cultural resources in the parcel, with the exception of one unevaluated prehistoric site, have been recommended as not eligible for NRHP inclusion. Three prehistoric and four historic-era isolated finds, which are categorically not eligible for NRHP inclusion, were also identified in the Tracy Power Plant parcel during survey. The two recommended-eligible and one unevaluated resources are located outside of the Tracy Power Plant site APE and will not be impacted by restoration activities. Within the West McCarran Ranch survey parcel, AMS identified two prehistoric archaeological sites, two historic-era sites, and three historic-era isolated finds, all of which have been recommended as not eligible for inclusion in the NRHP.

As there are no historic properties located within the APE at either the Tracy Power Plant site or the West McCarran Ranch site, Reclamation has reached a finding of no historic properties

affected, pursuant to 36 CFR Part 800.4(d)(1), for the restoration activities in these two locations. Reclamation will enter into consultation with, and seek concurrence from, the SHPO on this finding of effect prior to project implementation at the Tracy Power Plant and West McCarran Ranch sites. No ground-disturbing restoration work will be performed at either site until Reclamation has completed compliance with Section 106 of the NHPA. Reclamation will also inform the SHPO of the need for phased Section 106 identification and evaluation efforts for the Upper Mustang property. Once TNC acquires the property, and access to it can be gained, Section 106 inventory efforts similar to those undertaken at the other two lower Truckee River restoration sites will be conducted there as well. Reclamation will complete all NHPA Section 106 compliance for the Upper Mustang property prior to project implementation in that location.

**Environmental Consequences**

Before finalizing this EA and signing a Finding of No Significant Impact, Reclamation will complete Section 106 compliance, including SHPO consultation, related to the Proposed Action at the Tracy Power Plant site and West McCarran Ranch site. Based on the current configuration of the APE in both locations, no historic properties will be affected by the undertaking, meaning the Proposed Action will result in no significant impacts to cultural resources. Reclamation will consult with the SHPO on this finding of effect and, with SHPO concurrence, the proposed restoration work at the Tracy Power Plant site and West McCarran Ranch site may proceed as planned. Once TNC acquires the Upper Mustang property, Reclamation will initiate and complete the Section 106 process for that restoration site. No restoration work will occur on the Upper Mustang site until Reclamation's obligations under Section 106 of the NHPA have been fulfilled for that location.

If cultural resources are encountered during project construction at the Tracy Power Plant site and West McCarran Ranch site, mitigation measures will be followed as described above in Section 2.1.5. and the Section 106 process for post-review discoveries, as outlined at 36 CFR Part 800.13, will be followed. In such cases, restoration work would not resume until Reclamation meets all compliance requirements and provides a written notice to proceed. Similar mitigation measures would apply for restoration work on the Upper Mustang site as well.

### 3.2.13 Indian Trust Assets

**Affected Environment**

Indian Trust Assets are legal interests in property held in trust by the United States government for federally recognized Indian tribes or individual Indians. ITAs can include, but are not limited to, land, minerals, federally reserved hunting and fishing rights, federally reserved water rights, in stream flows associated with trust land, water quality, fisheries, native plants, wildlife resources, and cultural sites. These resources are important for both cultural and traditional practices.

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.

There are four Tribes potentially affected by the proposed project, Pyramid Lake Paiute Tribe—Pyramid Lake Indian Reservation (which includes Pyramid Lake) in Nevada; Reno-Sparks Indian Colony—Reno and Hungry Valley, in Nevada; Fallon Paiute-Shoshone Tribes—Fallon Paiute-Shoshone Reservation and Fallon Colony in Nevada; and Washoe Tribe of Nevada and California.

**Pyramid Tribe/Pyramid Lake Indian Reservation**

The reservation of the Pyramid Lake Paiute Tribe (PLPT), located in Washoe County north of Reno and including Pyramid Lake, presently covers 475,085 acres. P.L. 101-618 affirmed, "All existing property rights or interests, all of the trust land within the exterior boundaries of the Pyramid Lake Indian Reservation shall be permanently held by the United States for the sole use and benefit of the Pyramid Tribe (Section 210[b][1])."

The Federal actions that set aside Pyramid Lake Indian Reservation explicitly reserved Pyramid Lake for the Tribe's benefit. The Pyramid Lake fishery remains one of the cultural mainstays of the Pyramid Tribe. Tribal hatcheries raise LCT and cui-ui and the PLPT is working cooperatively with federal, state, and private agencies to protect spawning areas and improve river access for spawning. The LCT facility supports an excellent fishery; the cui-ui facility is a "fail-safe" operation to maintain the strain in case of catastrophic event (U.S. bureau of Reclamation 2008). Along with conserving fish, the Pyramid Tribe manages and controls fishing and hunting rights on the reservation.

The Washoe Tribe is a federally recognized Indian tribe organized pursuant to the Indian Reorganization Act of June 18, 1934, as amended. The Tribal office is located in Gardnerville, Nevada. The Washoe Tribe has four communities, three in Nevada (Stewart, Carson, and Dresslerville), and one in California (Woodfords). There is also a Washoe community located within the Reno-Sparks Indian Colony. The Washoe Tribe has jurisdiction over trust allotments in both Nevada and California, with additional Tribal Trust parcels located in Alpine, Placer, Sierra, Douglas, Carson, and Washoe Counties. The Washoe Tribe has cultural interests at and near Lake Tahoe but does not exercise any water rights in the Lake Tahoe or Truckee River basins. Tribal history extends an estimated 9,000 years in the Lake Tahoe basin and adjacent east and west slopes and valleys of the Sierra Nevada. The present day Washoe Tribe has deep roots in the past, radiating from Lake Tahoe, a spiritual and cultural center, and encompassing an area that stretches from Honey Lake to Mono Lake (Washoe Tribe 2012).

**Reno-Sparks Indian Colony**

The Reno-Sparks Indian Colony was created in 1916, when 20 acres were set aside in Reno for use by members of the Northern Paiute, Washoe, and Western Shoshone people. An additional 8 acres were added later. Recently, the colony acquired 1,920 acres in Hungry Valley north of Reno. The land is used primarily for residential purposes.

**Fallon Indian Reservation and Colony**

The Fallon Paiute-Shoshone Indian Reservation is located in Churchill County in west-central Nevada, approximately 10 mile northeast of Fallon and 65 miles east of Reno and Carson City. The reservation was created following the General Allotment Act of 1887, when members of the Paiute and Shoshone Tribes were allotted about 31,360 acres in the Lahontan Valley. The lands were located in an area that would become part of the Carson Division of the Newlands Project. Fallon Indian Reservation and Colony land is used for residential and commercial purposes.

For the Proposed Action, Indian trust assets and concerns include, but are not necessarily limited to, land, water quality, water rights, fisheries, native plants, wildlife resources, and cultural sites. These resources are important for both cultural, traditional practice, and financial reasons. The propagation, protection, and gathering of native plant species by traditional Native cultural practitioners is an important concern. The Pyramid Lake fishery remains one of the cultural mainstays of PLPT, and obtaining increased inflow to Pyramid Lake is an important concern.

**Environmental Consequences**

Indian trust assets would be either not affected or positively affected by the restoration of the three sites in the Proposed Action. Opportunities for harvest of native riparian vegetation would be enhanced, as well as access (Upper Mustang, West McCarran), water quality, fish habitat, and wildlife habitat associated with riparian vegetation communities.

### 3.2.14 Cumulative Effects

NEPA requires that federal agencies preparing an EA must consider the cumulative effects of a Proposed Action and other actions. According to the CEQ NEPA Regulations, cumulative effects are those effects that result from incremental impacts of a Proposed Action when added to other past, present, and reasonably foreseeable future actions, regardless of which agency or person undertakes such actions. Cumulative effects can result from individually minor but collectively significant actions that take place over a period of time (40 CFR 1508.7). The purpose of the cumulative effects analysis is to ensure that federal decisions consider the full range of consequences.

1. Since 2001, TNC has implemented restoration projects along the Truckee River as part of the Truckee River Project. TNC has collaborated with local, state, and federal agencies, tribal groups, and interested stakeholders to enhance wildlife habitat, improve water quality, reduce flood damage, and provide recreation opportunities and open space protection. TNC purchased 305 acres along five miles of the Truckee River and implemented a restoration projects on the lower reaches of the river at McCarran Ranch. The TNC Pilot Restoration Project at McCarran was completed in 2003 and the full McCarran Ranch Restoration was completed in 2007. The restoration project at McCarran Ranch restored 3.5 miles of the Truckee River and approximately 300 acres of upland and wetland habitat. In 2008, TNC implemented restoration projects at Lockwood (29 acres of floodplain, 0.6 river miles) and 102 Ranch (128 acres of floodplain, 2.5 river miles). In 2009, the restoration project at

Lower Mustang Ranch was undertaken (280 acres of floodplain, 1.6 river miles). The Proposed Action in this EA is a continuation of TNC's Truckee River Project.

2. The Truckee River Flood Management Authority has undertaken restoration projects to reverse the ecological damage of flood control work from the 1960s. Working in partnership with agencies and private entities for the purpose of ecosystem restoration of the lower Truckee River the goals are: Restore 50 miles of the Truckee River's ecosystem (Sparks to Pyramid Lake); Restore fisheries, including the threatened Lahontan Cutthroat Trout and endangered Cui-ui; Enhance deer, mountain lion, duck, and song-bird habitat; Enhance water quality; and Provide enhanced recreation opportunities, river access, and open-space. Recent projects include partnership with TNC on the 102 Ranch, Lockwood, and Mustang Ranch restoration sites.

3. Below Derby Dam Restoration. To improve water quality and aquatic habitat in the Truckee River below Derby Dam, the Cities of Reno and Sparks with funding by Reclamation implemented a riparian and streambank restoration project on a 0.75-mile reach of the Truckee River downstream of Derby Dam. The work was completed in late summer 2010. A variety of native Nevada plants and trees were placed along the bank in an effort to reduce water temperatures and increase oxygen levels for LCT and cui-ui. Other partners in the project included TNC, HDR Engineering, Western Botanical Services, Sierra Erosion Control, Storey County, the Nevada Department of Environmental Protection, and the Pyramid Lake Paiute Tribe.

4. Current water resource planning on the lower Truckee River is focused on restoring past environmental damage while balancing the needs of municipal, industrial, and agricultural water users and providing for flood protection. .An important recent water resource planning effort was the Truckee River Operating Agreement (U.S. Bureau of Reclamation 2008). TROA modifies upstream reservoir operations to enhance coordination and flexibility while ensuring that existing water rights are served and flood control and safety-of-dams requirements are met. The enactment of the TROA enhances conditions in the Truckee River for LCT and cui-ui by providing sufficient flows and improving water quality conditions downstream of Sparks, Nevada.

The Proposed Action would have no adverse cumulative effects on climate, geology, socioeconomics, traffic, visual quality, noise, land use, recreation, and cultural resources. The Proposed Action has the potential for participating in cumulative effects related to air quality, hydrological resources, water quality, vegetation, and wildlife. The Proposed Action would contribute to an adverse cumulative air quality effect by adding increments of CO and particulate matter during short-term construction activities; however, the Proposed Action would not violate any air quality standards or expose sensitive receptors to significant levels of pollutants. Mitigation measures are proposed to minimize air quality emissions during construction activities, and therefore, cumulative impacts are considered less than significant.

Water quality would be adversely affected by the construction and release of water into each newly constructed meander and during construction of the riffles. Any increases in sediment levels are anticipated to return to pre-existing conditions once the construction is complete.

BMPs and mitigation measures are incorporated into the proposed restoration design to minimize surface water contact with exposed cuts and fills, and reduce associated impacts. The Proposed Action would ultimately create long-term benefits associated with water quality, and therefore, cumulative impacts are considered less than significant.

Construction of the Proposed Action would generate short-term adverse effects on existing vegetation and wildlife resources in the project area. The potential effects of construction activities on wildlife habitat may displace or disturb individual resident and migratory wildlife; however, any movement of wildlife away from the project area is expected to return following construction activities. Construction of the Proposed Action may affect Lahontan cutthroat trout and cui-ui. Mitigation measures are proposed to minimize any adverse effects on existing vegetation and wildlife, including federally listed and candidate wildlife species, and therefore, cumulative impacts are considered less than significant.

The Proposed Action in conjunction with reasonably foreseeable future projects would restore the environmental damage from earlier projects along the river, and provide benefits related to flood management, water quality, habitat for special-status species, biological productivity and diversity, and invasive weed eradication.

# Section 4 Consultation and Coordination

## 4.1 Applicable Environmental Statutes

In undertaking the proposal, Reclamation will comply with the following federal laws, executive orders, and legislative acts:

- Floodplain Management (Executive Order 11988);
- Protection of Wetlands (Executive Order 11990);
- Migratory Bird Treaty Act (16 U.S.C. 703 et seq.);
- Federal Noxious Weed Control Act, E.O. 13112, and 43 CFR 46.215 (l);
- Environmental Justice (Executive Order 12898);
- Fish and Wildlife Coordination Act (16 U.S.C. § 661);
- National Environmental Policy Act (42 U.S.C. 4321 et seq.);
- Endangered Species Act (16 U.S.C. 1531 et seq.);
- Bald and Golden Eagle Protection Act. (16U.S.C 668(a); 50 CFR 22);
- National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 et seq.), Protection of Historic Properties (36 CFR Part 800), and National Register of Historic Places (36 CFR Part 60);
- American Indian Religious Freedom Act of 1978 (Public Law 95-341, 92 Stat. 469; 42 U.S.C. 1996);
- Clean Air Act (42 U.S.C. 1857 et seq.), as amended and recodified (42 U.S.C. 7401 et seq.);
- Clean Water Act (33 U.S.C. 1251 et seq.);
- Executive Order 13175, Consultation and Coordination With Indian Tribal Governments;
- Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds;

- Presidential Memorandum of April 29, 1994, "Government-to-Government Relations with Native American Tribal Government".

## 4.2 Public Involvement

Scoping, as defined by NEPA regulations (40 CFR 1501.7), is an early and open process for determining the scope of the issues to be addressed and for identifying the significant issues related to the Proposed Action. A letter was mailed on February 22, 2012, to approximately 65 members of the public, organizations, stakeholders, tribal groups, and public agencies, requesting public comment on the preparation of this EA.

Three responses were received requesting copies of the draft EA to review. No responses had comments regarding the proposed project.

## 4.3 Tribal Consultation

Tribal consultation was initiated by letter on August 5, 2011, to the Reno-Sparks Indian Colony, Washoe Tribe, PLPT, and the Fallon Paiute-Shoshone Tribe. Reclamation received no response to the letters.

In conjunction with the cultural resource inventory, ASM Affiliates contacted Native Americans regarding the West McCarran and Tracy Power Plant sites . ASM contacted local Native American groups by hard-copy letter and by phone in order to solicit comments on the survey project. All contacted Tribal representatives were asked to respond in 30 days with questions, comments, or concerns prior to the initiation of survey fieldwork. Any information received by ASM was immediately delivered to Reclamation archaeologists.

ASM received responses from individuals with the Pyramid Lake Paiute Tribe, the Washoe Tribe of California and Nevada, the Reno-Sparks Indian Colony, and the Fallon Paiute-Shoshone. E-mail correspondence and follow-up phone calls resulted in information and data being transmitted as requested.

## 4.4 Agency Coordination and Consultation

In response to a request from Reclamation, the U.S. Fish and Wildlife Service sent a letter with a species list dated August 30, 2011. The federally listed and candidate species are discussed in the Section 3 Fish, and Section 3 Terrestrial Wildlife.

For the Tracy power plant site, the Army Corps of Engineers designated Reclamation as the lead Federal agency to act in their behalf for purposes of compliance with Section 7 of the ESA and Section 106 of NHPA (U.S. Army Corps of Engineers 2012). In correspondence to responsible agencies, Reclamation will include the ACOE's designation letter and a statement about the ACOE's designation to Reclamation.

# Section 5 List of Preparers

This EA was prepared by Jane LaBoa, Environmental Consultant, under contract by The Nature Conservancy (TNC) and reviewed by the Bureau of Reclamation, Lahontan Basin Area Office. Document review was provided by Patricia Bakker, Mickey Hazelwood, and Chris Sega (TNC), Joanne Goodsell (Bureau of Reclamation, Mid-Pacific Regional Office), and Andrea Minor and Caryn Huntt DeCarlo (Bureau of Reclamation, Lahontan Basin Area Office).

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# Appendix A – BLM Special Status Species

The following information is excerpted from the analysis (EA) done for the restoration projects at Lockwood, Lower Mustang, and 102 Ranch (U.S Bureau of Reclamation and U.S. Bureau of Land Management. 2008b).The earlier projects are within the same segment of the lower Truckee River as the projects analyzed in this EA. Although the Bureau of Land Management is not involved in the current project, the list provides additional information about species that may occur in the proposed project area.

## Sensitive Species

**Table A-1. BLM Sensitive Species Potentially Occurring in the Proposed Action Area – Lower Truckee River Restoration Project**

| Common Name (Scientific Name) | General Habitat Description | Potential for Occurrence |
|---|---|---|
| California floater (*Anodonta californiensis*) | Freshwater lakes and lake-like stream habitats with fish. | **May be Present.** Truckee River provides suitable habitat. |
| Wong springsnail (*Pyrgulopsis wongi*) | Freshwater lakes, reservoirs, rivers, streams, etc. | **May be Present.** Truckee River provides suitable habitat. |
| Northern leopard frog (*Rana pipiens*) | Shoreline cover, submerged and emergent aquatic vegetation; cattail and sedge marshes, weedy ponds; 0-7,000 feet. | **May be Present**. Suitable habitat is limited; however, the species is known to occur in the Truckee River in the vicinity of McCarran Ranch. |
| Sierra alligator lizard (*Elgaria coerulea palmeri*) | Woodland and forest landscapes, grassland and brush habitat. | **May be Present.** Suitable habitat is present and the species has been recorded within 5 miles (Nevada Natural Heritage Program 2007). |
| Golden eagle (*Aquila chrysaetos*) | Occurs primarily in mountainous canyon land, rimrock terrain of open desert and grassland areas. | **Absent as Breeder.** Suitable nesting habitat not present. May occur as a forager. |
| Short-eared owl (*Asio flammeus*) | Large expanses of prairie and coastal grasslands, heathlands, shrub-steppe, and tundra. | **May be Present.** Shrub community provides suitable breeding and foraging habit. |
| Western burrowing owl (*Athene cunicularia hypugea*) | Open grasslands and shrublands with perches and burrows. | **May be Present.** Suitable breeding and foraging habitat present. |

**Table A-1. BLM Sensitive Species Potentially Occurring in the Proposed Action Area – Lower Truckee River Restoration Project**

| Common Name (Scientific Name) | General Habitat Description | Potential for Occurrence |
|---|---|---|
| Sage grouse (*Centrocercus urophasianus*) | Closely associated with sagebrush ecosystems. Adapted to a mosaic of sagebrush habitats. | **May be Present.** Shrub community provides suitable breeding and foraging habitat. |
| Vaux's swift (*Chaetura vauxi*) | Forages over grasslands and water. | **Absent as Breeder.** Species does not breed in the area but may occur as a rare migrant. |
| Black tern (*Chlidonias niger*) | Shallow freshwater marshes with emergent vegetation, occasionally river or island edges. | **Absent as Breeder**. Species does not breed in the area, but freshwater marshes provide suitable habitat for migrating birds. |
| Merlin (*Falco columbarius*) | Wintering habitat includes open forests and grasslands. | **Absent as Breeder.** Species does not nest in the project region, but may occur as a migrant. |
| Prairie falcon (*Falco mexicanus*) | Primarily associated with perennial grasslands, savannahs, rangeland, some agricultural fields, and desert scrub areas; requires ledges on rocky outcrops or cliffs for nesting. | **Absent as Breeder.** Suitable breeding habitat is not present in the Proposed Action area; however, the species may occur in the project area as a forager. |
| Loggerhead shrike (*Lanius ludovicianus*) | Open habitats with sparse shrubs and trees, other suitable perches, bare ground and low or sparse herbaceous cover. | **May be Present.** Shrub community provides suitable breeding and foraging habitat. |
| Lewis's woodpecker (*Melanerpes lewis*) | Open riparian woodland dominated by cottonwood, pinyon pine-juniper forests, and ranchland. | **May be Present.** Riparian community provides suitable breeding and foraging habitat. |
| Osprey *(Pandion haliaetus)* | Ocean shorelines, lake margins, and large, open river courses for both nesting and wintering habitat. | **Absent as Breeder.** Species is not known to breed in the area but may forage in the area. |
| Vesper sparrow (*Pooecetes gramineus*) | Breeds in dry, open habitats with short, sparse, and patchy herbaceous vegetation; some bare ground; and low to moderate shrub or tall forb cover. | **May be Present.** Shrub community provides suitable breeding and foraging habitat are present. |
| Pallid bat (*Antrozous pallidus*) | Prefers rocky outcrops, cliffs, and crevices with access to open habitats for foraging; day roosts are in caves, crevices, mines, and occasionally in tree hollows and buildings; night roosts may be in more open sites, such as porches and open buildings. | **May be Present.** Suitable roosting and foraging habitat is present. |
| Pygmy rabbit (*Brachylagus idahoensis*) | Sagebrush, bitterbrush, and pinyon-juniper habitats; associated with tall, dense, large-shrub stages of big sagebrush, greasewood, and rabbitbrush. | **May be Present.** Suitable habitat is present. |

**Table A-1. BLM Sensitive Species Potentially Occurring in the Proposed Action Area – Lower Truckee River Restoration Project**

| Common Name (Scientific Name) | General Habitat Description | Potential for Occurrence |
|---|---|---|
| Townsend's big-eared bat (*Corynorhinus townsendii*) | Prefers mesic habitats; gleans from brush or trees or feeds along habitat edges; requires caves, tunnels, mines, buildings, or other human-made structures for roosting. | **Absent as Breeder.** Suitable roosting/breeding habitat is not present; however the species has been recorded within 5 miles of the Proposed Action area (Nevada Natural Heritage Program 2007) and may forage over the sites. |
| Big brown bat (*Eptesicus fuscus*) | Prefers to forage over open areas, water sources, or among trees in fairly open stands; uses buildings and other human-made structures for roosting to such an extent that natural roosting habits are poorly known. | **Absent as Breeder.** Suitable roosting/breeding habitat is not present; however, the species may forage over the sites. |
| Spotted bat (*Euderma maculatum*) | Prefers sites with adequate roosting habitat, such as cliffs; feeds over water and along washes; occasionally found in caves and buildings; cliffs provide optimal roosting habitat. | **Absent as Breeder.** Suitable roosting/breeding habitat is not present; however, the species may forage over the sites. |
| Hoary bat (*Lasiurus cinereus*) | Prefers open habitats or habitat mosaics with access to trees for cover and open areas or habitat edges for feeding; generally roosts in dense foliage of medium to large trees in sites hidden from above, with few branches below. | **May be Present.** Suitable roosting and foraging habitat is present. |
| California myotis (*Myotis californicus*) | Prefers rock-walled canyons with open water, open woodlands, and forests, or brushy habitats for foraging; typically a crevice-roosting species in buildings, under bark, and in caves and mines. | **May be Present.** Suitable roosting and foraging habitat is present. |
| Western small-footed myotis (*Myotis ciliolabrum*) | Most common in pinyon-juniper forests. It also occurs in deserts, chaparral, riparian zones, and western coniferous forest. Roosts in cliff and rock crevices, buildings, concrete overpasses, caves, and mines. | **Absent as Breeder.** Suitable roosting/breeding habitat is not present; however, the species may forage over the sites. |
| Long-eared myotis (*Myotis evotis*) | Feeds along habitat edges, in open habitats, and over water; roosts in buildings, crevices, spaces under bark, and snags; caves are used primarily as night roosts. | **May be Present.** Suitable roosting and foraging habitat is present. |
| Little brown bat (*Myotis lucifugus*) | Prefers to feed over water or open habitats; roosts in buildings, trees, under rocks or wood, or occasionally in caves; fairly common in sagebrush, bitterbrush, alkali desert scrub, wet meadow, and montane chaparral. | **May be Present.** Suitable roosting and foraging habitat is present. |

**Table A-1. BLM Sensitive Species Potentially Occurring in the Proposed Action Area – Lower Truckee River Restoration Project**

| Common Name (Scientific Name) | General Habitat Description | Potential for Occurrence |
|---|---|---|
| Fringed myotis (*Myotis thysanodes*) | Uses open habitats, early successional stages, streams, lakes, and ponds as foraging areas; roosts in caves, mines, buildings, crevices, and snags. | **May be Present.** Suitable roosting and foraging habitat is present. |
| Long-legged myotis (*Myotis volans*) | Feeds over water and over open habitats, using denser woodlands and forests for cover and reproduction; roosts in rock crevices, buildings, under tree bark, and in snags, mines, and caves. | **May be Present.** Suitable roosting and foraging habitat is present. |
| Yuma myotis (*Myotis yumanensis*) | Distribution is closely tied to bodies of water, which it uses as foraging sites and sources of drinking water; open forests and woodlands are optimal habitat; roosts in buildings, mines, caves, or crevices; also seen roosting in abandoned swallow nests and under bridges. | **May be Present.** Suitable roosting and foraging habitat is present. |
| Western pipistrelle (*Pipistrellus hesperus*) | Prefers rocky canyon walls and cliffs in arid habitats; roosts primarily in rock crevices, occasionally in mines and caves, and rarely in buildings; often found foraging over water, in rocky canyons, and along cliff faces. | **Absent as Breeder.** Suitable roosting/breeding habitat is not present; however, the species may forage over the sites. |
| Brazilian free-tailed bat (*Tadarida braziliensis*) | Uses caves, crevices, and buildings for cover, foraging high over surrounding habitats and water; requires caves, mine tunnels, crevices, or buildings for roosting and hibernation. | **Absent as Breeder.** Suitable roosting/breeding habitat is not present; however, the species may forage over the sites. |
| River otter (*Lontra canadensis*) | Cover provided by thickets, tall wetland plants, hollow logs, stumps, snags, and burrows and other cavities | **May be Present.** Truckee River and adjacent riparian provide suitable habitat. |

## Migratory Birds and Game Species

**Table A-2. Migratory and Game Birds of Conservation Concern in the Project Region**

| Migratory Birds of Conservation Concern | | |
|---|---|---|
| Greater sage grouse (*Centrocercus urophasianus*) | Tricolored blackbird (*Agelaius tricolor*) | Northern harrier (*Circus cyaneus*) |
| American avocet (*Recurvirostra american*) | Ferruginous hawk (*Buteo regalis*) | Olive-sided flycatcher (*Contopus cooperi*) |
| American bittern (*Botaurus lentiginosus*) | Swainson's hawk (*Buteo swainsoni*) | Peregrine falcon (*Falco peregrinus*) |
| Bendire's thrasher (*Toxostoma bendirei*) | Golden eagle (*Aquila chrysaetos*) | Prairie falcon (*Falco mexicanus*) |
| Black-throated gray warbler (*Dendroica nigrescens*) | Gray vireo (*Vireo vicinior*) | Pinyon jay (*Gymnorhinus cyanocephalus*) |
| Virginia's warbler (*Vermivora virginiae*) | Lewis's woodpecker (*Melanerpes lewis*) | Pygmy nuthatch (*Sitta pygmaea*) |
| Brewer's sparrow (*Spizella breweri*) | White-headed woodpecker (*Picoides albolarvatus*) | Red-naped sapsucker (*Sphyrapicus nuchalis*) |
| Sage sparrow (*Amphispiza belli*) | Loggerhead shrike (*Lanius ludovicianus*) | Williamson's sapsucker (*Sphyrapicus thyroideus*) |
| Flammulated owl (*Otus flammeolus*) | Long-billed curlew (*Numenius americanus*) | Willet (*Catoptrophorus semipalmatus*) |
| Burrowing owl (*Athene cunicularia*) | Mountain plover (*Charadrius montanus*) | Wilson's phalarope (*Phalaropus tricolor*) |
| Short-eared owl (*Asio flammeus*) | Snowy plover (*Charadrius alexandrinus*) | Yellow-billed cuckoo (*Coccyzus americanus*) |
| Spotted owl (*Strix occidentalis*) | Northern goshawk (*Accipiter gentilis*) | |

**Table A-2. Migratory and Game Birds of Conservation Concern in the Project Region**

| Game Birds of Conservation Concern | | |
|---|---|---|
| Canvasback (*Aythya valisineria*) | Wood duck (*Aix sponsa*) | Northern pintail (*Anas acuta*) |
| Mourning dove (*Zenaida macroura*) | Mallard (*Anas platyrhynchos*) | |
| Ring-necked duck (*Aythya collaris*) | Band-tailed pigeon (*Columba fasciata*) | |

# Appendix B – Migratory Bird Data from McCarran Ranch

**Table B-1. Total captures by species, during fall migration banding at McCarran Ranch in 2009 and 2010 (GBBO 2011).**

| Species | 2009 | 2010 |
|---|---|---|
| Bewick's Wren | 26 | 13 |
| Black Phoebe | 3 | |
| Black-billed Magpie | 2 | |
| Brown Creeper | 1 | |
| Bushtit | 16 | 17 |
| Canyon Wren | 1 | |
| Cassin's Vireo | 2 | 1 |
| Chipping Sparrow | | 2 |
| Common Yellowthroat | 2 | |
| Downy Woodpecker | 1 | 2 |
| Dusky Flycatcher | | 1 |
| European Starling | 3 | |
| Fox Sparrow | 2 | 2 |
| Gray Flycatcher | | 1 |
| Hammond's Flycatcher | 4 | 3 |
| Hermit Thrush | 4 | |
| House Wren | 10 | 12 |
| Lesser Goldfinch | | 1 |
| Lincoln's Sparrow | | 16 |
| MacGillivray's Warbler | 3 | 3 |

| | | |
|---|---|---|
| **Nashville Warbler** | **7** | |
| **Northern (Red-shafted) Flicker** | **5** | **3** |
| **Orange-crowned Warbler** | **75** | **118** |
| **Pacific-slope Flycatcher** | **1** | |
| **Red-breasted Nuthatch** | **2** | **1** |
| **Red-breasted Sapsucker** | **1** | **1** |
| **Ruby-crowned Kinglet** | **82** | **53** |
| **Savannah Sparrow** | **1** | **4** |
| **Sharp-shinned Hawk** | | **1** |
| **Song Sparrow** | | **7** |
| **Spotted Towhee** | **6** | **2** |
| **Warbling Vireo** | **6** | **4** |
| **Western Tanager** | **26** | **3** |
| **Western Wood-Pewee** | **1** | **1** |
| **White-crowned (Gambel's) Sparrow** | **6** | **12** |
| **Williamson's Sapsucker** | | **2** |
| **Willow Flycatcher** | **2** | |
| **Wilson's Warbler** | **3** | **8** |
| **Yellow Warbler** | **23** | **29** |
| **Yellow-breasted Chat** | **1** | **2** |
| **Yellow-rumped (Audubon's) Warbler** | **67** | **31** |
| **Total** | **395** | **356** |