DRAFT RESTORATION PLAN

and

ENVIRONMENTAL ASSESSMENT

for the

EAST WALKER RIVER ADVANCED FUEL FILTRATION OIL SPILL

Prepared by:

The East Walker River Trustee Council

California Department of Fish and Game
Office of Oil Spill Prevention and Response
Sacramento, California

Nevada Department of Wildlife
Fisheries Bureau
Reno, Nevada

Nevada Division of Environmental Protection
Bureau of Water Pollution Control
Carson City, Nevada

U.S. Fish and Wildlife Service
Division of Environmental Quality
California and Nevada Region
Sacramento, California

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“The river is the center of the land, the place where the waters, and much more, come together. Here is the home of wildlife, the route of explorers, and recreation paradise...Only fragments of our inheritance remain unexploited, but these streams are more valuable than ever.”

– Tim Palmer

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EXECUTIVE SUMMARY

On December 30, 2000, a tanker truck operated by Advanced Fuel Filtration Systems, Inc. (AFFS) of Corona, California overturned on California State Route 182 north of Bridgeport, California resulting in the release of approximately 3,608 gallons of #6 fuel oil, the majority of which entered into the East Walker River. The fuel visibly oiled approximately ten miles of stream habitat, seven of which were in California (Mono County) and three in Nevada (Lyon County). The impacted area was divided into ten sections (or divisions) for clean up and assessment for natural resource damages (Figure 1). Based on water and sediment samples taken downstream in Nevada, approximately 15 miles of stream were impacted. The cleanup lasted throughout the winter months. This oil spill impacted natural resources along the spill path of the East Walker River watershed, causing injury and mortality to plants and animals. The U.S. Fish and Wildlife Service, the California Department of Fish and Game – Office of Spill Prevention and Response, the Nevada Division of Environmental Protection, and the Nevada Division of Wildlife joined together to become the Natural Resource Trustees (Trustees) and documented impacts during the damage assessment. Injury and damages were separated into two categories in order to address impacts to natural resources and human recreational activities.

As required under the federal Oil Pollution Act of 1990 (33 U.S.C. 2701 et seq.) and the California Lempert-Keene-Seastrand Oil Spill Prevention and Response Act (Government Code 8670.1 et seq.), a Natural Resource Damage Assessment was performed to determine the injuries from the spill to the natural resources of the East Walker River, and to develop and implement the appropriate actions to restore, rehabilitate, replace, or acquire the equivalent of the injured natural resources.

During the response period, crews recovered/collected the following dead animals within the first 10 miles of the spill zone: one Virginia rail (*Rallus limicola*), two American dippers (*Cinclus mexicanus*), one American mink (*Mustela vison*), and six beavers (*Castor canadensis*). Approximately 21 dead fish were also collected, the majority of which were mountain whitefish (*Prosopium williamsoni*). The following animals were observed alive and oiled, but were not captured: one common merganser (*Mergus merganser*), one great blue heron (*Ardea herodias*), and one bald eagle (*Haliaeetus leucocephalus*). Based on the number of birds and mammals recovered, the number expected to be along the stream, and the amount of oil spilled, it is likely that nearly all the birds and mammals that regularly came into contact with the water within the first 10 miles of the spill zone were either directly or indirectly killed by the spill.

An out of court settlement agreement was reached among the Trustees and AFFS in January 2004 that specified that AFFS shall pay to the Trustees a total of four hundred eighteen thousand dollars ($418,000). Of this amount, $68,000 was paid to California Department of Fish and Game for its past assessment costs involved in determining the extent of damages to the natural environment, and the balance of $350,000 was paid to the Department of Interior to be used by the Trustees for planning, implementation, and oversight activities to restore the natural resources injured and the interim loss of recreational use caused by the incident.

In December 2005, the Trustees entered into a Memorandum of Understanding (MOU) that created a Trustee Council and that provided a framework for coordination and cooperation

among the Trustees in the use of the Natural Resource Damage (NRD) money from the AFFS settlement for wildlife projects, habitat restoration and protection, and human use projects. The Trustees committed to the expenditure of the NRD money for the design, implementation, permitting (as necessary), and oversight of restoration projects, and for the costs of complying with the requirements of the law to conduct a restoration planning and implementation process.

The purpose of this Draft Restoration Plan/Environmental Assessment (DRP/EA) is to outline the proposed restoration alternatives that are being considered as compensation for injuries to natural resources caused by the spill and to facilitate public review of the DRP/EA. This DRP/EA outlines the restoration activities that, once implemented, will restore, rehabilitate, replace or acquire the equivalent of the injured natural resources. The restoration alternatives outlined in this DRP/EA include riparian habitat restoration, in-stream habitat restoration, and recreational fishing improvements that encourage public use and enjoyment of the East Walker River.

The Trustees intend to implement the following activities using the associated NRD money allocations: $140,000 to fund restoration projects benefiting in-stream and riparian habitat; $105,000 for recreational fishing improvements/human use type projects; $55,000 for monitoring; and $50,000 for Trustee oversight and administration costs. However, NRD fund allocations and activities may be adjusted based on actual restoration costs and needs as part of the restoration planning process carried out by the Trustee Council.

1.0 Introduction

On December 30, 2000, a tanker truck operated by Advanced Fuel Filtration Systems (AFFS) of Corona, California overturned on California State Route 182 north of Bridgeport, California resulting in the release of approximately 3,608 gallons of #6 fuel oil into the East Walker River. This oil is particularly black and heavy and must be heated to 160 degrees Fahrenheit in order for it to flow for loading and unloading. At low temperatures, it becomes tar-like. The fuel visibly oiled approximately ten miles of stream habitat, seven of which were in California (Mono County) and three (Lyon County) in Nevada. Based on water and sediment samples taken downstream in Nevada, approximately 15 miles of stream were impacted (Hampton et al. 2002). The cleanup lasted throughout the winter months. This oil spill impacted natural resources along the spill path in the East Walker River watershed causing injury and mortality to plants and animals. The U.S. Fish and Wildlife Service, the California Department of Fish and Game – Office of Spill Prevention and Response, the Nevada Division of Environmental Protection, and the Nevada Division of Wildlife joined together to become the East Walker River Natural Resource Trustees (Trustees) and documented impacts during the damage assessment. Injury and damages were separated into two categories in order to address impacts to natural resources and human recreational activities.

1.1 Purpose

The purpose of this Draft Restoration Plan/Environmental Assessment (DRP/EA) is to outline the proposed restoration alternatives that are being considered as compensation for injuries to natural resources caused by the accidental release of #6 fuel oil by AFFS to the California and Nevada portions of the East Walker River. The DRP/EA outlines the restoration activities that, once implemented, will restore, rehabilitate, replace or acquire the equivalent of the injured natural resources. The restoration alternatives that are outlined in this DRP/EA include riparian habitat restoration, in-stream habitat restoration, and recreational fishing improvements including projects that encourage public use and enjoyment of the East Walker River and surrounding area. The purpose of the DRP/EA is also to inform and to seek input from the public on the overall approach of the DRP/EA, and the proposed and preferred restoration alternatives under consideration by the U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Game (CDFG), Nevada Division of Environmental Protection (NDEP), and the Nevada Department of Wildlife (NDOW), (collectively the "Trustees"). The Trustees are soliciting specific ideas or proposals for projects from the public that could be included under the proposed restoration alternatives for this DRP/EA. There will be an opportunity for the public to submit proposals for restoration projects once the DRP/EA is final.

The proposed restoration activities will serve as compensation for natural resource injuries in order to make the environment and the public whole. The restoration planning, development, and implementation are conducted under the authorities of the federal Oil Pollution Act of 1990 (OPA) (33 U.S.C. 2701 et seq.) and the California Lempert-Keene-Seastrand Oil Spill Prevention and Response Act (Government Code 8670.1 et seq.). Restoration activities must comply with all applicable laws and regulations including the federal and state Endangered Species Act, the federal Clean Water Act, the federal Migratory Bird Treaty Act, the National

Environmental Policy Act, the National Historic Preservation Act and the California Environmental Quality Act.

1.2 Settlement Agreement

An out of court Settlement Agreement (in lieu of a Consent Decree) was reached between the Trustees and AFFS in January, 2004, whereby AFFS agreed to pay the Trustees a total of four hundred eighteen thousand dollars ($418,000) for compensation as a result of natural resource injuries resulting from the AFFS's release of #6 fuel oil to the East Walker River. Of this amount, $68,000 was paid to CDFG for its past natural resource damage assessment costs and the remainder of the balance ($350,000) was paid to USFWS for deposit into the Department of the Interior's Natural Resource Damage Assessment (NRDA) Fund on behalf of the Trustees for use in the restoration of the injured natural resources and interim losses of recreational use created by the incident. These funds are also be used for restoration planning and oversight by the Trustees. In addition, the USFWS was allowed to retain and utilize for restoration planning and oversight the remaining balance of a $50,000 payment made to it by AFFS for response and cleanup costs pursuant to a letter dated February 12, 2001.

1.3. Formation of the East Walker River Trustee Council

The Trustees share joint responsibilities regarding the injured wildlife, habitat, and human use losses and are committed to the expenditure of the NRDA money for the design, implementation, permitting (as necessary), and oversight of Restoration projects, and for the costs of complying with the requirements of the law to conduct a restoration planning and implementation process. Therefore, after the Settlement Agreement, the Trustees entered into a Memorandum of Understanding (MOU) on December 21, 2005 providing a framework for coordination and cooperation in the use of the NRDA money from the Settlement Agreement for wildlife projects, habitat restoration and protection, and human use projects (Appendix A). There are two trustee representatives and two alternates from each agency on the Trustee Council. The Trustee Council is responsible for the development and implementation of the Final Restoration Plan, and the allocation of settlement funds associated with that effort. The Trustee Council is also responsible for oversight and monitoring to ensure success and completion of the restoration projects. All approved projects must be by unanimous consent among the member agencies of the Trustee Council.

1.4 Trustee Council Strategy in Restoration Planning

In forming their restoration planning strategy, the Trustees considered the various sources of guidance currently available, including OPA, state law, and federal regulations guiding restoration planning under OPA at 15 C.F.R. Part 990. The strategy used to develop this restoration plan is consistent with all applicable statutes and guidelines. The Trustees' goal in the restoration planning process, outlined in this RP/EA, is as follows:

Goal: "To increase the ecological and recreational value of the East Walker River that will compensate for the natural resources lost by the AFFS oil spill with the goals of contributing to restoration of the river's natural ecosystem and providing lasting value to the public."

To accomplish this goal, the Trustees developed the following restoration strategy:

Strategy: "Identify projects which would increase or enhance natural resources and opportunities for recreational access or use of these same resources, in accordance with the public losses which were documented."

The Trustee Council also developed objectives that were formulated to support the Council's goal and strategy. The objectives include the following:

- *Promote a land ethic which includes stewardship and responsibility toward natural resources.*
- *Promote watershed management that is consistent with the river's natural dynamic processes.*
- *Enhance and maintain the natural biological diversity of the watershed. Incorporate local government along with public participation in the restoration plan development and implementation.*
- *Promote restoration projects with long-lasting benefits. Promote partnerships and collaborative efforts to maximize funding, efficiency, and expertise.*

Restoration actions can compensate for lost recreational opportunities in various ways, such as by increasing access to existing resource recreation sites; increasing the capacity of existing resource recreation sites; increasing the quality of existing resource recreation sites; or creating new resource sites for recreation. Each of these approaches can result in two effects -increasing the quantity or improving the quality of the recreational use of the relevant natural resources.

In developing this DRP/EA, the Trustees have sought to identify a reasonable range of alternatives for consideration, including those with the potential to restore recreational services through actions to effectively restore, preserve or enhance the amount, quality or availability of the affected natural resources. Where available, these actions are believed by the Trustees to represent the best means of restoring natural resource services. Where options of this nature do not exist or are insufficient alone to address the public's losses, restoration options capable of providing services of the same type and quality as those lost are generally preferred. Where in-kind service replacement options are not available, restoration alternatives providing services comparable to those lost may be considered. When restoration alternatives provide dissimilar services, the appropriate trade-off between the services lost and those provided by restoration must be considered to ensure the benefits of such restoration will be sufficient to offset public losses.

In developing this DRP/EA, the Trustees have also sought to rely on restoration options capable of providing or benefiting multiple resources or services, particularly those serving multiple recreational resource uses. This approach ensures restoration actions undertaken provide the greatest overall benefit to the public, consistent with the primary goal of this DRP/EA. Actions

with multiple benefits also have the potential to reduce administrative oversight, procedural requirements, permitting needs, and construction logistics, which makes accomplishing restoration more cost-efficient.

2.0 Affected Environment and Natural Resources of Concern

The Walker River Basin encompasses approximately 2,658,420 acres along the eastern side of the Sierra Nevada and western portion of the Great Basin (Sharpe et al. 2007). Headwaters of the East and West forks of the Walker River, which ultimately feed Walker Lake, originate in the Sierra Nevada of California at elevations between 10,007 and 12,303 feet (Sharpe et al. 2007). The rivers flow through the Bridgeport, Antelope, and Smith valleys – located in California and Nevada – and join in Mason Valley, Nevada, to create the main stem of the Walker River. The main stem flows through the Mason Valley Wildlife Management Area, Walker River Paiute Reservation, and terminates at Walker Lake, near Hawthorne, Nevada (Figure 1).

The basin has been subjected to extensive human impacts from land and water development, population growth and recreation. These impacts have altered the physical and biological integrity of the Walker River basin causing water quality degradation, habitat fragmentation, geomorphic instability, and have resulted in a decline of native fish populations (WRIT 2003).

The surface flows of the Walker River basin are determined by (1) the amount of water available in the headwaters of the East and West Forks of the Walker River, (2) storage and managed releases from three major and several smaller reservoirs, and (3) diversion of surface water and groundwater (well) pumping (WRIT 2003). The Walker River extends approximately 160 miles from the headwaters to the terminus at Walker Lake. The basin is characterized by alpine lakes, high, moderate, and low gradient streams, and a desert terminal lake. The Walker River exhibits extremes in hydrologic conditions, typical of Great Basin rivers, from nearly dry during drought periods to high water from flood events.

2.1 Human Influences on the Walker River Basin [a]

The Walker River basin has been inhabited by humans for at least 11,000 years (WRIT 2003). Archeological research and the oral histories of the Paiute, Shoshone, and Washoe Tribes indicate that the people in the Walker River basin depended on aquatic and riparian life in the Walker River and Walker Lake for sustenance (Houghton 1994). With the discovery of gold in the California Territory in 1848, accelerated settlement of the Great Basin began. Between 1855 and 1862, settlers immigrated to Smith, Antelope, and Mason valleys. Agriculture and ranching began to divert and utilize the water of the Walker River during this period.

The first measurements of Walker River flow were documented in June 1881 by I.C. Russell. He recorded Walker River flow at 400 cubic feet per second (cfs) approximately 3 miles upstream of Walker Lake (Russell 1885). This is a measurement equaling approximately 290,000 acre feet (af)

[a] Except where specifically cited, the information in this section is taken from WRIT (2003).

annually (Russell 1885, Nevada Division of Water Planning 2001). Information gathered by Russell is often referenced for baseline evaluation today.

With the 20th century came increased demand on Walker River water as rapid growth of mining and agriculture continued. In 1909, an estimated 58,000 acres of land were under irrigation in the basin and by 1919, irrigated acreage in the basin had increased to 103,000 acres (Nevada Division of Water Planning 2001). In 1919, Walker River Irrigation District was formed, which provided the financial ability for water users in Nevada to construct Topaz and Bridgeport reservoirs. These two California reservoirs have a combined storage capacity of 107,400 af (Public Resource Associates 1994). Bridgeport Dam restricted access of LCT to spawning habitat in East Walker River and upstream tributaries. Water depletions and diversion dams on the West Walker limited LCT access to upstream areas. In 1929, the Yerington weir was constructed on the Walker River which thereafter prevented fish access to both East and West Walker River. Weber Dam construction was completed in 1935 by Bureau of Indian Affairs (BIA) to assist with Tribal agricultural irrigation. Design storage capacity of Weber Reservoir was 12,500 acre-feet. The dam created an additional migration barrier to LCT. In summary, the historic uses of water in the basin have contributed to declining water quantity, quality, and fragmentation of the Walker River basin (WRIT 2003).

2.2 Surface Water Resources[b]

Surface water resources in the Walker Basin include Walker Lake, the East and West forks and main stem of the Walker River, three major reservoirs that store and release Walker River water (Bridgeport, Topaz, and Weber reservoirs), high altitude lakes in the Sierra Nevada, small water storage reservoirs, as well as ponds, marshes and streams. Surface water resources in the basin support a variety of human uses, provide habitat for wildlife populations, and are subject to both natural hydrologic process and human water management systems. At times, surface water supply is insufficient to simultaneously meet all competing needs.

Beneficial uses for the Walker River (NAC 445A.159) are as follows: 1. Irrigation; 2. Watering livestock; 3. Recreation involving contact with water; 4. Recreation not involving contact with water; 5. Industrial supply; 6. Municipal or domestic supply, or both; 7. Propagation of wildlife, and; 8. Propagation of aquatic life and more specifically, species of major concern

Beneficial uses for Walker Lake (NAC 445A.1693) are: 1. Recreation involving contact with water; 2. Recreation not involving contact with water; 3. Propagation of wildlife, and; 4. Propagation of aquatic life and, more specifically, species of major concern (tui chub, Tahoe sucker, and adult and juvenile Lahontan cutthroat trout).

[b] Except where specifically cited, the information in this section is taken from Sharpe et al. (2007).

Figure 1. Map of the Walker River Basin and surrounding areas of California and Nevada.

Source: California Department of Water Resources

2.2.1 West Walker River

A number of tributaries meet and form the main channel of the West Walker River upstream from the town of Walker, California. USGS flow monitoring gage 10296000 (Walker River below Little Walker River, upstream of Walker, California) is located just below this confluence. This gage has the longest continuous period of record on the West Walker River and documented an average annual flow of 185,000 acre-feet per year between 1939 and 1993. The main channel of the West Walker River flows through Antelope Valley. A USGS flow monitoring gage where the West Walker River enters Antelope Valley (10296500: West Walker River near Walker, California), has an average annual flow of 195,000 acre-feet per year for 1939 to 1993 (Thomas, 1995). The flow entering Antelope Valley is subject to large annual variations depending on the amount of snowfall that occurs in mountains upstream of Antelope Valley.

In Antelope Valley, the West Walker River passes several miles to the east of Topaz Lake and continues downstream to Smith Valley (Figure 1). Topaz Lake is a reservoir that is off stream; that is, water is diverted from the West Walker River to Topaz Lake but the river channel passes to the east of the reservoir. USGS gage 10297500 (West Walker River at Hoye Bridge, near Wellington, Nevada) is located below Topaz Lake inflow near the outlet of Antelope Valley and at the upstream end of Smith Valley. This site has a measured average annual flow rate of 180,000 acre-feet per year between 1939 and 1993. All diversions are used for irrigation within the basin. Diversions to the Colony Ditch do not return any flow to the West Walker River. Irrigation return flows and flood flows in this area discharge to the Alkali (Artesia) Lake WMA.

Total dissolved solids in the West Walker River ranged between 24 and 314 ppm from May 1998 to March 1999 (Humberstone 1999). These values remained well below the 500 ppm annual average maximum limit for uses of water supply, irrigation, and livestock set by the Nevada Administrative Code (NAC 455A.118 to 445A.225) in this river reach. The higher values Humberstone recorded are still below the single value < 425 mg/L TDS requirement to maintain existing higher quality water set forth in NAC 455A.118 to 445A.225 above the confluence with the East Walker River at Nordyke Road in Mason Valley. Minimum values of TDS tend to be in the headwaters and gradually increase downstream. TDS also varies with seasonal stream flow changes, generally decreasing with increasing flows. According to Humberstone (1999), TDS levels increase during irrigation season with maximum levels typically occurring in September.

Water temperature behaves in a manner similar to TDS and varies in space and time. Water temperature is generally lowest near headwater streams and gradually increases downstream. Water temperatures in the West Walker River range from as low as 32° F in the upstream areas in winter to as high as 75° F in the downstream areas, measured in August 1998 (Humberstone 1999). Between May 1998 and March 1999, dissolved oxygen levels in the West Walker River ranged between 6.3 and 13.7 mg/L. Between May 1994 and June 1995 levels ranged between 5.2 and 11.3 mg/L. Trout prefer oxygen levels above 5 mg/L; the ideal dissolved oxygen level for fish is between 7 and 9 mg/L (Humberstone 1999; Koch et al.1979).

2.2.2 East Walker River

Headwaters of the East Walker River originate from several creeks in the eastern Sierra Nevada upstream of Bridgeport Valley, California. The largest of these tributaries include Buckeye, Green, Robinson, Virginia, Swauger, and Sumners creeks. The average annual combined inflow of these tributaries into the Bridgeport Valley between 1939 and 1993 was 132,000 acre-feet per year, as estimated by Thomas (1995) using data from USGS stream gages. Inflow values are subject to large annual variations depending on the amount of snowfall in the mountains above Bridgeport Valley.

Downstream of Bridgeport Valley and Bridgeport Reservoir are the areas referred to as the Upper East and Lower East Walker valleys. USGS gage 10293000 (East Walker River near Bridgeport, California) is located just below Bridgeport Reservoir. The average annual flow of the river at this gage was 107,000 acre-feet per year between 1939 and 1993 (Thomas 1995).

As with the West Walker River, East Walker River solutes vary depending on seasonal stream flow. From May 1998 to March 1999, TDS ranged between 54 ppm in July near Bridgeport Reservoir to 139 ppm in October at Minister Road (Humberstone 1999). These values remained well below the 500 ppm annual average maximum limit for uses of water supply, irrigation, and livestock and the single maximum value of < 390 mg/L to maintain existing higher quality water set by the Nevada Administrative Code (NAC 455A.118 to 445A.225) in this river reach. Water temperature ranges from 32° F upstream in the winter to approximately 72° F downstream in summer months. Dissolved oxygen ranged between 7.1 and 12.3 mg/L from May 1998 to March 1999 (Humberstone 1999).

2.2.3 Mainstem Walker River

The mainstem Walker River generally flows north through Mason Valley until reaching the valley's northern end near Wabuska, Nevada. Here the river changes course, turning eastward to southeast where it enters the Walker River Paiute Indian Reservation before entering Weber Reservoir, created by Weber Dam (completed in 1937). The reservoir is located approximately 4 miles upstream of Schurz, Nevada and 16 miles upstream of Walker Lake. The river then flows generally south through alluvial flats before entering Walker Lake.

Between 1939 and 1993, the combined average annual flow into Mason Valley was 233,000 acre-feet (Thomas 1995). The inflow of water varies annually due to upstream watershed conditions and seasonally due to upstream reservoir releases.

The average annual flow at Wabuska (Parker gage) for the period of 1939 through 1993 was approximately 128,000 af (Thomas 1995). The water quality of Walker River represents the combined influence of the East and West forks, irrigation return flow and natural runoff. Point and non-point sources of pollutants may impact the Walker River basin. Point sources of pollutants include discharges from wastewater treatment plants and irrigation return flows.

2.3 Habitat in the Walker River Basin [c]

The largest acreage of the Walker River watershed is located primarily in the Great Basin, the largest desert ecosystem in North America and the only cold desert on the continent (Mares, 1999). The Great Basin ecoregion as defined by Bailey (1995) has a high number of endemic species and the second highest number of imperiled species across all U.S. ecoregions (Forbis et al., 2006). Perhaps the most recognizable characteristic of the Great Basin is shrub-steppe vegetation, which includes salt desert and sagebrush communities. These semi-arid vegetation communities occur in the rain shadow of the Sierra Nevada and receive as much as 60% of their annual precipitation as snow (Baldwin et al., 2003). In contrast, headwaters of the Walker River are located in montane and alpine ecosystems. The aquatic habitat in the basin includes alpine lakes; high, moderate, and low gradient streams; reservoirs; and a desert terminus lake (USFWS, 2003).

Wildlife in the Walker Basin is associated with specific types of habitats, although habitat use may be seasonal. Migratory birds, for example, may visit Walker Lake during specific times of the year while sage grouse are year-round residents in the sagebrush community. While fauna are typically considered users of habitat or having habitat association, flora also may be associated with specific habitat types. The relationship between a species and its habitat is called a habitat relationship. Morrison et al. (1992) define habitat as "an area with the combination of resources (food, cover, water) and environmental conditions (temperature, precipitation, presence or absence of predators and competitors) that promote occupancy by individuals of a given species (or population) and allows those individuals to survive and reproduce." Therefore both fauna and flora have habitat associations.

The habitat of the Walker Basin can be characterized in a number of different ways that are meaningful from an ecological or biological perspective. Water is used here as a primary feature to define habitats. The Walker watershed can be delineated into four very general habitat types: (1) lacustrine; (2) riverine, riparian, and wetlands; (3) upland or non-water dominated; and (4) farmlands and associated agricultural production areas. These four habitat types have water associated with them to different degrees and in varying temporal scale. Quality of the habitat is not intrinsic in the definition and therefore changes through time.

2.3.1 Lacustrine

Lacustrine is any pond, lake, or reservoir viewed as an ecosystem. They are predominantly aquatic systems with a varying extent and composition of shoreline vegetation, and they support habitats for various animals at different times throughout the year. Natural lake levels fluctuate because of external environmental and climatic conditions, whereas reservoir levels fluctuate based on human use. Disjunct wetland communities may occur when water levels drop for extended time periods and can exist intermittently depending on fluctuating water levels. Discharge from reservoirs is regulated and controlled to accommodate downstream water requirements and reservoir holding capacities. For this reason, reservoirs tend to be more unstable environments than lakes, particularly in terms of shoreline habitat.

[c] Except where specifically cited, the following information in this section is taken from Sharpe et al. (2007)

Bridgeport Reservoir

Rainbow trout (*Oncorhynchus mykiss*) are stocked in Bridgeport reservoir by CDFG. Brown trout (*Salmo trutta*) also inhabit the reservoir. Pelicans (*Pelicanus sp*.), gulls (*Larus sp.*), egrets, and herons are common. The reservoir also is used as a stopover for migrating waterfowl. Species associated with the irrigated pasture and meadows adjacent to the reservoir occur where shoreline habitat provides adequate cover, foraging, or hunting conditions.

Topaz Lake

In 2006, Topaz Lake was stocked with rainbow, bowcutt, and tiger trout by the NDOW. Rainbow/cutthroat hybrids, brown trout, and bullhead catfish (*Ictalurus nebulosus*) also occur there. Wetland habitat exists in the area where the Walker River is diverted into the reservoir and provides habitat for a variety of waterbirds such as egrets, herons, and wading shorebirds. Pelicans and gulls are also common. The reservoir is used as a stopover for migrating waterfowl. Other riparian species and species associated with irrigated pasture habitat may be found near the reservoir or nearby. Bats, for example, forage over the reservoir and along the shore. Species associated with the irrigated pasture and meadows adjacent to the reservoir occur where shoreline habitat provides adequate cover, foraging, or hunting conditions.

Weber Reservoir

Weber Reservoir is the most downstream reservoir before Walker Lake. Carp, channel catfish (*Ictalurus punctatus*), crappie (*Pomoxis sp*.), and largemouth bass (*Micropterus salmoides*) occur here. Shorebirds and migrating waterfowl are common.

Twin Lakes

Twin Lakes lie at 7,726 feet elevation in the Toiyabe National Forest, just below the Hoover Wilderness in Mono County, California. The lakes and surrounding area are used extensively for recreation. Privately owned residences as well as motels and cabins are located near the lakes. A large campground at the west end of the lakes and a trailhead for foot and stock access to the high Sierra backcountry are used by visitors. The lakes drain via Robinson Creek into an extensive wetland that is both natural and receives water from ditch irrigation. Although LCT no longer inhabit Twin Lakes, the USFWS reported that Twin Lakes was the only lacustrine habitat in the Walker River Basin, other than Walker Lake, where LCT occurred (USFWS, 1995). Rainbow trout are stocked in Twin Lakes by the CDF&G. The Bridgeport Inn in Bridgeport, California, reports that Kokanee salmon (*Oncorhynchus nerta*) inhabit Twin Lakes and brown trout also occur in Twin Lakes as well.

2.3.2 Riverine, Riparian, and Wetlands

In general, the entire Walker River riparian zone plays a critical role in maintaining physical characteristics and function of the river. For example, the riparian zone moderates river temperatures, traps sediment, and adds resiliency to the river channel during floods. For the riparian zone to function in these restorative and regenerative capacities, enough water must be

available with appropriate frequency and duration. Water must be available for the germination and survival of seeds from riparian and wetland plants, and these plants, in turn, provide critical functions that maintain the integrity of the river.

Riparian zones affect in-stream habitat and quality by converting, diluting, and flushing accumulated pollutants and redistributing sediment. Rejuvenation of coarse and fine-grained habitat patches is essential for maintaining aquatic organisms. The riparian zone vegetation of the Walker includes native and non-native species. Although tamarisk and Russian olive (*Elaegnus angustifolia)* have invaded the Great Basin, native Fremont cottonwood (*Populus fremontii*) and willow (*Salix* spp.) still line reaches of the Walker River. Cattail (*Typha* spp.) and hardstem bulrush (*Scirpus acuta*) are abundant in riparian zone wetlands associated with the Walker River and where the water table supports wetland vegetation as well as grasses, sedges (*Carex* spp.*),* and rushes (*Juncus* spp.). Wetlands can form in oxbows or in areas of the river where flow is slow. Inundated land can host submergent plant communities dominated by pondweeds (*Potomogeton* spp.), widgeon grass (*Ruppia maritime)*, flatsedges (*Cyperus* spp.), and spikerushes (*Eliochrus* spp.).

West Walker River

Headwaters of the West Walker originate east of the Sierra crest just south of Sonora Pass, California, from Kirkwood and Tower Lakes. Three of the four remaining LCT populations that occur in the Walker River are found in West Walker River tributaries of Slinkard Creek, Silver Creek, and Wolf Creek. Leavitt Meadows, a high alpine valley, and Pickel Meadows remain undeveloped and contribute to the clarity and high water quality of the upper reaches of the West Walker River. Thirty or more species of wildflowers may be found in these mountain meadows including paintbrush (*Castilleja miniata*), lupine (*Lupinus polyphyllus*), and shooting stars (*Dodecatheon alpinum*). Where the ground remains fairly wet, grasses, rushes, and sedges dominate (Howald, 2000). At the same time, where microtopography dictates, sagebrush and other more xeric plant species occur.

Plant communities that comprise the riparian zone of the West Walker River host diverse assemblages of mammals, amphibians, birds, and insects, as well as aquatic invertebrates. California spotted owls (*Strix occidentalis occidentalis*) may occur along the Walker River headwaters in dense, old-growth, multi-layered mixed conifer forests of the Sierra Nevada to 7,600 feet elevation. They feed on a variety of small mammals, birds, and large arthropods and are thought to require a permanent water source. The Mono checkerspot butterfly (*Euphydryas editha moensis*) is a rare subspecies of the Editha butterfly. It occurs in foothills and high elevations in mountains, with the center of its range being Mono County. They also are found in wet meadows and pine forests.

Native fish species occurring in the West Walker River include rainbow trout (*Oncorhynchus mykiss*), mountain whitefish (*Prosopium williamsoni*), Lahontan redside (*Richardsonius egregious)*, Lahontan speckled dace (*Rhinichthys osculus robustus)*, Tahoe sucker (*Catostomus tahoensis)*, Lahontan Mountain sucker (*Catostomus platyrhynchus*), and Lahontan tui chub (*Gila biocolor obesus)*. Common carp (*Cyprinus carpio)* and largemouth bass (*Micropterus salmoides)* occur here, and brown trout (S*almo trutta*) and rainbow trout are stocked (NDOW 1997; Sada, 2000). Paiute sculpins (*Cottus beldingi*) were reported by

Stockwell (1994) above Topaz Lake. LCT inhabit streams feeding into the upper reaches of the West Fork, and LCT have been planted in the West Fork. In 1997, brown trout were the most common sport fish in the West Walker River (NDOW, 1997). Benthic macro-invertebrates were sampled in 1996 by NDOW at two locations (see NDOW, 1997) for Hydrazoa, Oligochaeta, and Insecta.

South of the town of Walker, the river channel becomes a network of boulders in the constraints of the Walker River canyon and, thus, is popular with anglers. Ponderosa pine (*Pinus ponderosa*) is common on the shores of the river here. From here, the West Walker flows into Antelope Valley and is flanked by irrigated pasture and alfalfa fields. Water is diverted from the main river channel downstream into Topaz Lake; this location is the upstream extent of Paiute sculpins (Stockwell, 1994). From Topaz, the West Walker River flows through Smith Valley, Wilson Canyon, and Mason Valley, through predominantly sagebrush shrub-scrub and irrigated agriculture fields. The two forks of the Walker, West and East, join in Mason Valley to form the main stem of the Walker River (CDWR 1992).

East Walker River

The East Walker River headwaters originate in the Sierra Nevada above Twin Lakes outside of Bridgeport, California. LCT occur in By-Day Creek above Bridgeport Reservoir. This meadow-like environment is grazed by cattle and supports a variety of wetland associated avifauna. Grasses and sedges dominate this pastureland, although some sagebrush occurs where microtopography permits drainage or where the ground is alkaline. The short river stretch above the grazed pasturelands in the Twin Lakes vicinity is montane riparian woodland, characterized by quaking aspen (*Populus tremuloides*), mountain alder (*Alnus tenuifolia*), and black cottonwood (*Populus balsamifera*) as well as willows (*Salix sp*.) and creek dogwood (*Cornus stolinifera*) (Howald, 2000). Rainbow trout (*Onchorhynchus mykiss*) and brown trout (*Salmo trutta*) from the Mason Valley Fish Hatchery are stocked in the East Walker River. Brown trout are the most common sport fish except where rainbow trout are stocked. Wild rainbow trout occur but are uncommon. The native mountain whitefish (*Prosopium williamsoni)* occurs mainly at Rosaschi Ranch and is rare throughout the river (NDOW, 2004).

Below Bridgeport Reservoir, the river takes on characteristics more typical of a below-dam water course. The lower stretches are considered high desert riparian woodlands. Woody vegetation in the riparian zone includes species such as the arroyo willow (*Salix lasiolepis*), cottonwood (*Populus* spp.), birch (*Betula occidentalis*), and interior wild rose (*Rosa woodsii*) (Howald, 2000). Fish species include rainbow trout, mountain whitefish, Lahontan redside, speckled dace, Tahoe sucker, Lahontan mountain sucker, tui chub, common carp, and brown trout (Sada, 2000). Both brown and rainbow trout are actively stocked in the East Walker River (Stockwell, 1994). Stockwell (1994) reported that a remnant population of LCT in the East Walker River was used to establish populations elsewhere in the east and west forks of the Walker. These fish species feed on the abundant mayflies, stoneflies, caddis, and midges. Amphipods, snails, and minnows are also abundant throughout the east and west forks of the Walker River.

Shortly after the East Walker crosses the California and Nevada border, it enters Pine Grove Hills. The riparian vegetation between Bridgeport Reservoir and the southern end of Mason Valley is similar to the riparian community below Bridgeport Reservoir. This vegetation provides cover for a variety of birds and small mammals. In Mason Valley, the East Walker runs through open sagebrush and irrigated agriculture country.

Mainstem Walker River

The main stretch of the Walker River, below the point at which the east and west forks converge, is dominated by cottonwood, willow, and, in places, tamarisk. Tamarisk, commonly known as salt cedar, was introduced to the river basin in 1837. The river slows down relative to its flow rate in the constrained canyons upstream after it enters the relatively flat sagebrush and agricultural countryside. As a result, the river changes character, losing its boulder and cobble substrate and pronounced pools and riffles. Water is lost to phreatophyte use (deep-rooted plants that obtain water from the water table or the layer of soil just above it), particularly downstream from the Wabuska gage (Humberstone, 1999).

Cooper and Koch (1984) reported that LCT and Tahoe suckers no longer spawn in the Walker River. Stockwell (1994) reports rainbow trout, mountain whitefish, Lahontan redside, speckled dace, Lahontan Mountain sucker, tui chub, common carp, and brown trout are found in the Walker River. Other fish species that occur here include largemouth bass (*Micropterus salmoides*), channel catfish (*Ictalurus nebulosis*), white catfish (*Ameirus catus*), bullhead catfish (*Ictalusus nebulosis*) and bluegill sunfish (*Lepomus macrochirus*).

On a broader scale, Great Basin wetlands—such as riparian zones along the Walker River, the pasturelands outside of Bridgeport, and pasture in the Walker Valley adjacent to Topaz Lake—are important habitat for migrating birds. In general, for the Great Basin, such wetland areas provide critical stopover habitat.

2.4 Recreational Use in the Walker River Basin[d]

The Walker River Basin includes diverse recreational resources. Lake, reservoir, river, upland, mountain, and wetland areas are used for day and overnight recreational activities all year. Activities in the Walker Basin include boating, fishing, big and small game hunting, offroad vehicle use, sightseeing, hiking, kayaking, swimming, rock hounding, photography, nature study, bird watching, collecting plants, and rock climbing.

Recreational lands are private or owned and administered by USFS, California, Bureau of Indian Affairs (BIA), and Bureau of Land Management (BLM). The USFS owns and manages the Rosaschi Ranch, which includes a seven-mile stretch of the East Walker River, renowned as a spectacular catch and release fly-fishing destination. Within the Toiyabe National Forest, Nevada, and the Inyo National Forest, California, lies the 47,937-acre Hoover Wilderness Area. Two proposed areas are currently (2007) recommended for wilderness designation in the Toiyabe National Forest Plan: the Hoover Planning Area West (49,200 acres) and the Hoover Planning Area East (23,500 acres). The USFS also administers Alum Creek campground

[d] Except where specifically cited, the following information in this section is taken from Sharpe et al. (2007)

(camping and picnicking) and Desert Creek Campground (camping, fishing, and picnicking). The BIA administers much of the land around the main stem of the Walker River. The BLM administers Wilson Canyon (picnicking and fishing), and the Nevada Highway Division administers the Wilson Canyon rest area.

More than 57 miles of the East Carson River, from its source in the Carson-Iceberg Wilderness to a point just upstream of the Gardnerville/Minden area were determined eligible for federal designation as a *"Wild and Scenic River"* in recognition of the river's outstanding scenic, recreation, fish, and wildlife values. In addition, approximately 48 miles of the West Walker River from its source in the Hoover Wilderness to the Topaz Lake Valley were determined eligible for its outstanding recreation, fish, and wildlife values. The USFS also identified 35 miles of the East Walker River from Bridgeport reservoir to the National Forest boundary in Nevada as eligible due to its outstanding scenic, recreation, historical, cultural, fish, and wildlife values.

The BLM, Walker River Paiute Tribe, and Hawthorne Army Depot are landowners contiguous to Walker Lake, whereas Nevada has jurisdiction of land beneath the lake. BLM campgrounds adjacent to Walker Lake, Sportsman's Beach, and Tamarack Point attract between 8,000 and 11,000 visitors every year. Special events, such as the Audubon Christmas Bird Count and the Loon Festival, attract three to five hundred visitors to the basin each year. Boating and boat fishing, swimming, picnicking, and camping also occur at the three major reservoirs in the basin. Bridgeport Reservoir is situated at the base of the Sierra Nevada in California on the East Walker River. Topaz Lake lies on the California-Nevada border and receives West Walker River water. Weber Reservoir is located on the main stem of the Walker River on the Walker River Paiute Reservation. Public access to these areas includes land owned or administered by the USFS, BLM, private entities (Bridgeport Reservoir); private and federal (Topaz Lake); and Walker River Paiute Reservation (Weber Reservoir).

The Mason Valley Wildlife Management Area and the Alkali Lake (Artesia) Wildlife Management Area, administered by Nevada, offer hunting, bird watching, and fishing opportunities. Recreational use of the Mason Valley Wildlife Management Area (WMA) is considerable. For the period from 1991 through 2005, the area hosted an average of 38,000 visitors per year. Visitor activities include hunting, fishing, bird watching, hiking, horseback riding, berry picking, photographing, bicycling, and touring the fish hatchery.

3.0 Resource Injuries and Damage Claims

Injury and associated damages were separated into two categories by the Trustees in order to address impacts to natural resources and human recreational activities. A detailed description of the injuries documented and the associated damage claims developed as a result of the AFFS release are provided in Hampton et al. (2002) but are summarized in the following sections for reference.

3.1 Natural Resources

The Trustees based their damage claim for injuries to natural resources upon the cost to compensate the public for the lost resources between the time of the impacts and full recovery of the resources. Resource Equivalency Analysis (REA) was used to provide the basis of a service-to-service measurement of the restoration required to compensate for the injuries (Hampton et al. 2002). This is a standard method used nationwide for NRDA and is the recommended approach under the National Oceanic and Atmospheric Administration's (NOAA) guidelines for the Oil Pollution Act of 1990. This method bases the dollar amount of damages on the costs to restore the equivalent resources that were injured in the spill. The basic task of REA is to quantify the injury, identify a restoration project and quantify the benefits, scale the restoration project so that its size is commensurate with the injury, and then cost out the project. The cost of the project, plus appropriate oversight and monitoring, thus become the claim for damages.

The injury was quantified with respect to degree, duration, and geographic area. For simplifying purposes, the impact area was limited to 15 stream miles of in-stream resources. To quantify the initial degree of injury, the Trustees considered the results of the water, sediment, and fish tissue sampling, the macro-invertebrate surveys, the fish surveys, and other observed impacts to wildlife during the spill. The Trustees concluded that, by virtually any measure, the initial degree of injury was at least 75% of the resource services. To estimate the time until full recovery, the Trustees considered the natural life histories and reproductive capabilities of the impacted macro-invertebrates, fish, birds, and mammals. The Trustees believe that the macro-invertebrates would fully recover in one to two years (depending on species), and the other animals would take at least five years to fully replace the demographic age classes that were lost. Therefore, the Trustees have estimated that full recovery from the spill would occur after five years. Note that this is based on the assumption that oil is no longer adversely affecting the stream. A summary of the documented and suspected injuries to natural resources for which the damage claims were estimated are summarized in the following sections.

3.1.1 Acute Injuries and Mortalities

Significant acute impacts occurred to aquatic macro-invertebrates and fish due to the toxicity of the oil spilled and the actions needed to facilitate cleanup such as the reduction in river flows and the use of equipment within the riverine environment. Approximately 21 dead fish were collected during the cleanup operations, the majority of which were mountain whitefish (*Prosopium williamsoni*), and the aquatic macro-invertebrate community were severely impacted (Hampton et al. 2002). In addition to the impacts to macro-invertebrates and fish, other species also suffered direct injuries. During the response period, crews recovered/collected the following dead animals within the first 10 miles of the spill zone: one Virginia rail (*Rallus limicola*), two American dippers (*Cinclus mexicanus*), one American mink (*Mustela vison*), and six beavers (*Castor canadensis*). The following animals were observed alive and oiled, but were not captured: one common merganser (*Mergus merganser*), one great blue heron (*Ardea herodias*), and one bald eagle (*Haliaeetus leucocephalus*).

Generally, it is very difficult to find dead animals during a spill response and it is usually assumed that only a fraction of those actually killed are found dead. Given that an American dipper is less than eight inches long and has solid dark gray plumage, it is remarkable that two were recovered. Based on the number of birds and mammals recovered, the number expected to be along the stream, and the amount of oil spilled, it is likely that nearly all the birds and mammals that regularly came in contact with the water within the first 10 miles of the spill zone were killed by the spill.

3.1.2 Biota Exposures to AFFS Fuel Oil #6

In the aquatic environment, the main concern from fuel oil #6 is in the aromatics such as benzene, toluene, xylene, naphthalene and others. Fuel oil #6 contains considerable amounts of polycyclic aromatic hydrocarbons (PAHs) (Rand and Petrocelli 1985; World Health Organization 1989). In terms of impacts to natural resources, PAHs vary substantially in their toxicity to aquatic organisms. Low-weight PAHs (LPAHs) such as naphthalene, fluorene, phenanthrene, and anthracene are acutely toxic to aquatic organisms. The majority of PAHs released to the East Walker River were LPAHs. Many of the high-weight PAHs (HPAHs), such as chrysene and benzo(a)pyrene, are less acutely lethal but demonstrably carcinogenic, mutagenic, or teratogenic to a wide variety of organisms including fish, amphibians, birds, and mammals (Moore and Ramamoorthy 1984; Eisler 1987). The analytical results from water, sediment and fish tissue samples collected in the East Walker River after the AFFS release and the potential ecological risks from exposure is provided in Higgins (2002) and summarized below.

3.1.2.1 Water

Water concentrations of PAH's in the East Walker River were above concentrations associated with mortality of salmon embryos during the January 2001 period and above concentrations associated with sub-lethal effects to herring eggs during the March 2001 period. However, concentrations were reduced enough in the water column by May 2001 to no longer pose an immediate threat to fish. Areas of the East Walker River had high enough concentrations of PAHs to impact reproductive success of fish as well as recruitment after the spill event. This was confirmed with data collected in an extensive fish survey of the East Walker River in 2001 by the California Department of Fish and Game and the Nevada Division of Wildlife (Hampton et al. 2002). Results showed the potential reduction of juvenile age classes and recruitment of rainbow trout and mountain whitefish.

3.1.2.2 Sediment

Total PAH concentrations in sediment exceeded the consensus-based Threshold Effect Concentration (TEC) guideline established for freshwater sediments by MacDonald et al (2000) at several locations within the impacted area during the March 2001 period. Sediment at most sites sampled during March 2001 consisted mostly of LPAHs. By the May 2001 period PAH concentrations decreased below their specific TEC guidelines at all sites except one. Over time LPAHs in sediments may convert to HPAHs and may persist where they are subjected to burial, resuspension, and degradation reactions. The available literature suggests that microbes degrade HPAHs slower than LPAHs. Half-lives for these compounds range

from months to years. Furthermore, biodegradation probably occurs more slowly in aquatic systems than in soil (Clement Associates 1985). However, concentrations found in sediments suggest that significant degradation of PAHs occurred at most sites downstream of the impact site by May 2001

3.1.2.3 Fish

Fish surveys conducted by the Nevada Division of Wildlife showed significant numbers of young fish detected on surveys in the past. In 2001, however, almost no young rainbow trout were found (Hampton et al. 2002). Rainbow trout spawn in spring, shortly after the time of the spill event. The reduction of the juvenile age class is consistent with known toxicological effects of oil on fish eggs and PAH concentrations detected in sediment samples during the spring spawning period (March). In addition, fish density per mile for mountain whitefish was significantly reduced for both California and Nevada sites (Hampton et al. 2002). Mountain whitefish are bottom-oriented predators which feed mostly on small aquatic insects and made them more susceptible to effects of sediment contamination from the spill event.

Fish tissue concentrations of PAHs indicated uptake into tissues from diet and exposure to PAH-contaminated sediments. PAH concentrations were highest for suckers who spend a majority of their time at the sediment/water interface and feed directly at the substrate where PAH concentrations were greatest. However, bioaccumulation factors calculated by Higgins (2002) indicated that fish rapidly metabolized PAHs in the East Walker River. Therefore, fish tissue concentrations of PAH compounds in fish tissues did not provide a useful measure of exposure and could not provide a definitive assessment of damage to fish. Instead, determining concentrations of PAHs in sediment was a useful measure of exposure because exposure to PAH-contaminated sediment has been linked to adverse effects.

3.1.3 Macro-invertebrate Community

California Department of Fish and Game conducted surveys of benthic macro-invertebrates in the East Walker River both before and after the AFFS spill to determine and quantify impacts to aquatic biota. Using methods outlined in the California Stream Bioassessment Protocol, CDFG determined that benthic communities if macro-invertebrates were affected by the spill. Benthic Macro-Invertebrate Index (BMI) data showed a 79 and 65 percent loss in abundance in January and March 2001, respectively. A follow-up benthic macro-invertebrate survey was conducted at the same sample points above and below the spill zone in October 2006 and 2007. Final results from surveys are pending but will provide information on the recovery of the impacted section of East Walker River. For the detailed analyses of the macro-invertebrate results, refer to Hampton et al. (2002).

3.1.4 Fish Community

Fish species diversity and abundance is high in the East Walker River. Annual fish surveys were conducted each fall in California and Nevada before the spill because of the high value (recreationally and ecologically) that the fishery provides to the local community. Using fish

survey data conducted in the East Walker River before and immediately after the AFFS spill, significantly fewer fish were present 2001 compared to previous years. Focusing on the percentage change from the pre-spill average, the percent injury estimates ranged from 25% (for rainbow trout in California) to 98% (for young rainbow trout in Nevada). This rather straightforward approach, however, fails to consider natural variation. The standard deviation around the pre-spill mean provides a useful measure of the variability in the data. When looking at the number of standard deviations beyond the mean, all of the survey data show a marked decline in fish in 2001 except for rainbow trout in California. Nearly all of the fish measures are over one standard deviation beyond the mean prior to the spill. For mountain whitefish in Nevada, the 2001 average was 2.6 standard deviations below the mean. This suggests that the low numbers of fish observed in the 2001 surveys are exceptional and well beyond natural variability.

Analyses by the Trustees (Hampton et al. 2002) indicated that fish populations were lower in 2001 because of at least three separate spill related causal factors which lead to significantly fewer fish in 2001: 1) anchor ice in the East Walker River created from exceptionally cold weather and low flow management used for oil cleanup purposes; 2) a reduction of food supply as a result of injuries to macro-invertebrates; and 3) direct toxicity from exposure to polycyclic aromatic hydrocarbons (PAHs) contained in the spill oil.

3.2 Human Recreational Activities

The spill and resulting cleanup had a direct impact on angling in Nevada during the response period (January through March, 2001). During this period, angling was curtailed in portions of Nevada, causing cancellations of reservations at private ranches. Angling in California was unaffected, as fishing season was closed until April 28. Through the rest of the year, angling may have been further impacted in both states as news of the oil spill spread through the recreational fishing community. CalTrout, a large fishermen's organization, became quite concerned about the spill, informing its members and closely monitoring the cleanup. They wrote to the Director the California Department of Fish and Game, urging rapid cleanup to protect "one of the finest fisheries in the entire state" and to ensure that "public trust values are maintained" (Edmondson 2001). In addition, they encouraged their members to write similar letters. Other fishing organizations and magazines also followed the spill (e.g. High Sierra Fly Casters and The Fish Sniffer Online). This cumulative impact may have caused anglers to avoid the East Walker River and alter their plans for the summer.

Baseline recreational use by anglers was determined using data from roving angler surveys and the drop-box questionnaires provided by the Nevada Department of Wildlife. Based upon those results, the Trustees estimated a conservative estimate of 5,500 lost angler days due to the spill. Because recreational fishing is an activity with limited defined market and/or prices, it was necessary to use a non-market valuation method to determine the willingness-to-pay for an angler day. Such methods include Contingent Valuation, Travel Cost Method, and Random Utility Models. While no such analysis was been done for the East Walker River, and conducting primary research would be quite costly, the Trustees relied on the Benefits Transfer

Method, whereby the results of previous studies on similar rivers is extrapolated and applied to this case.

Boyle and Markowski (2000), on behalf of the USFWS, conducted a meta-analysis of 23 different studies, with 278 different observations, of recreational fishing in the United States. For trout fishing in rivers, they calculated the weighted mean consumer surplus of the sample to be $37 per angler day (Table 12 of Boyle and Markowski). Adjusted for inflation using the Consumer Price Index, this is $42.28 in 2002 dollars. Multiplying this rate by the total number of lost angler days yields the recreational fishing values lost by the public as a result of the spill: $42.28/angler day x 5,500 lost angler days = **$232,540**. For the detailed results of the analyses, refer to Hampton et al. (2002).

4.0 Background to Alternative Selection

The proposed restoration alternatives in this DRP/EA incorporate a watershed based approach to effectively restore and protect aquatic resources and improve recreational opportunities for the public. This is consistent with the United States Environmental Protection Agency (EPA) approach to promote watershed based planning efforts. This is also consistent with other activities that have been and are currently being managed by the Walker River Recovery Implementation Team that is already working in the watershed.

Emphasis under the watershed approach is directed at all aspects of surface and ground water quality including physical, chemical, and biological parameters. The alternatives proposed in this document are consistent with these activities. The watershed approach is action oriented, driven by broad environmental objectives, and involves key stakeholders. The major cornerstones of this approach are public participation, problem identification, and implementation of restoration projects.

4.1 Identification of Restoration Projects

The Settlement Agreement and the MOU provides guidance for restoration projects along the East Walker River. The MOU memorializes the incident and provides a framework for coordination and cooperation among the Trustees in the use of the NRD money from the Oil Spill settlement for wildlife projects, habitat restoration and protection, and human use projects.

The Trustees presently intend to apply approximately $140,000 of the NRD money to fund restoration projects benefiting in-stream and riparian habitat; approximately $105,000 will be allocated for recreational fishing improvements/human use type projects; approximately $55,000 will be allocated for continued benthic macro-invertebrate (BMI) surveys of the stream recovery as needed; and approximately $50,000 will be allocated for Trustee Council administration. However, ultimately these allocations may be adjusted based on actual restoration costs and needs as part of the restoration planning process carried out by the Trustee Council.

The Trustee Council has held meetings regarding the restoration planning for the East Walker River. During these meetings, the Trustees have developed a list of potential restoration project concepts. The concepts have been prioritized and further developed to facilitate the evaluation of their feasibility. The project alternatives are presented in the following sections. Following the public review process of this DRP/EA restoration concepts will be further refined and new potential projects will be evaluated to develop a final project list for implementation.

4.2 Restoration Alternative Evaluation Criteria

The Trustee Council developed evaluation criteria to evaluate, prioritize, and select restoration alternatives. The following list of criteria was used to qualitatively examine each project proposal as opposed to using a numerical ranking.

1. Consistency with the trustees' restoration goals
The restoration alternative must meet the trustees' intent to restore riparian and in-stream habitat and enhance public recreation uses along the East Walker River its tributaries. The more consistent the restoration projects are to the restoration goals, the higher the priority given to the proposed alternative under this criterion.

2. Feasibility
This criterion is used to examine the technical, biological, regulatory, and political feasibility of a proposed restoration project. Trustees shall evaluate the soundness of the restoration technique, level of risk or uncertainty in implementing the project, the likelihood of success, and various other factors that influence feasibility of the alternative. Higher priority is given to a more feasible restoration alternative.

3. Compliance with laws
The proposed restoration alternative must comply with all applicable laws including those that protect the health and safety of the public. In addition, the restoration alternative cannot serve as required mitigation for another project. Those restoration alternatives that do not comply will be eliminated from consideration.

4. Duration of benefits
The mission of the East Walker River Trustee Council and the intent of the Settlement Agreement are to restore riparian and in-stream habitat and provide recreational fishing improvements in perpetuity. Such restored resources would have to be again restored if future events damaged these resources. Those restoration alternatives that do not contribute to restoration and public use in perpetuity will not be considered further.

5. Avoidance of future or collateral injuries
The proposed restoration alternative shall avoid or minimize adverse impacts to the environment and the associated natural resources. Unavoidable and temporary adverse impacts may result when implementing the proposed project. The more permanent restoration project benefits will outweigh any temporary unavoidable adverse impacts. Restoration alternatives that provide for a greater avoidance of collateral injuries shall receive more consideration under this criterion.

6. Benefits relative to costs
This criterion examines the relationship between expected benefits and expected costs of a restoration alternative. Trustees shall seek projects with the most cost-efficient approach to provide the same resource benefits. The lower the cost of providing the benefits, the higher the priority that will be given to a restoration alternative under this criterion.

7. Opportunities for collaboration
The trustees shall consider the possibility of matching funds, in-kind services, or volunteer assistance, as well as coordination with other ongoing or proposed restoration projects. Restoration alternatives that provide opportunities for a collaborative restoration effort shall receive a higher priority for this criterion.

8. Endangered/threatened species and sensitive habitat areas
The trustees shall examine the ability of the restoration alternative to enhance and protect endangered and threatened species, and the more sensitive and rare habitat areas. A project that promotes the restoration, enhancement and protection of these species and habitat areas receives a higher priority for this criterion.

5.0 Proposed Restoration Projects

The Trustee Council, when developing the DRP/EA, identified a reasonable number of possible alternatives that provide for riparian and in-stream habitat restoration and recreational fishing improvements that will compensate for the losses that occurred during the incident. These proposed restoration alternatives met the conditions of the Settlement Agreement and MOU, were evaluated and have been proposed through application of the evaluation criteria, and met the goals and objectives outlined by the Trustee Council. The following proposed restoration projects were identified by the Council, including a 'no action' alternative. General descriptions of the type of proposed restoration actions are listed below. Detailed descriptions of individual projects either considered or not considered under these actions are provided in Appendices B and C.

5.1 No Action Alternative (Natural Recovery)

The 'no action' alternative looks at the ability of the injured natural resources to recover on their own. The 'no action' alternative is not to spend the $350,000 allocated for riparian and in-stream

habitat restoration and recreational fishing improvements. Under this alternative, the Trustee would not complete "restoration activities" over the next several years. The public would not be compensated, at this time, for any injuries to natural resources or any interim losses of natural resources caused by the release of fuel oil #6 into the East Walker River. Past environmental degradation due to activities not directly related to the oil release (e.g., logging, road building, agriculture, grazing) would not be addressed by the Trustees under the No Action alternative. Since the Trustee Council is committed and required under the Settlement Agreement to spend the allocated money on riparian and in-stream habitat restoration and recreational fishing improvements, the 'no action' alternative will not be considered further as a viable alternative.

5.2 Project Proposals Not Considered

Project proposals not considered by the Trustee Council for implementation are provided in Appendix B. These proposals were not considered because they failed to meet the evaluation criteria, were inconsistent with the Trustee Council's restoration goals as specified in the Settlement Agreement, or were not ready for implementation. Some proposals submitted by the public may not have been approved as separate projects but were incorporated into other approved projects for implementation.

5.3 Project Proposals Considered for Implementation

The Trustee Council has considered a number of project proposals on both public and private lands. Land in the watershed that is adjacent to creeks is both Federal, State and privately owned. Where Trustee Council funds will be used on private property, enforceable agreements will be required with the landowners to ensure protection of the projects. In some cases such agreements are already in process. The Trustee Council does not intend to fund projects unless long term protection is provided in the form of conservation easements or similar agreements with willing landowners. Where long term protection will not be provided, the funds will remain in the NRDAR account and used to fund a comparable project at a site where the landowner is willing to ensure protection of the project.

Projects considered for implementation were subdivided into three categories representing the types of work needed to compensate for the resources that were injured in the spill. These categories are Riparian Restoration, Native Fish Recovery, or Recreational Improvements. A detailed list of initial projects considered prior to input provided by the public is provided in Appendix C.

5.3.1 Riparian Restoration Projects

Riparian habitat is important to aquatic and terrestrial resources. A healthy complex of vegetation, including large canopy trees and understory vegetation, along with instream structure creates shade to keep water temperatures cool for fish and provides habitat where fish can rest, feed, and reproduce. These riparian habitats are also critical for numerous species of birds,

mammals, and amphibians. Loss of these important habitats impacts all aquatic life, as well as other species which depend on these areas for food and cover. Additionally, there is the potential that revegetated and stabilized banks will filter run-off that may contain pollutants such as fertilizers, pesticides and herbicides. Such chemicals, if present, may impact fish and macroinvertebrates.

Riparian restoration projects could use a variety of restoration techniques, incorporating both active and passive methods, which would be applied at sites within the Walker River Basin. The quality and quantity of instream and riparian cover is severely reduced in many Walker River Basin streams. This condition will be directly improved utilizing four complementary actions: 1) fencing riparian areas, 2) constructing instream structures, 3) removal and control of exotics, and 4) planting stream side vegetation. These actions have proven effective in restoring stream habitat condition when properly applied. The objectives of projects would include the creation of more species-diverse stands that would provide long-term benefits of stream shading, large wood recruitment, organic litter, and root strength for stream bank stability. Projects would be applied along fish-bearing streams that are 3rd -order or larger. Brief descriptions of riparian restoration actions considered by this DRP/EA are provided below.

5.3.1.1 Fencing Riparian Areas

The purpose of riparian protection fence range improvement proposal is to improve rangeland health, watershed condition, and plant species composition and production in the impacted riparian corridors. Fencing would prevent livestock (cattle and sheep) from over-utilizing native riparian plants in important habitats, and give areas needed range rest. Range utilization studies conducted in various areas of the Walker Basin over the past several years have shown a pattern of heavy and severe use by livestock during the summer grazing period, resulting in adverse impacts to select riparian areas. These problems included creek down-cutting, eroded banks, trampled and hummocky areas, inappropriate vegetation composition, and a riparian system that is not vertically stable. Riparian fencing would take steps to correct these problems.

5.3.1.2 Constructing Instream Structures

The intent of this method is to manage habitat at the highest potential quality based on inventory and analysis of channel and watershed attributes. Many habitats currently supporting native and game fish populations are in sub-optimal condition due to habitat alteration and/or natural influences. Actions to restore habitat condition will be identified and implemented, including actions to improve conditions of water quality impaired streams that support native and game fish. In certain situations, enhancement options (e.g., passage barriers, spawning and rearing habitat) that create habitat conditions beyond those considered natural will be implemented to maximize benefits to a population. Habitat restoration and/or enhancement may be necessary on streams identified for population restoration or introduction of native fish such as LCT.

5.3.1.3 Removal and Control of Exotics

Reducing the density of non-native vegetation decreases competition with desirable native vegetation such as willow and cottonwood. Multiple techniques have been developed for

non-native vegetation control in riparian habitats of the Eastern Sierras, including mechanical, herbicide, and cut-stump treatments.

Mechanical treatment involves the use of heavy equipment to turn standing vegetation into mulch material by mastication. Rotary mulching heads are attached to either rubber-tire or tracked equipment that can move to target non-native vegetation while leaving desirable species undisturbed. The mulch layer that is left as a byproduct of mastication can be removed or left on-site to aid in moisture retention and erosion control.

In cut-stump treatment, hand crews and chainsaws remove unwanted vegetation. The use of hand crews allows for precise removal of undesirable vegetation and is particularly desirable in stands of mixed native/non-native vegetation. The cut-stump treatment is also beneficial when working on islands or other locations where heavy equipment access is limited.

Herbicide application is used in combination with other control techniques. When using the cut-stump treatment, herbicide is applied with a backpack sprayer directly to the cut stump immediately after felling. Application with a backpack sprayer allows for precise application, minimizing potential application to non-target vegetation. Following mechanical treatment with mastication equipment, herbicide is applied to the foliar area of the re-sprouts of non-native vegetation as a re-treatment during the growing season after mastication. One or more of the following commonly used herbicides will be used in the project: triclopyr ester (e.g., Garlon 4); triclopyr amine (e.g., Garlon 3a); imazapyr (e.g., Arsenal); and glyphosphate (RoundUp). All herbicides will be applied in strict accordance with the product label and under a State of California or Nevada–approved pesticide application license.

5.3.1.4 Planting Streamside Vegetation

Replanting of native riparian vegetation encourages the establishment of desired species during restoration efforts. Planting native vegetation can help to prevent the encroachment of noxious weeds after they are removed. Common riparian vegetation replanting techniques include pole planting, whip planting, containerized stock planting, and direct seeding. Pole and whip planting are frequently used for willow and cottonwood. Poles and whips are straight, branch-like pieces of the desired species. Holes are dug to the low water table, and the pole or whip is then inserted and the hole backfilled. This technique takes advantage of the regenerative nature of the species. If favorable conditions persist, no maintenance is required for this technique. Planting containerized stock is similar to pole planting, but rooted vegetation grown in a greenhouse is used in place of poles and whips. Direct seeding is often the preferred technique for replanting herbaceous vegetation. Seed is broadcast mechanically or by hand to achieve the desired coverage. Alternatively, seed drills can be used to sow the seed beneath the soil surface. Placing the seed beneath the surface allows for protection from the elements and animals that may feed on the seed. All of the described techniques may be used during the proposed Project.

5.3.2 Native Fish Recovery Projects

Historically, LCT occurred throughout the Walker River drainage from the headwaters in California downstream to Walker Lake (LaRivers 1962; Gerstung 1988). It has been documented that LCT were found in Upper and Lower Twin Lakes and in tributaries above the present day Bridgeport Dam on the East Fork of the Walker River (Becker, pers. comm 2002; as cited in WRIT 2003); in many tributaries in the upper sections of the West Fork of the Walker River (Becker, pers. comm. 2002; as cited in WRIT 2003) and seasonally downstream in the Walker River to Walker Lake.

Introductions of non-native fish into the Walker River system began in the 1800s, by private and state entities (USFWS 1995). The addition of non-native salmonid species has contributed to the decline of most if not all of the cutthroat trout subspecies including LCT. In aquatic ecosystems modified by human disturbance, non-native fish species often become dominant and out-compete native fish species (Deacon and Minckley 1974, Shepard et al. 1997; Brandenburg and Gido 1999; Schindler 2000; Knapp et al. 2001). The two most prevalent non-native salmonids in the East and West Forks of the Walker River are rainbow and brown trout. Brook trout and brown trout compete with cutthroat trout for space and resources (Gerstung 1988; Gresswell 1988; Griffith 1988; Fausch 1989; Hildebrand 1998; Schroeter 1998; Dunham et al. 1999). Rainbow trout, a closely related species, spawns at the same time and uses the same spawning habitat as LCT with which it interbreeds creating hybrids individuals.

Cutthroat trout management has two very important but somewhat different components: a conservation component and a recreational fishery component. The conservation component deals with preservation of the subspecies and the unique adaptive life history characteristics. The recreational fishery component focuses on management for the direct benefit of the angling public. However, the information contained in this part of the DRP/EA outlines the conservation component of LCT management while also considering recreational opportunities. Therefore, f native fish recovery projects considered by this DRP/EA may include one or more of the following actions: isolation of fish populations; removal of non-native fish; and native trout introductions. Brief descriptions of these actions are provided in the following sections.

5.3.2.1 Isolation of Fish Populations

Fish-migration barriers will be constructed at the downstream end of project stream reaches where naturally occurring or manmade barriers do not already exist. Barriers will generally consist of small check dams constructed of boulders and large rocks, creating a vertical drop of approximately 5 ft on the downstream side. Locations for barriers will be selected to utilize naturally occurring drops which can be enhanced and where the stream channel and floodplain is confined to minimize the size of the structure and the amount of water impounded behind the check dam/barrier. Where feasible, two barriers will be constructed near the downstream end of project stream reaches to help insure their effectiveness. In some instances, barriers may be created by modifying or enhancing structures such as culverts at stream crossings or diversion structures. All barrier construction will comply with laws, regulations, and permitting requirements of the State Engineer for stream channel alteration. Barrier materials would be taken from the ground surface, near the stream. The collection of these materials would not require excavation, stream alteration, or vegetation disturbance. If

sufficient material is not available on site additional materials will be hauled to the barrier site from an approved source.

Stream barrier locations would be selected to minimize changes in stream gradient, hydraulic function, and water pooling. In addition, barriers would be constructed adjacent to existing roads where equipment access is acceptable, thus requiring little disturbance to surrounding areas. Riparian vegetation would be disturbed as little as possible during the construction of migration barriers, while areas where surface disturbance would occur will be restored to pre-project conditions. Barriers will not be placed in areas of cultural or historic significance, or in areas where sensitive, threatened or endangered plants occur. Migration barriers are designed to operate under the natural fluctuations of a stream flow without routine maintenance. Barrier designs pose little, if any, threat to the natural stream system or its associated riparian area. Consequently, if a barrier failed no damage would result to the stream environment. Maintenance could include the adjustment or replacement of individual rock materials, but such work would be minor.

5.3.2.2 Non-native Fish Removal

As a protective action, removal or suppression of non-native fish that are likely to hybridize or compete with conservation populations will be considered. These actions will be under the direction of the State and will be based on site-specific investigation and analysis and recommendation from the Walker River Recovery Implementation Team.

Physical removal by electrofishing, gillnetting, or seining are common techniques used to collect fish and sample populations. They are, however, labor intensive, and it is not practical to capture all fish necessary for a removal program (CDFG 1983). Consequently, this method of capture and removal of fish is not effective enough to insure that nonnative fish would be completely removed and would not re-colonize treated waters.

Liquid emulsifiable and powder rotenone (Liquid Rotenone, 5% Active Ingredient, EPA Registration No. 432-172; Powder Rotenone, 7.4% Active Ingredient, EPA Registration No. 6458-6) would be used to treat target waters. Liquid Rotenone would be applied at a rate of 0.5 - 3.0 ppm. In ponds liquid rotenone would be dispersed from small water-craft using pressurized backpack spray units. On streams and canals, liquid rotenone would be applied using drip stations over a 3-24 hr period (Finlayson et. al 2000). Drip stations would be located at approximately 0.5 mile intervals. Pressurized backpack sprayers would be used to apply a diluted solution of the chemical to springs and backwater areas containing fish which were not effectively treated by boat or drip station. Rotenone powder may be used in addition to liquid when treating ponds or the marsh area. Powder Rotenone would be applied at 0.5 - 3.0 ppm as wet slurry by boat or hand. Where necessary, the rotenone would be detoxified with potassium permanganate downstream from target waters to prevent impacts from occurring below the target area. Application of the chemical would be conducted by CDFG, NDOW, and/or USFS personnel certified as Noncommercial Pesticide Applicators by the California or Nevada Departments of Agriculture. Safety gear including rubber gloves, protective coveralls and respirators would be used where appropriate.

5.3.2.3 Native Fish Introductions

LCT will be taken either from the Lahontan National Fish Hatchery (Pilot Peak strain) or from a donor population in nearby streams as appropriate and placed into the project stream(s). Fish will either be transported by helicopter or truck to the project area. Where driving is not possible, fish will be transported to the stocking sites by pack animal, backpack or helicopter.

5.3.3 Recreational Improvements

As noted in Section 1.5, the strategy of this DRP/EA is to increase or enhance natural resources and opportunities for recreational access or use of these same resources, in accordance with the public losses which were documented. Based upon an analysis of recreational losses as a result from the AFFS spill incident, Hampton et al (2002) estimated a loss of approximately 8,000 angler days for the East Walker River. During the restoration scoping process, however, the Trustees found that opportunities to restore natural resource losses as a means of increasing the services of these resources for public recreation were limited. As a result, the DRP/EA includes some actions which preserve or conserve natural resources, but also includes actions which will increase or enhance recreational access or use of the affected resources.

All proposed projects should be consistent with resource management activities that are compatible with river resources. Therefore, recreational improvements proposed by this plan will have the following goals.

Projects considered under this DRP/EA will be focused on providing river-oriented recreation in natural-appearing or culturally-influenced settings. The river may be readily accessible by roads and trails. Recreational improvements such as trailheads and river access points will be available in some locations. A variety of non-motorized recreation opportunities may be provided throughout the watershed. These activities will be dispersed as much as possible in order to alleviate potential overcrowding or use conflicts. Access points such as trailheads and parking lots will be strategically located in the corridor and watershed to aid in the dispersal of recreation use.

Interpretation of the outstandingly remarkable values of the watershed will be available in various forms to the public from low-key off-site interpretive materials and technologies to interpretive displays at appropriate locations. The Forest Service will continue to work closely with state and local governments and private landowners to protect and enhance the outstandingly remarkable values of the East Walker River corridor.

Therefore, recreational improvement projects considered under this DRP/EA could include the following actions:

- Create or improve trail systems by dispersing biking, equestrian, and hiking uses;
- Provide staging areas for some recreational activities;
- Improve facilities and parking within the immediate river corridor but avoiding over-concentration of uses;

- Provide increased opportunities for partnerships;
- Provide an active interpretive program and improve information and directional signing; and
- Emphasize riparian area restoration and encourage improvement of water quality within the watershed.

A list of recreational improvements considered in the DRP/EA is provided in Appendix C.

6.0 Environmental Consequences of Restoration Alternatives

6.1 Riparian Restoration Projects

Each proposed technique has different levels of potential impact on riparian vegetation. All vegetative communities, native and non-native, will be altered to some degree at the selected locations under these projects. Dead and downed native deciduous species may be used for in-channel placement as large woody debris. Living native deciduous species will be avoided. Some herbaceous floodplain species may be trampled during construction, but impacts will be moderate and transitory.

For any instream actions, some potential for mobilization of sediment would exist. This would be associated with: stream bank disturbance during felling and/or winching of logs and trees into position; using an excavator to position logs and key them into stream banks; and operating an excavator in the stream channel. In the case of keying or embedding logs into the bank, approximately one cubic yard of soil per log could be displaced into the channel. In order to minimize the potential effects of these activities, the following project design features and Best Management Practices could be employed:

- Using trees from on site and placing logs that are 1.5 to 2.0 times the channel width would minimize the need for excavation.

- Silt dams or fences would be installed below excavation sites to limit the extent to which fine sediment may be transported downstream, lessening the area affected.

- Instream work would be scheduled between July 1st and September 15th when flows are at summer lows.

- Absorbent booms would be installed below the project site which would trap sediments and any accidental spills of petroleum products.

- Disturbed areas would be mulched and seeded with native grass seed.

With these mitigations, the amount of sediment delivered to streams would be small. The effects would be short-term as any fine sediment deposited in stream channels would be mobilized during the first winter freshet, and would not become embedded in spawning gravels. Any small

amounts that remain would be insufficient to affect spawning habitat or the survival of eggs and emerging fry in the following winter.

Long-term benefits would include the capture and retention of substrates to provide additional spawning opportunities for adult fish; creation of structurally complex habitats; and the creation of deep pools and off-channel habitat to provide cover and rearing habitat for juvenile fish. The overall objectives would be to provide greater spawning success, higher juvenile survival rates, and better juvenile health condition when compared to the current conditions. The benefits of these projects would be realized almost immediately following completion and persist for up to 50 years depending on the durability of structures.

Riparian restoration projects will produce short-term direct impacts on wildlife in the immediate area of disturbance and long-term beneficial effects on wildlife from improved ecological function and aquatic habitat. To avoid direct impact to migratory birds protected by the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703, et seq.), clearing and grubbing of woody vegetation will be scheduled between August 15 and April 15, outside of the normal breeding season for many migratory avian species. Should vegetation removal be implemented between April 15 and August 15, pre-construction nesting bird surveys should be conducted to identify potential MBTA issues. Any positive pre-construction survey results for migratory birds will be brought to the attention of the USFWS to determine methods of MBTA impact avoidance. Other wildlife species that likely inhabit the proposed project area, such as reptiles, mammals, and amphibians, will be temporarily displaced and could experience mortality during the implementation of the Proposed Action. These effects will be outweighed by the long-term benefits of a healthier riparian ecosystem. No long-term adverse impacts on fish species are expected to occur under these projects. Long-term benefits from aquatic habitat creation and increased food abundance within mesohabitats are expected.

6.2 Native Fish Recovery Projects

6.2.1 Isolation of Fish Populations

Fish migration barriers would be constructed on streams where barriers do not currently exist to prevent the reinvasion of removed trout species.

Implementation of this activity could result in degradation of water quality from temporary turbidity increases or erosion, or the accidental spill of hazardous materials or petroleum products. Possible degradation of water quality could result from land disturbing activities and vegetation clearing, by temporarily diverting creek flows through diversion channels, and during dewatering of construction/excavation sites. In addition, the construction site would contain various hazardous materials and petroleum products used in heavy machinery and construction operations. Implementation of this activity would require permits from the Lahontan Regional Water Quality Control Board, (LRWQCB), NDEP, and the U.S. Army Corps of Engineers to ensure that water quality is not significantly impacted. These permits are likely to include the following construction requirements and Best Management Practices (BMPs) which would avoid or minimize water quality impacts:

- A Spill Prevention Control Countermeasure Plan (SPCCP) would be developed in coordination with the LRWQCB/NDEP through the Section 401 Clean Water Act permitting process.

- Soils contaminated with fuel or other chemicals would be disposed of in a suitable manner and location to prevent discharge into flowing waters or groundwater. The contractor would follow accepted disposal methods according to the SPCCP.

- Clean spawning gravel would be used to construct temporary cofferdams.

- Hazardous materials and petroleum products would be stored in approved containers or chemical sheds, and be located at least 100 feet from the creek in an area protected from runoff.

- Equipment and machinery coming in contact with water would be inspected daily and cleaned of grease, oil, petroleum products or other nonnative materials.

- Equipment which crosses the creek could be outfitted with "diapers" to catch oil or other petroleum projects.

- Diversion channel construction may include, but is not limited to, the use of clean/washed spawning sized gravel, riprap placement, and geotechnical fabric to avoid erosion and increases in downstream turbidity.

- Temporary sediment control measures (e.g., fiber rolls or silt fences) would be located, as needed, and downstream of disturbed areas to prevent sediment from entering surface waters. These measures would be kept in place until disturbed areas are stabilized.

- Interim measures to control erosion and sedimentation over-winter would include BMPs. These include, but are not limited to, mulch, straw waddles, and silt fences. All measures would be done in coordination with an erosion control specialist and adhere to the Construction Stormwater Permit.

- Settling ponds for dredge material would be constructed in accordance with LRWQCB/NDEP regulations and design criteria. Decant waters from the ponds would meet LRWQCB/NDEP permit criteria prior to discharge into the project subject creek. Excavated material would be stored using BMPs as required by LRWQCB/NDEP permits.

- Concrete delivery and transfer equipment would be washed in contained areas protected from direct runoff until the material sets.

The permitting requirements and BMPs included in the construction specification for the project to avoid or minimize potentially adverse effects to water quality would reduce the effects to less than significant levels.

Small pools will be created by migration barriers to be installed as part of this activity at some locations. Compliance with regulations governing alteration of stream channels, including approval from the State Engineer and Army Corps of Engineer, will be obtained prior to construction of the barriers.

The construction of fish migration barriers and introduction of native trout would result in establishing and expanding native cutthroat trout in project waters. By expanding the range and number of native trout, the risk of the subspecies being lost as the result of a catastrophic event, hybridization, or displacement by other species would be reduced. This would help maintain or increase the genetic diversity in native trout populations. The potential to establish metapopulations of native trout would be increased as well as overall biological diversity.

Surface disturbance associated with construction of fish migration barriers would be limited to a narrow zone within a given stream's floodplain where it is unlikely that any historical or cultural resources would be located. Sites where barriers will be constructed will be evaluated for historical or cultural resources prior to construction in accordance with California or Nevada State laws and regulations. Final locations for barriers will be chosen so no historical properties will be affected.

6.2.2 Non-Native Fish Removal

Rotenone was selected as the chemical to use because of its effectiveness in controlling fish populations and its lack of long-term effects on the environment (Sousa et al 1987). Rotenone is a naturally occurring fish toxicant that is toxic to only fish, some aquatic invertebrates, and some juvenile amphibians at the concentrations planned for the project. It is not toxic to humans, other mammals, and birds at the concentrations used to remove fish. It has been widely used in the United States since the 1950's. CDFG and NDOW have used rotenone successfully in many similar projects and have refined application techniques to minimize adverse side effects to the environment.

Rotenone does not effect aquatic or riparian vegetation. There would be short-term direct effects to water quality as a result of the chemical treatment with rotenone. The primary direct effect would be the toxicity of rotenone to aquatic organisms including fish and invertebrates. Rotenone dissipates in flowing waters relatively rapidly (often less than 24 hours) due to dilution and increased rates of hydrolysis and photolysis (Finlayson et. al 2000). In standing water, toxic effects may occur up to for 4 - 5 weeks depending upon temperature (Bradbury 1986). Numbers of aquatic invertebrates important to the aquatic ecosystem would be temporarily suppressed. Areas upstream from the target waters or refugia left in the fishless portions of target waters would provide a source for rapid recolonization. Off-stream ponds, bogs, seeps and springs would be left untreated, serving as refugia for aquatic invertebrates. This would help insure the recolonization of the treated portions of the streams. The natural, downstream drift of aquatic insects generally results in the rapid recolonization of streams following their removal by natural or man-made events (Hynes 1972). Most or all of the invertebrate species would repopulate the treated area within one or two years (CDFG 1994).

Engstrom-Heg et al. (1978) conducted a laboratory study of the rotenone tolerance of aquatic macrionvertebrates. They felt that a treatment of less than 10 ppm-hours would generally result in only mild and temporary damage to the aquatic macroinvertebrate community. Whelan (2002) reviewed aquatic macroinvertebrate literature for both rotenone treatments and natural disturbances. He found that aquatic macroinvertebrate responses to natural events were often similar to rotenone treatments. Natural disturbances faced by macroinvertebrates in the project area include snowmelt runoff and flooding, drought, monsoon season thunderstorm flood events, and wildfire. Floods can result in major movement of the streambed, greatly affecting macroinvertebrate population levels by scouring and deposition. Rotenone treatments at low concentrations for short treatment times are likely less impacting to aquatic macroinvertebrates than major natural events. Whelan (2002) summarized mechanisms that aquatic macroinvertebrates have evolved to live in dynamic environments that make them potentially able to survive or persist through rotenone treatments. These include resistant egg stages, multiple overlapping generations, life stages that live deep in the in the gravel of the stream (hyporheic zone) with upwelling groundwater, life stages that live in silt or aquatic vegetation that binds up rotenone, and dispersal by winged adults from areas of refugia. Some taxa, especially those with low oxygen requirements, are relatively resistant to rotenone even as nymphs or adults.

Rotenone is non-toxic to mammals, including humans. At the concentrations used to kill fish, it has been estimated that a 132-lb person would have to consume over 60,000 liters of treated water at one sitting to receive a lethal dose (Sousa et al, 1987). Using a safety factor of 1,000X and the most conservative safe intake level, a person could still drink 14 liters of treated water per day. In addition, extensive testing has not shown rotenone to be carcinogenic (Bradbury 1986). Even though rotenone has been shown to be safe to humans, as a matter of policy, the EPA does not set tolerances for pesticides in potable water. At the same time, the EPA has exempted rotenone from tolerance requirements when applied intentionally to raw agricultural commodities. The CDFG (1994) and the National Academy of Science (1983) have computed "safe" levels of rotenone in drinking water that are roughly equivalent to the detection level of rotenone in water (0.005 ppm pure rotenone). Municipal drinking water supplies have been treated with rotenone in at least seven states including Utah. In some cases, rotenone treatment has been used to protect or improve drinking water quality (Hoffman and Payette 1956; Barry 1967).

The mobility of rotenone in soil is low. In fact, the leaching distance of rotenone is only 2 cm in most types of soils. This is because rotenone is strongly bound to organic matter making it unlikely that it would enter ground water. At the same time, rotenone breaks down quickly into temporary residues that would not persist as pollutants of ground water. Ultimately rotenone breaks down into carbon dioxide and water.

A secondary indirect effect of the treatment would be a temporary increase in the nutrient input to the water as a result of decomposition of fish that are killed. This effect would occur for a period of approximately 2 weeks while decomposition occurred. However, natural mortality has always occurred in the target waters and the increase would be negligible with respect to the ecosystem. Some of the nutrients would likely be rapidly assimilated by rebounding aquatic macroinvertebrate populations.

The EPA approves rotenone for the use intended in this project and it would be applied according to label instructions by personnel certified as Non-Commercial Pesticide Applicators. Changes in water quality during the project would not impair other uses. Rotenone will not affect plants and would still be of suitable quality for use by livestock, other mammals and birds.

Potassium permanganate would be used to detoxify rotenone during treatments at some of the project waters. Potassium permanganate would degrade to nontoxic, common compounds within an hour of application at the concentrations that would be used. The detoxification is not immediate in space, but requires a short mixing zone where the potassium permanganate is in contact with and oxidizes the rotenone. Below this mixing zone both fish and aquatic macroinvertebrates would survive.

Drinking water supplies would not be affected by the use of potassium permanganate because it rapidly breaks down into potassium, manganese, and water. In addition, no target streams are used directly as municipal or culinary water sources. In recent years there has been concern for human safety expressed following a study linking exposure to rotenone to Parkinson's-disease-like symptoms (Betarbet et al. 2000). Unfortunately, fear for human safety was generated by incomplete or inaccurate reporting of the Emory University study. In the study, rats were continuously and intravenously exposed to rotenone by injecting rotenone dissolved with a carrier chemical into their jugular vein. The method of exposure and degree of exposure was in no way comparable to the normal exposure in humans or other mammals through inhalation, ingestion or through the skin (AFS Fish Management Chemical Subcommittee 2001). The authors of the study concluded their study did not show that exposure to rotenone caused Parkinson's disease and stated that "rotenone seems to have little toxicity when administered orally". The intent and value of their study was in developing a model of Parkinson's disease to facilitate further research into the pathology of the disease. After extensive exposure studies and over 50 years of use as a piscicide there is no evidence of harm to humans or mammals at the concentrations to be used in the Proposed Action.

There would be a temporary increase is turbidity immediately downstream from barrier construction sites. The increase would be limited to a short reach directly below the construction site and be limited in duration to the construction period (8-12 hours).

In general, waters would be treated in the fall to minimize impacts on non-target wildlife species (amphibians, insectivorous birds and bats). The fall treatment period would also minimize the impacts on sport fishing recreation. Where necessary, waters would be treated on successive years to insure complete removal of target species. Approximately two waters would be treated per year, allowing completion of the overall project within five-six years.

Since one of the recreational activities at most of the project waters is fishing or fishing related camping and hiking, there would be a short-term impact to recreation under the Proposed Action Alternative. Fishing opportunities and success at most waters would be reduced during the rotenone treatment periods and, where limited numbers of only native trout are introduced, for several years following the chemical treatments. At some streams sterile hybrid trout may be stocked to shorten that period to one or two years. In the long term, there would be increased opportunities to fish for native trout once those populations became established.

6.2.3 Native Fish Introductions

There would be an increase in the number of, and habitat for, native cutthroat trout. The construction of fish migration barriers and introduction of native trout would result in establishing and expanding pure-strain native cutthroat trout in approximately [insert #] miles of project waters. By expanding the range and number of native trout, the risk of the subspecies being lost as the result of a catastrophic event, hybridization, or displacement by other species would be reduced. This would help maintain or increase the genetic diversity in native trout populations. The potential to establish metapopulations of native trout would be increased as well as overall biological diversity.

6.3 Recreational Improvement Projects

Since 1955, the U.S. Fish and Wildlife Service has annually conducted the *National Survey of Fishing, Hunting, and Wildlife-Associated Recreation*. The tenth survey conducted in 2001 uses the term "wildlife-watching activities." Formerly the term was "non consumptive wildlife-related recreation" (U.S. Department of the Interior 2002). The terms "consumptive" and "non consumptive" were used in previous years to distinguish between outdoor recreation activities which consume a resource, such as fish or wildlife when fishing and hunting, and those activities which were supposed not to consume a resource, such as sightseeing or walking. With the recognition that visual, solitude, and other amenities are important attributes of various recreational experiences, the conclusion was reached that any outdoor recreational activity does consume something in the way of natural, cultural, or scenic resources. The degree of consumption is dependent on the outdoor recreational activity and the outdoor receptionists engaged in the activity. One activity may require more consumption than another activity. One recreationist may consume more resources than another recreationist when engaged in the same activity. Recognition of these attributes of consumption when applied to outdoor recreation resources and use is essential to attempt to reach the proper balance between resources and use.

A variety of recreation opportunities would be provided by this DRP/EA. Recreation experiences would tend to be maintained or enhanced over time by providing better parking and support facilities throughout the watershed. Management direction would encourage access such as trailheads and parking to be dispersed throughout the watershed so as to minimize overcrowding in the corridor. Total capacity of recreation use would increase because of improved distribution of use over time and area. Commercial activities would be managed to minimize over-crowding. Angler opportunities would increase because of habitat improvements.

6.4 Cumulative Effects

Cumulative effects are the incremental effects of a proposed action when added to other past, present, and reasonably foreseeable actions, regardless of which agency or person undertakes them. This analysis discusses cumulative effects in the context of the proposed action with other known and likely actions in the resource area and for a time period of 5 to 10 years.

Implementation of the projects described in this DRP/EA could affect other specific downstream restoration projects by changing local fluvial geomorphology and hydrology. Other actions listed here could affect the DRP/EA by altering physical processes upon which the proposed projects depend. Changes in upstream water operations could also augment and improve or could decrease the effectiveness of proposed projects. In the context of the Settlement Agreement rationale, this DRP/EA will be expected to achieve compensatory restoration of 3.46 stream miles for injuries to stream biota and habitat compared to a total of approximately 3,670 miles of perennial streams that are available within the Walker Basin. In addition, the recreational improvements proposed by this DRP/EA will be designed to compensate for the public loss of 2,483 angler days among baseline average of approximately 21,590 total angler days for the East Walker River alone. When framed within the watershed approach, this DRP/EA will not have significant cumulative effects on public health or safety; natural, cultural, or tribal resources; or have precedent for a future action or represent a decision about future actions with potentially significant environmental effects. However, if any individual project implemented under this DRP/EA is determined to have the potential for an adverse effect as described under CEQA or NEPA when combined with other actions, it will be the responsibility of the implementer of the project to ensure that compliance is met under those delegated authorities.

7.0 Plan Implementation, Management, Monitoring and Oversight

For projects implemented under the riparian restoration actions, the Trustee Council will provide a notice for the submittal of proposed restoration project proposals from stakeholders and the public. The Council will develop criteria by which to evaluate and select restoration project proposals. Once the projects are selected, they will be implemented and completed with Trustee Council oversight. Each project will include performance and success criteria by which to determine project completion. This restoration project alternative may be partnered with the other grant programs such as USFWS Partners for Fish and Wildlife or NDEP's Clean Water Act 319 Non-Point Source Pollution for sharing of administration and implementation costs.

The Trustee Council will allocate funds for native fish recovery projects to the Walker River Recovery Implementation Team or a non-profit organization for implementation. The management and monitoring aspects of projects will not be paid by Council funds. However, the Trustee Council will have the opportunity to provide input and to approve of the management and monitoring plans for projects implemented with Council funds. There may be opportunities, however, where riparian restoration, recreational improvements, or combinations thereof can occur on, or in relation to native fish recovery projects funded by the Council. In these situations, the Council will have more of an oversight role in the management and monitoring of these programs. Upon the cessation of the Trustee Council, the parent agencies, namely the USFWS along with California Department of Fish and Game and Nevada Department of Wildlife, will assume oversight jurisdiction and authority. This oversight authority is to ensure that native fish recovery projects established with Council funds are properly and effectively protected, restored and managed for fish and wildlife and their associated habitats, in perpetuity.

The Trustee Council will allocate funds to another group who will coordinate the recreational improvement projects approved through this DRP/EA. It is anticipated that USFS will be the primary coordinator of such an effort, partnering with other groups or individuals such as the California DFG, Mono County, CalTrout, Trout Unlimited, and private landowners. It will require long-term commitment of resources by all partners. The management and monitoring of the recreational improvements program will be the responsibility of USFS and its partners. Success criteria will be defined and program success will be determined by USFS, Trustee Council, and other partners. The Trustee Council will have the responsibility, along with other contributors, for oversight of the projects under the program to ensure success and completion over the long-term.

The Trustee Council has the ultimate authority and responsibility for successful implementation and completion of restoration projects. For restoration alternatives, however, assistance will be provided by various groups and individuals for the implementation, management and monitoring of the projects.

8.0 Project Implementation Schedule and Budget

Implementation of this DRP/EA will be overseen by the East Walker River Trustee Council. The Trustee Council is responsible for approving all projects and approving disbursals to project implementers. Contracts will be entered into by one of the member agencies, on behalf of all the Trustees. The Trustee Council will also oversee the activities of the individual Trustee project managers.

8.1 Implementation Schedule

Implementation of restoration projects will begin over a period of approximately three years and be followed by a monitoring period of at least three to five years. Projects not requiring permits will be implemented immediately, while projects requiring additional hydrologic analysis, engineering work, and/or agency permits will be implemented as the preliminary work is completed. An implementation schedule and specific performance criteria will be developed for each of the projects approved by the Trustee Council.

8.2 Budget

The Settlement Agreement required AFFS to deposit $418,000 into an interest bearing account with the Department of the Interior's Natural Resource Damage Assessment Fund. The Trustee Council will select projects for riparian habitat, native fish restoration, and recreational improvements based upon the estimated budgets provided by the proponents. Monies not obligated or used by the initial set of selected projects will be set aside by the Trustees in the NRDA Fund for future projects requests meeting restoration goals as specified in the Settlement Agreement and meeting the criteria used to evaluate restoration project concepts. A small

portion of funds may be allocated for Trustee oversight of certain projects. The Trustee Council has the option of modifying the budget to assure the successful completion of restorations.

9.0 Compliance with other Key Statutes, Regulations, and Policies

Oil Pollution Act of 1990 (OPA), 33 U.S.C. § 2701 *et seq*.; 15 C.F.R. Part 990.
OPA consolidated provisions from several previous statutes dealing with prevention, response and compensation for oil spills. OPA provides authority for Trustee agencies to seek restoration to compensate for interim losses of natural resources or services, including the lost human uses of resources that occur pending the recovery of affected resources or services.

Under OPA and its implementing regulations, the natural resource damage assessment process consists of three phases: pre-assessment, restoration planning, and restoration implementation. In the pre-assessment phase, Trustees make a preliminary determination whether losses have occurred involving natural resources or the services they provide, and whether feasible restoration options exist to address the losses. During the restoration planning process, the losses are evaluated, the type and scale of necessary restoration actions is determined, and the proposed restoration actions are presented for public review in a Restoration Plan. In the implementation phase, selected restoration actions are carried out by the parties responsible for the spill or by the Trustees using recovered funds. This RP/EA was developed in accordance with the requirements of OPA, particularly those bearing on the use of recovered damages and public participation in the restoration planning process, and in accordance with the restoration planning guidance found in 15 C.F.R. Part 990.

National Environmental Policy Act (NEPA), 42 U.S.C. § 4321 *et seq*.; 40 C.F.R. Part 1500
NEPA requires the federal government to perform an Environmental Assessment with respect to any federal action with potential environmental consequences. In considering and identifying the restoration actions described herein, the elements of an Environmental Assessment (EA) were integrated into this RP/EA, in accordance with NEPA. Thus, the effects of the restoration actions identified herein were evaluated prior to selection. This evaluation was found to support a Finding of No Significant Impact (FONSI), which finding is incorporated into this document in Section 10.0

California Environmental Quality Act (CEQA)
After reviewing the proposed restoration projects, the State Trustee (CDFG) has determined that the restoration actions will not have a substantial, or potentially substantial, adverse change in any of the physical conditions within the areas affected by the projects. Additionally, the State Trustee considers these projects to be categorically exempt pursuant to: (1) 14 Cal. Code of Regs. section l5304, “Minor alterations to land, water, or vegetation”; (2) 14 Cal. Code of Regs. section 15307, “Actions by regulatory agencies for protection of natural resources”, and (3) 14 Cal Code Regs. section 15308, “Actions by regulatory agencies for protection of the environment”. The CEQA categorical exclusion statement is provided in Appendix E.

Federal Water Pollution Control Act, commonly called the Clean Water Act (CWA), 33 U.S.C. § 1251 *et seq*.
Section 311 of the CWA is also a source of authority for seeking natural resource damages and for implementing restoration actions to address natural resource injuries and service losses. Like OPA, this statute provides for damage claims based on appropriate restoration actions.

Section 404 of the CWA requires a permit for the disposal of material into navigable waters. The Army Corps of Engineers administers the program. A restoration project that moves significant amounts of material into or out of waters or wetlands requires a 404 permit. A CWA Section 404 permit will be obtained, if required, prior to implementing any restoration action under this RP/EA.

Endangered Species Act (ESA), 16 U.S.C. § 1531 *et seq*.; 50 C.F.R. Parts 17, 222 & 224.
The ESA directs all federal agencies to assist in the conservation of threatened and endangered species to the extent their authority allows. Protection of wildlife and preservation of habitat are the central objectives in this effort. Section 7 of the Act requires that federal agencies consult with these departments. The restoration actions described in this RP/EA are not expected to adversely impact any species listed under the ESA. Prior to implementation of any restoration project under this plan, the Trustees will initiate consultation with the appropriate agencies pursuant to the ESA in order to ensure that the restoration actions undertaken under this plan are in accordance with all applicable provisions of the ESA.

Fish and Wildlife Conservation Act, 16 U.S.C. § 2901 *et seq*.
The selected restoration projects will not encourage or discourage the conservation of non-game fish and wildlife.

Fish and Wildlife Coordination Act (FWCA), 16 U.S.C. § 661 *et seq*.
The FWCA requires that federal agencies consult with the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, and state wildlife agencies regarding activities that affect any aquatic environments. This consultation is generally incorporated into the compliance process associated with other relevant statutes, such as CWA and NEPA. The Trustees have initiated consultation with the appropriate agencies pursuant to this statute. This consultation process will continue as necessary to provide for appropriate implementation of restoration actions under this plan, including the necessary permits that must be obtained.

Migratory Bird Conservation Act, 126 U.S.C. § 715 *et seq*.
The selected restoration actions will have no adverse effect on migratory birds.

Archeological Resources Protection Act, 16 U.S.C. § 470 *et seq*.
The State Historical Preservation Officer for both California and Nevada will be consulted pursuant to this Act before selected restoration projects are implemented to ensure that there are no known cultural resources in any project area and no sites listed or eligible for listing on the National Register of Historic Places.

Rivers and Harbors Act, 33 U.S.C. § 401, *et seq.*
The Rivers and Harbors Act regulates the development and use of the Nation's navigable waterways. Section 10 of the Act prohibits unauthorized obstruction or alteration of navigable waters and vests the U.S. Army Corps of Engineers with authority to regulate discharges of fill and other materials into such waters. Restoration actions that require Section 404 Clean Water Act permits are likely also to require permits under Section 10 of the Rivers and Harbors Act. However, a single permit usually serves for both. Therefore, the Trustees can ensure compliance with the Rivers and Harbors Act through the same mechanisms.

Executive Order Number 11514 (34 Fed. Reg. 8693) Protection and Enhancement of Environmental Quality
An Environmental Assessment is integrated within this RP/EA and environmental coordination has taken place as required by NEPA.

Executive Order Number 11990 (42 Fed. Reg. 26961) Protection of Wetlands
The selected restoration activities will not adversely affect wetlands or the services they provide.

Executive Order Number 12898 (59 Fed. Reg. 7629) Environmental Justice
This Executive Order requires each federal agency to identify and address any policy or planning impacts that disproportionately affect the health and environment in low-income or minority populations. EPA and the Council on Environmental Quality have emphasized the importance of incorporating environmental justice review into the analyses conducted by federal agencies under NEPA and of developing appropriate mitigation measures. The Trustees have concluded that there would be no adverse impacts on low-income or minority communities due to implementation of any restoration action selected hereunder.

Executive Order Number 12962 (60 Fed. Reg. 30769) Recreational Fisheries
The selected restoration projects will not adversely effect recreational fisheries and the services they provide.

Executive Order 13112 - Invasive Species
The 1999 Executive Order 13112 applies to all Federal agencies whose actions may affect the status of invasive species. The Order requires such agencies, to the extent practicable and permitted by law, to: (1) identify such actions; and (2) take actions specified in the Order to address the problem consistent with their authorities and budgetary resources; and (3) not authorize, fund, or carry out actions that they believe are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere unless, "pursuant to guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions."

The Trustees do not believe that any of the preferred restoration projects have the potential to cause or promote the introduction or spread of invasive species.

10.0 Literature Cited

AFS Fish Management Chemicals Subcommittee. 2001. Relationship between rotenone use in fisheries management and Parkinson's disease. American Fisheries Society, Bethesda, Maryland.

Bailey, R.G. 1995. Descriptions of ecoregions of the United States. Miscellaneous Publication No. 1391. U.S. Department of Agriculture, Forest Service, Washington, DC.

Baldwin, C.K., F.H. Wagner, and U. Lall. 2003. Water resources. *In:* Wagner, F. H., editor, Rocky Mountain/Great Basin Regional Climate-Change Assessment. Report for the U.S. Global Change Research Program. Utah State University, Logan, UT.

Barry, J. J. 1967. Evaluation of creel census, rotenone embayment, gill net, traps and electrofishing samples, by complete drainage of Lenape and Bischoff Reservoirs. Indiana Department Natural Resources, Division Fish Game, Fishery Research Section. 35 p.

Betarbet, R., T. Sherer, G. MacKenzie, M. Carcia-Osuna, A. Panov, and J. Greenamyre. 2000. Chronic systemic pesticide exposure reproduces features of Parkinson's disease. Nature Neuroscience 3:12 1301-1306.

Boyle, K.J. and M. Markowski. 2000. *Meta Analysis of Sport Fishing Values in the U.S: An Investigation of the Effects of Using Selected Groupings of Data.* Prepared for Economics Division, U.S. Fish and Wildlife Service, Department of the Interior.

Bradbury, A. 1986. Rotenone and trout stocking. A literature review with special reference to Washington Department of Game's Lake Rehabilitation Program. Fisheries ManagementReport 86-2. 181 p

Brandenburg, W.H., and K.B. Gido. 1999. Predation by nonnative fish on native fishes in the San Juan River, New Mexico and Utah. Southwestern Naturalist 44 (3): 392-394.

California Government Code 8670.1 et seq. 1990. Lempert-Keene-Seastrand Oil Spill Prevention and Response Act.

CDFG. California Department of Fish and Game. 1983. An assessment of the use of chemical fish toxicants in California. Inland Fisheries Administrative Report No 83-2. 21 p.

_____. 1994. Rotenone use for fisheries management. Final programmatic environmental impact report (subsequent). Sacramento, CA. 334 p.

CDWR. California Department of Water Resources. 1992. Walker River Atlas. The Resources Agency, State of California, Sacramento, CA.

Clement Associates. 1985. Chemical, physical, and biological properties of compounds present at hazardous waste sites. Prepared for the U.S. Environmental Protection Agency, Washington, DC.

Cooper, J.J., and D.L. Koch. 1984. Limnology of a desertic terminal Lake, Walker Lake, Nevada, U.S.A. Hydrobiologia 118:275-292.

Deacon, J.E. and W.L. Minckley. 1974. Desert fishes. *In* Desert Biology, vol. 2, ed. G.W. Brown, Jr., Academic Press, New York, New York.

Dunham, J.B., M.M. Peacock, B.E. Rieman, R.E. Schroeter, and G.L. Vinyard. 1999. Local and geographic variability in the distribution of stream-living Lahontan cutthroat trout. Transactions of the American Fisheries Society 128 (5): 875-889.

Edmondson, J., Conservation Director of CalTrout. 2001. Public letter to Robert Hight, Director of California Department of Fish and Game.

Eisler, R. 1987. Polycyclic aromatic hydrocarbon hazards to fish, wildlife, and invertebrates: A synoptic review. Biological Report 85(1.11). U.S. Department of the Interior, Fish and Wildlife Service, Patuxent Wildlife Research Center, Laurel, MD. 81 pp.

Engstrom-Heg, R., R. T. Colesante, and E. Silco. 1978. Rotenone Tolerances of Stream-bottom Insects. New Your Fish and Game Journal 25(1):31-41.

Fausch, K.D. 1989. Do gradient and temperature affect distributions of, and interaction between, brook charr (*Salvelinus fontinalis*) and other resident salmonids in streams? Biology of Charrs and Masu Salmon 1: 303-322.

Finlayson, B.J., R.A. Schnick, R.L. Cailteaux, L. DeMong, W.D. Horton, W. McClay, C. W. Thompson, and G.J. Tichacek. 2000. Rotenone use in fisheries management; administrative and technical quidelines manual.

Forbis, T.A., L. Provencher, L. Frid, and G. Medlyn. 2006. Great Basin land management planning using ecological modeling. Environmental Management, 38(1):62-83.

Gerstung, E.R. 1988. Status, life history, and management of the Lahontan cutthroat trout. American Fisheries Society Symposium 4:93-106.

Gresswell, R.E. 1988. Status and management of cutthroat trout, American Fisheries Society Symposium 4.

Griffith, J.S. Jr. 1988. Review of competition between cutthroat trout and other salmonids. American Fisheries Society Symposium 4: 134-140.

Hampton, S., A. Montalvo, D. Higgins, and P. Sollberger. 2002. Assessment of natural resource damages as a result of the East Walker River Oil Spill on December 30, 2000. East Walker River Trustee Council. 21 p. plus appendicies.

Higgins, D.K. 2002. Assessment of damages to natural resources in the East Walker River from the Advanced Fuel Filtration spill: water, sediment, and fish tissue analysis. Final Report EC 34.14.9. Nevada Fish and Wildlife Office. U.S. Fish and Wildlife Service. Reno, Nevada. 22 pp.

Hildebrand, R.H. 1998. Movements and conservation of cutthroat trout. Aquatic Ecology, 133 pp.

Hoffman, D.A. and R.C. Payette. 1956. "Operation Carp" on a San Diego reservoir. Water Sewage Works 103(7):281-287.

Houghton, Samuel G. 1994. *A Trace of Desert Waters: The Great Basin Story.* Reno: University of Nevada Press.

Howald, A. 2000. Plant Communities. *In:* Smith, G., editor, Sierra East: Edge of the Great Basin. University of California Press, Berkeley, CA. 498 p.

Humberstone, J.A. 1999. Walker River Basin water quality modeling. University of Nevada, Reno.

Hynes, H. B. N. 1972. The Ecology of Running Waters. University of Toronto Press, Toronto. 555 p.

Knapp, R.A., P.S. Corn and D.E. Schindler. 2001. The introduction of nonnative fish into wilderness lakes: good intentions, conflicting mandates, and unintended consequences. Ecosystems 4 (4): 275-278.

Koch, D.L., Cooper, J.J., Lider, E.L., Jacobson, R.L., and Spencer, R.J. 1979. Investigations of Walker Lake, Nevada: Dynamic ecological relationships. University of Nevada, Desert Research Institute Publication No. 50010.

LaRivers I. 1962. Fishes and fisheries of Nevada. Nevada State Department of Fish and Game.

MacDonald, D.D., C.G. Ingersoll, and T.A. Berger. 2000. Development and evaluation of consensus-based sediment quality guidelines for freshwater ecosystems. Arch. Environ. Contam.Toxicol. 39:20-31.

Mares, M.A. 1999. Encyclopedia of Deserts. University of Oklahoma Press, Norman, OK. 654 p.

Moore, J.W. and S. Ramamoorthy. 1984. Organic chemicals in natural water. Springer-Verlag, New York, NY.

Morrison, M.L., B.G. Marcot, and R.W. Mannan. 1992. Wildlife Habitat Relationships. University of Wisconsin Press, Madison, WI. 364 p.

National Academy of Science. 1983. Rotenone. Pages 63-70 in Drinking water and health, Volume 5. Safe Drinking Water Committee, Board on Toxicology and Environmental Health Hazards, Commission on Life Sciences, National Research Council, National Academy Press, Washington, D. C.

NAC 445A.118 et seq. Nevada Administrative Code. Nevada Water Pollution Control. Standards for Water Quality.

NAC 445A.159. Nevada Administrative Code. Nevada Water Pollution Control. Standards for Water Quality. Beneficial uses for Walker River.

NAC 445A.1693. Nevada Administrative Code. Nevada Water Pollution Control. Standards for Water Quality. Beneficial uses for Walker Lake.

NDOW. Nevada Department of Wildlife. 1997. Federal Aid Job Progress Report. West Walker River, Western Region. Fisheries Bureau Annual Project Report. 21 p.

NDOW. Nevada Department of Wildlife. 2004. Federal Aid Job Progress Reports F-20-39. East Walker River, Western Region. Fisheries Bureau Annual Project Report. 13 p.

NDWP. Nevada Division of Water Planning. 2001. Walker River Chronology. Parts I and II. http://www.state.nv.us/cnr/ndwp (December 27, 2001).

Public Resource Associates. 1994. Water resources in the Walker River Basin: a search for water to save Walker Lake. Reno, Nevada. Russell, I.C. 1885. Geological History of Lake Lahontan. United States Geological Survey, Monograph 11.

Rand, G.M. and S.R. Petrocelli (eds.). 1985. Fundamentals of Aquatic Toxicology. Hemisphere Publishing Company, NY, 666 pp.

Sada, D. 2000. Native Fishes. *In:* Smith, G., editor, Sierra East: Edge of the Great Basin. University of California Press, Berkeley, CA. 498 p.

Schindler, D.W. 2000. Aquatic problems caused by human activities in Banff National Park, Alberta, Canada. Ambio 29 (7): 401-407.

Schroeter, R. 1998. Segregation of stream dwelling Lahontan cutthroat trout and Brook trout: patterns of occurrence and mechanisms for displacement. M. S. thesis, University of Nevada, Reno.

Sharpe, S.E., M.E. Cablk, and J.M. Thomas. 2007. The Walker Basin, Nevada and California: physical environment, hydrology, and biology. Publication No. 41231. Desert Research Institute. Reno, Nevada. 71 p.

Shepard, B.B., B. Sanborn, L. Ulmer and D.C. Lee. 1997. Status and risk extinction for westlope cutthroat trout in the Upper Missouri River basin, Montana. North American Journal of Fisheries Management 17(4): 1158-1172.

Sousa, R.J., F.P. Meyer, and R.A. Schnick. 1987. Better fishing through management. U.S. Fish and Wildlife Service, Washington, D.C.

Stockwell, C. 1994. The Biology of Walker Lake. Biological Resources Research Center, University of Nevada Reno, Reno, NV.

Thomas, J.M. 1995. Water budget and salinity of Walker Lake, western Nevada. U.S. Geological Survey Fact sheet FS-115-95. Carson City, Nevada.

U.S. Department of the Interior, Fish and Wildlife Service and U.S. Department of Commerce, U.S. Census Bureau. October 2002. *2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.* Washington, D.C.

USFWS. U.S Fish and Wildlife Service. 1995. Lahontan cutthroat trout (*Oncorhynchus clarki henshawi*) recovery plan. U.S. Fish & Wildlife Service, Region I, Portland, Oregon.

Whelan, J.E. 2002. Aquatic macroinvertebrate monitoring results of the 1995 and 1996 rotenone treatments of Manning Creek, Utah. Publication Number 02-04. Utah Division of Wildlife Resources, Salt Lake City, UT. 34pp.

World Health Organization. 1989. International Agency for Research on Cancer (IARC) Monographs on the Evaluation of Carcinogenic Risks to Humans: Occupational exposures in petroleum refining; Crude oil and major petroleum fuels. Volume 45. IARC, Printed in the UK. 322 pp.

WRIT. Walker River Basin Recovery Implementation Team. 2003. Short-term action plan for Lahontan cutthroat trout (*Oncorhynchus clarki henshawi*) in the Walker River Basin. Developed for the U.S. Fish and Wildlife Service. 117 p.

Appendix B.
Restoration Projects Not Under Consideration by the East Walker River Trustee Council

A. Riparian Restoration Projects

A list of riparian restoration project proposals received but not considered by the Trustees during the public comment/solicitation period will be provided in this section of the final DRP/EA document.

B. Native Fish Recovery Projects

A list of native fish recovery project proposals received but not considered by the Trustees during the public comment/solicitation period will be provided in this section of the final DRP/EA document.

C. Recreational Improvement Projects

A list of recreational improvement project proposals received but not considered by the Trustees during the public comment/solicitation period will be provided in this section of the final DRP/EA document.

Appendix C.
Restoration Projects Under Consideration by the East Walker River Trustee Council

A. Riparian Restoration Projects

1. CDFG Fuels Reduction and Riparian Enhancement Demonstration Project

Project Background and Concept

Riparian and adjacent upslope, meadow vegetation along the East Fork of the Walker River has suffered from a land management ethic that focused on extinguishing fires, be they natural or human-induced. The result is dense woody stands of decadent, impenetrable, sometimes dead vegetation that provides substandard wildlife habitat; prevents recreational access and egress for long sections (potentially a safety issue for instream recreationists and anglers); with extremely high fuel loads increasing the risk of a damaging, excessively hot wildfire which could result in permanent loss of habitat without rehabilitation. The Fish and Game Commission has mandated California Department of Fish and Game to aggressively manage vegetation for wildlife habitat and wildfire reduction on Department lands, although the focus has been in Southern California.

Mechanical thinning and mastication would improve the vigor of individual plants, as well as the structure of plant communities, with an expected corresponding benefit to the fishery and wildlife within the corridor. A healthy riparian corridor better protects banks by reducing erosion; provides fish and wildlife habitat (cover, temperature attenuation, nesting, nutrients, etc); filters nutrients; maintains water quality; regulates sediment transport; and enhances aesthetics and recreational values for humans, with a resultant socio-economic benefit to the local community.

Location and Size

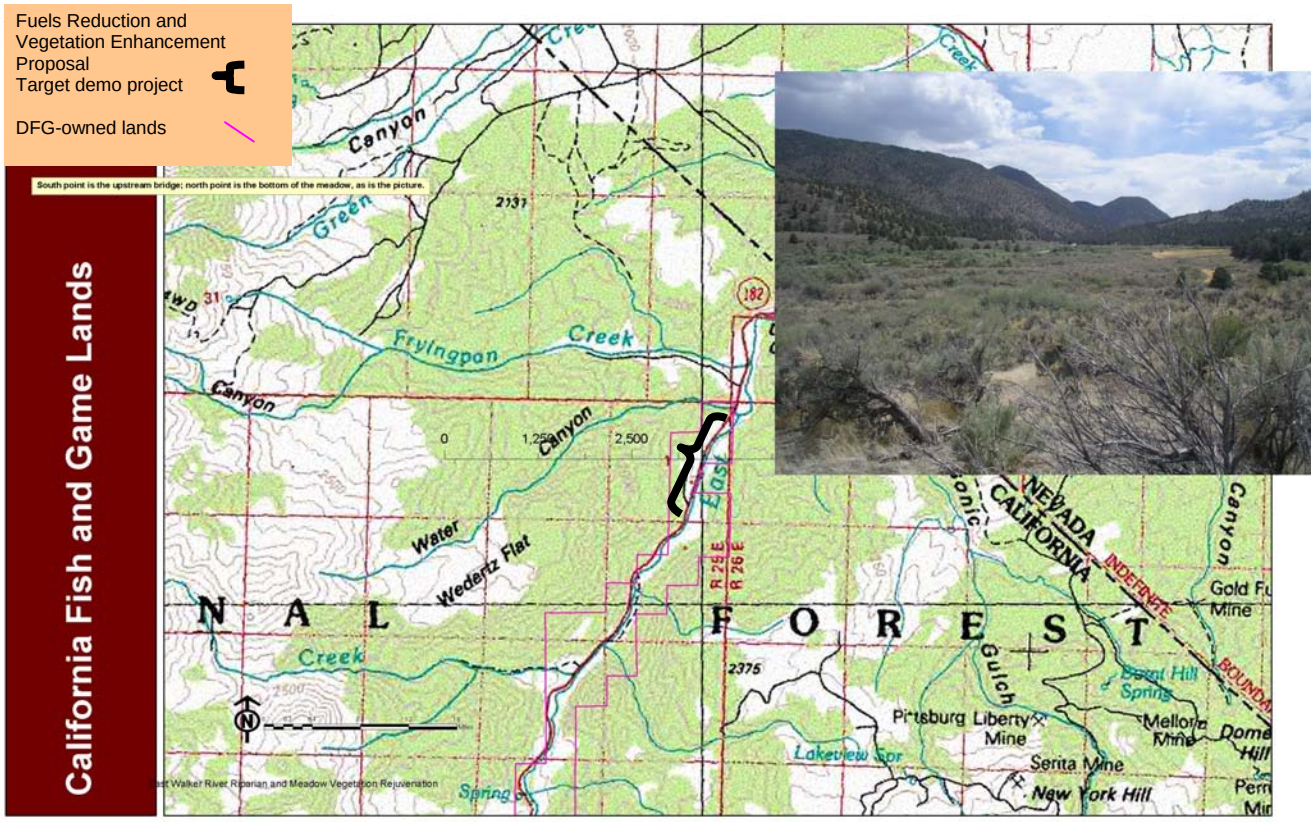
- The proposed project would occur on State lands immediately adjacent to the East Walker River, including riparian, meadow, and some upland (Figure 1). It is estimated that during the initial demonstration project, up to a mile of riparian could be treated, and from 15 to 25 acres.
- This project would occur onsite.

Species, Habitat, and Recreational Benefits

- This project has been bid as a demonstration project by time rather than area. Due to the complexity of different treatment methods, the estimate of acreage was difficult to assess. A six person crew would work on site for one week.
- Numerous species utilize the East Walker River Corridor and the associated meadow and uplands that will be treated. Riparian nesting songbirds would benefit greatly, as would mammals, including bear, deer, and mountain lion that use the riparian vegetation as a transportation corridor. The thinned and pruned vegetation will result in increased invertebrate use, thus increased terrestrial drift for aquatic species.

- Approximately 90 ten foot access points (breaks in the riparian corridor) would be created per mile of riparian vegetation along the highway. Rocks and stumps would be grubbed out to create safe access. It is estimated that all of these breaks would be generated during the week-long demonstration project.

Figure 1. Location of the proposed CDFG Fuels Reduction and Riparian Habitat Enhancement Demonstration Project for the East Walker River, California.



Land Use

- Recreational and natural wildlife habitat within a State Wildlife Area.

Feasibility

- Technical feasibility: the project site has already been inspected by State personnel and by the project bidder, and is deemed extremely feasible and crucial.
- This project would fall under Categorical Exemption, Title 14, Section 15304, Class 4, example d. Ideally, the project would occur following the fledging season of nesting birds.
- No permits are deemed necessary to implement this project. Local Lands Program personnel have been apprised of the project and are in support.

Budget

The evaluation and breakdown of this proposed project is provided in Table 1. One day of time would be required for the initial inspection of the demonstration project to determine whether expansion of the project would be a higher priority than other proposals. Cost for this initial inspection would be conducted by CDFG staff to evaluate and document with photographs. An existing bidder whose work has been recommended has quoted a project cost of $10,500 for implementation which would include all necessary equipment and a crew of six working for 40 hours, as well as any preliminary meetings prior to the project. An onsite monitor during the project is recommended, and per diem costs would be up to $500 per person, with two people being ideal. Following the approval of the Demonstration Project, it is anticipated that much of the corridor upstream to the Bridgeport Dam could potentially be treated and the cost estimated. As for post-project monitoring, California Department of Fish and Game requires that all state land be subjected to an annual monitoring survey, therefore monitoring costs would be covered in routine Department procedures.

Table 1. Estimated budget breakdown of CDFG Fuels Reduction and Riparian Habitat Enhancement Demonstration Project for the East Walker River.

Item	Unit	Quantity	Cost
Pre-Project Planning and Inspection	Per person (@$500 each)	1	$500
Equipment (maintenance and rental)			$400
Personnel	Per person (@ $40/hr/40-hr week)	6	$9,600
CDFG Project Evaluation & Oversight	Per person (@$500 each)	2	$1,000
			$11,500

B. Native Fish Recovery Projects

1. Slinkard Creek Lahontan Cutthroat Trout Expansion

Project Background and Concept

This project would enhance both native species and local recreational fisheries. Lower Slinkard Creek formerly provided angling opportunities primarily for families. The goal of this project would be to provide fishing (limited bag) of native Lahontan cutthroat trout (LCT) in the lower, easily-accessible Slinkard Creek, hopefully facilitating support for native trout restoration within the local community, as well as securing the upper Heritage Trout section of stream from brook trout invasion. All Walker Basin Lahontan

cutthroat trout restored recovery waters occur in the West Walker Basin, and were formerly managed as recreational fisheries, but are currently closed to angling until populations stabilize, with the exception of upper Slinkard, which is a special regulation Heritage Trout Water.

In 2002, a wildfire burned the area surrounding and including the lower portion of Slinkard Creek. In the summer of 2003, rain washed sediment and ash from the adjacent steep, bare slopes into the creek resulting in a fish kill. In the fall of 2003, DFG surveyed the creek. No fish were found, except upstream of the fire line (which consisted of ~1.5 miles of habitat). In the summer of 2004, fire again ravaged the area, and the creek and surrounding area burned upstream of the 2003 fire line, this time affecting the upper section, which is separated from the lower by a manmade barrier that protects an upstream refuge population of native Lahontan cutthroat trout. In the past, brook trout (BK) have been found above the barrier, jeopardizing the integrity of the LCT restoration water. In 2005, a tanker truck crashed into Slinkard Creek, which resulted in both a fuel spill and riparian fire.

Proposals to fund BK removal from this relatively small section of stream immediately following the fish kill were not able to be implemented. In June, 2005, ~2,200 feet of detonation cord was strategically placed in the stream to remove both BK and excessive sediments that had settled into the channel in a low-gradient meadow section of the stream. The experiment successfully removed brook trout and, where the cord had been pushed into the substrate, removed sediment. However in the fall of 2006, a survey of the fish removal site revealed three brook trout.

A natural barrier exists between the Walker River and the burned section of Slinkard Creek, and the goal is to chemically treat the lower stream to remove the remainder of BK, prior to LCT's successful re-dispersal throughout the lower stream. Slinkard Creek downstream of the barrier would be subjected to a reduced bag regulation, thus allowing the local public to benefit recreationally from LCT restoration. This may increase public support for LCT recovery, an element crucial to effective restoration. Approximately 5 miles of LCT-inhabited stream would be gained; the existing upstream Recovery water would be secured from BK invasion.

Location and Size

This project would occur within the West Walker River watershed primarily on State lands, with a possible small section of BLM lands (Figure 2). Approximately five miles of stream would be treated.

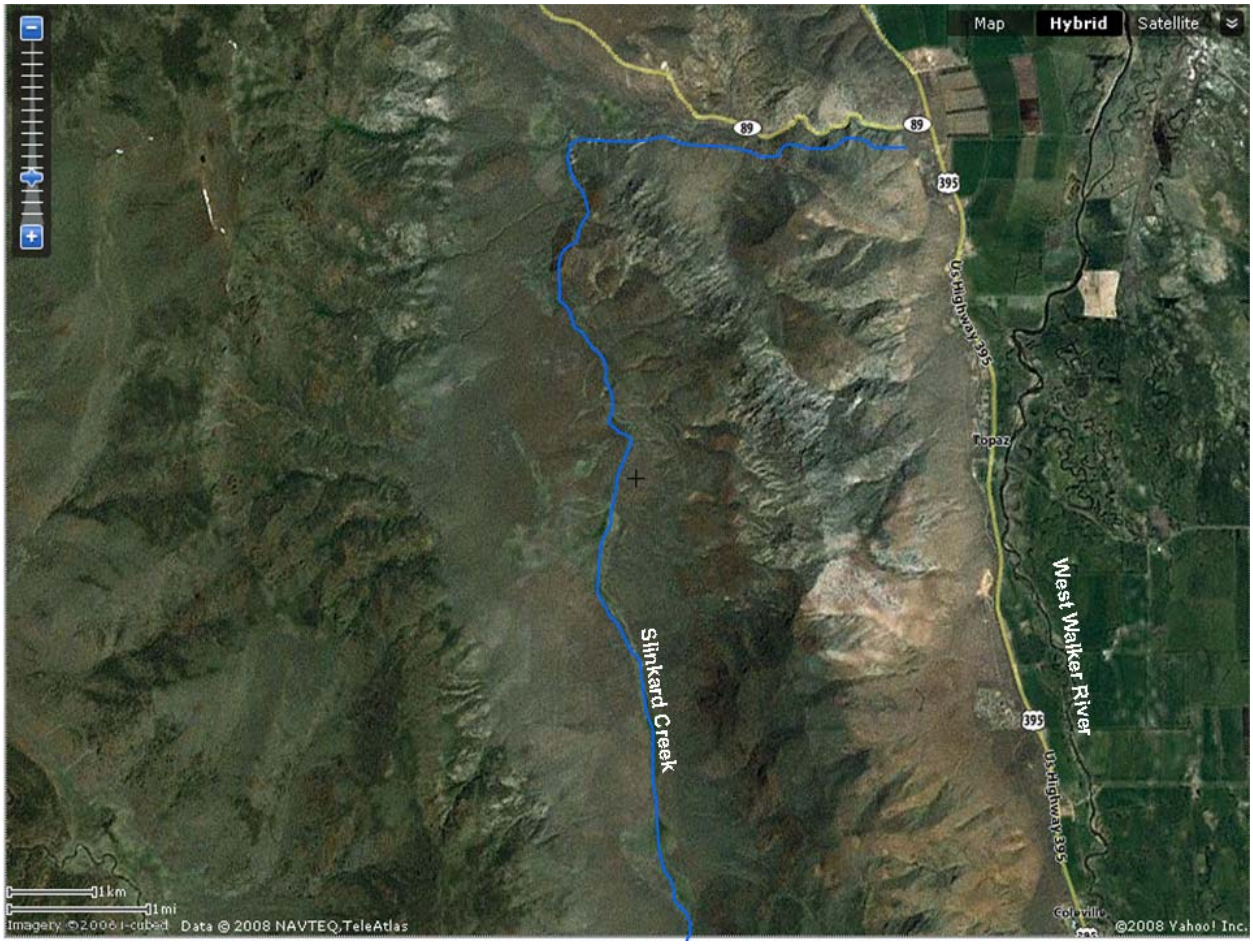
Species, Habitat, and Recreational Benefits

The project would extend habitat for the Lahontan cutthroat trout, thus expanding numbers of this fish. A higher population number would allow for translocation of some of these fish into the proposed Bodie/Rough Restoration Project, which would benefit both native fishes and recreational fishes within the East Walker River Basin.

Approximately five miles of stream would be restored.

The federally-listed Lahontan cutthroat trout would be the primary species benefited. Currently, although lower Slinkard Creek is open to angling, there are very few fish persisting within it, and virtually none exist in the easily-accessed section of stream adjacent to the highway.

Figure 2. Location and extent of Slinkard Creek proposed for Lahontan cutthroat trout expansion.



Land Use

The majority of the project occurs on the Slinkard Wildlife Area, with a small portion occurring on BLM land. Management of lands is primarily for wildlife habitat, with associated outdoor recreation.

Feasibility

The proposed project occurs on public lands, and the physical feasibility of an effective chemical treatment is virtually assured.

An existing EIR exists for rotenone use, and a mitigated negative declaration could be

tiered off the existing document. Slinkard Creek is diverted prior to flowing into the Walker River, eliminating many concerns regarding detoxification. In 1990, the Regional Board adopted Resolution No. 6-90-43 to allow the conditional use of rotenone by DFG in the Lahontan Region. The Resolution granted authority to the Regional Board's Executive Officer to waive waste discharge requirements and reports of waste discharge for rotenone application projects meeting the conditions specific conditions, including native species restoration. The Resolution also directed the Executive Officer to execute a Memorandum of Understanding with the DFG to facilitate the implementation of rotenone projects within the Lahontan Region. The MOU was executed on July 2, 1990.

A regulation change would be submitted to the Fish and Game Commission to reduce the bag limit of fish allowed. A previous project upstream should facilitate the preparation of necessary documents, however, steps to create documents have not yet occurred.

Budget

The Department already has rotenone and dispensing equipment available for the project and would be provided at no cost. The salaries of various levels of personnel assigned to the project for onsite duties as well as background document preparation, implementation, and monitoring is provided in Table 2.

Table 2. Estimated budget breakdown of CDFG Slinkard Creek Lahontan Cutthroat Trout Expansion Project for the East Walker River.

Item	Unit	Quantity	Cost
CDFG Rotenone Equipment (provided)	each		$0
Project Planning Costs (for 4 personnel for 20 days to conduct flow studies, project design, and determine logistics (4 persons x$100 (food/lodging) x 20 days)	Per treatment	2	$16,000
Project Implementation Costs (two consecutive Septembers for ~18 personnel for five days including travel to site)	Per treatment	2	$16,000
Post-Project Monitoring Costs (project organization, fish and tributary spring surveys, and equipment set up for 2 seasonals for 2 seasons	Per treatment	2	$16,000
Post-Project Personnel Costs (wages for seasonally employed personnel: 2 persons for 12 weeks for 2 seasons to organize, repair, construct, and transport equipment, as well as assist with flow studies and determine current fish distribution, including assessment of success of first treatment)	Per season	2	$25,000
Non-CDFG Equipment Costs (porta-potties, miscellaneous safety gear, etc.)			$2,500
			$75,500

C. Recreational Improvement Projects

1. Rosachi Ranch Outdoor Recreational Improvements

Project Background and Concept

Based on mail-in angler questionnaire data sent to 10% of license holders and data expanded to estimate the angling population, angler use within the Nevada portion of the East Walker River averaged 21,590 angler days annually prior to the December 30, 2000 oil spill (standard deviation = 4,435; from 1996-2000). However, angling use has not recovered to these levels since the spill (average = 8,572 angler days, standard deviation = 3,271) (see Table 3). Typically, 50% to 60% of the angling use comes from Nevada residents while California residents primarily make up the remainder of use. Catch rates, although declining in the past few years, remain relatively high for a Nevada river; therefore, it is unclear why angler use has not rebounded. The majority of angling along the East Walker River in Nevada occurs at Rosaschi Ranch (no trout stocked; catch-and-release fishing) and the Elbow (trout stocked; 5-fish harvest limit) which are entirely within the 15-mile injury area.

Table 3. Angler days and average fish per day determined from Nevada Department of Wildlife mail-in angler questionnaires taken at the East Fork Walker River from 1996 to 2005.

Year	Angler Days	Avg. Fish/day
1996	20,243	4.06
1997	20,483	4.37
1998	17,384	4.91
1999	29,149	4.67
2000	20,692	4.53
2001	13,112	4.75
2002	10,222	4.52
2003	6,646	3.09
2004	8,265	3.05
2005	4,614	3.45

The goal of this project is to increase recreation along the East Walker River at Rosaschi Ranch by providing or improving access to and along the river, providing amenities such as toilets and tables, providing interpretive signage, and providing fencing and barrier rocks to eliminate access in sensitive areas.

Location and Size

The actual project area begins at the bridge on Forest Road 028 (i.e., Sweetwater Rd) and runs upstream of the East Walker River about 0.75-mile (Figure 3). The impacts of the project, however, are expected to benefit recreational users throughout the entire ranch.

The river and ranch boundary are approximately 1.75-miles below the NV/CA border, 7.25-miles below the spill site, and ends about 6.5 miles down stream.

Figure 3. Area (circled in yellow) of the proposed U.S. Forest Service's Rosaschi Ranch Outdoor Recreational Improvement Project located in the East Walker River portion of Lyon County, Nevada.

Species, Habitat, and Recreational Benefits

The project will affect about 0.75-miles within the upland terrace and along riparian habitat near the river. Not only will anglers benefit from increased or improved access, but also it is intended to benefit all outdoor enthusiasts. Vault toilets will improve the cleanliness of the area, fencing and rock barriers will eliminate access to sensitive areas, and removal of the parking area at the bridge will reduce runoff and improve water quality in the river.

Land Use

The USFS (Bridgeport Ranger District) manages all land use while NDOW manages the fisheries within the Rosaschi Ranch boundary. It historically was a working cattle ranch, but since 1995, its use has been dominated by recreation.

Feasibility

Recreational use was addressed by the USFS in the *Rosaschi Ranch Restoration Project Environmental Assessment* in December 2002. The current project, however, is a modification and the design and project work has been/will be completed by the USFS. Further permitting, if required, will be the responsibility of the USFS.

Budget

The project design and budget is comprised of three phases (Table 4). Budget estimates under consideration by the Trustee Council include Phase I and II. Estimated budget for Phase I is approximately $85,000. Allocation of funds for Phase II (~$100,000) would occur once Phase I is successfully completed. Phase III would be the sole responsibility of the Bridgeport Ranger District of the U.S. Forest Service for funding and implementation.

Table 4. Estimated budget for implementation of the U.S. Forest Service's Rosaschi Ranch Outdoor Recreational Improvement Project.

Description	Quantity	Unit	Price	Total
Phase I				
Survey/Design/Layout	10	Day	$320	$3,200
Clearing/Staking	1	LS	$4,500	$4,500
Site Preparation and Grading w/Water & Compact	1	LS	$16,000	$16,000
Single Vault Toilet (Includes Finish Grading)	1	each	$23,000	$23,000
6-Inch Crushed Aggregate Base (Two-1/2 Acre Parking Areas)	970	yd^3	$13	$12,600
Accessible Trailhead (At River)	300	ft^3	$7	$2,100
Accessible Trail (To River)	780	linear foot	$7	$5,500
Barrier Rocks	60	each	$100	$6,000
Per Diem for Road Crew				$12,000
				$84,900
Phase II				
Single Vault Toilet (Includes Finish Grading)	1	each	$23,000	$23,000
Wood Fencing (Around Ranch)	2,000	linear foot	$25	$50,000
Interpretive Signs	4	each	$2,000	$8,000
Interpretive Sign Framing	4	each	$500	$2,000
Benches	2	each	$1,000	$2,000
Picnic Tables	2	each	$1,000	$2,000
Trail Construction (Northside of River)	1,560	linear foot	$5	$7,800
F.O.R. Monthly Fixed Costs for Gov't Equipment				$5,000
				$99,800
Phase III				
Interpretive Signs	1	each	$2,000	$2,000
Interpretive Sign Framing	1	each	$500	$500
3-Panel, Roofed Kiosk	1	each	$10,000	$10,000
Trail Construction (Southside of River)	1,180	linear foot	$5	$5,900
Fishing Access Spots	2EA@300	ft^3	$7	$4,200
Footbridge (Includes 80' Design x 5' Width)	1	each		$140,000
				$162,600

2. East Walker River Wildlife Area Vehicle Access Control

Project Background and Concept

The California Department of Fish & Game owns and manages property adjacent to the East Walker River (EWR), downstream of Bridgeport Reservoir, primarily for access to angling. Currently, the EWR is managed as a Wild Trout Water, which attracts anglers from areas within and outside of California. This proposed recreation control/habitat restoration project would provide for the placement of boulders to prevent vehicular access in strategic areas along the river where currently vehicles are not controlled. A specific example within the site is shown in Figure 4.

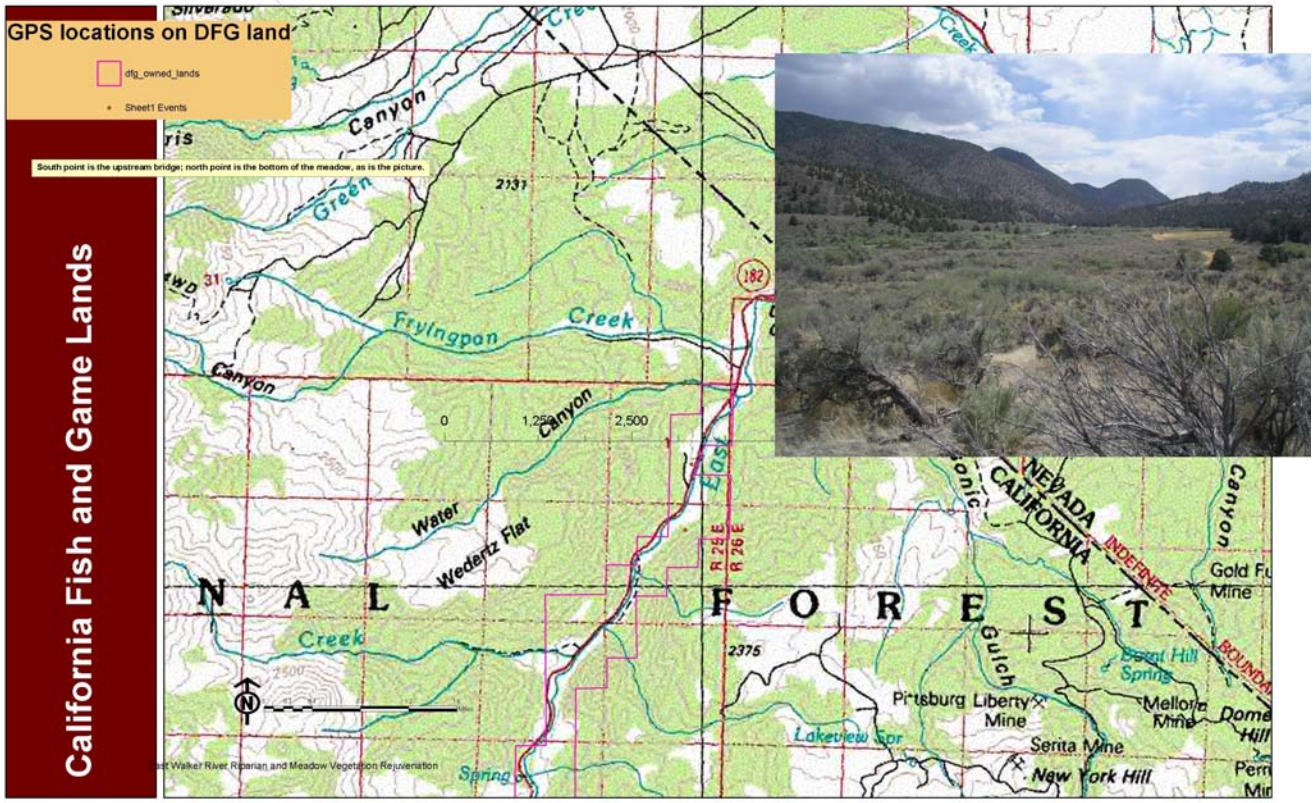
Figure 4. Example of an uncontrolled vehicle access point impacting the riparian habitat in the East Walker River on California Department of Fish and Game lands.

No facilities exist for users of this area to reduce human-use impacts from trash, feces, overnight camping and vehicle parking in riparian habitats. With direct effects to water quality resulting from human waste and trash, as well as indirect effects from poorly-placed trails and parking areas that infringe upon the riparian corridor, impacts are only likely to increase, especially as this water is now open to year-round angling.

Location and Size

The proposed project would occur on State lands immediately adjacent to the East Walker River (Figure 5). X number of sites would be barricaded.

Figure 5. Location of California Department of Fish and Game lands in the East Walker River where placement of boulders are proposed to control vehicle access along the riparian corridor.



Species, Habitat, and Recreational Benefits

- Protection of water quality would be enhanced.
- Impacts from vehicle use would be removed allowing restoration and improvement to meadow and riparian habitat.
- Riparian nesting songbirds would benefit greatly in time, as would mammals, including bear, deer, and mountain lion that use the riparian vegetation as a transportation corridor. Once the exasperator activity is removed (i.e. vehicles), vegetation will result in increased cover, increased shading, increased invertebrate use, thus increased terrestrial drift for aquatic species.

Land Use

- Recreational and natural wildlife habitat within a State Wildlife Area.

Feasibility

- Numerous sites have been identified, most of which are situated so that strategic placement of boulders could prevent vehicular access into the riparian corridor.
- This project would fall under Categorical Exemption, Title 14, Section 15304, Class 4, example d.
- No permits are deemed necessary to implement this project. Local Lands Program personnel have been apprised of the project and are in support.

Budget

Agency costs would include time only for onsite flagging of project locations. GPS of sites has already created waypoints of problem areas. Contract costs to design, implement, and monitor is approximately **$15,000**.

3. East Walker River Wildlife Area Restroom

Project Background and Concept

The California Department of Fish & Game owns and manages property adjacent to the East Walker River (EWR), downstream of Bridgeport Reservoir, primarily for access to angling. Currently, the EWR is managed as a Wild Trout Water, which attracts anglers from areas within and outside of California. No facilities, however, exist for users of this area, and trash, feces, trails, and parking areas have been scattered about the area, with no management direction and with potentially detrimental impacts to water quality resulting directly from human waste, as well as indirectly from poorly-placed trails and parking areas that infringe upon the riparian corridor. Impacts are only likely to increase, especially as this water is now open to year-round angling.

This proposed recreation use project would place one or two vault toilets in high-use access areas.

Location and Size

The proposed project would occur on State lands immediately adjacent to the East Walker River (see Figure 5). One site is an already-disturbed, easy access parking area where the stock trail bridge crosses the river. The other potential site is an area upstream, below the reservoir, where a large denuded network of roads and parking areas exist.

Species, Habitat, and Recreational Benefits

- Dispersed litter etc. throughout the river corridor would be decreased, potentially numerous acres.
- This proposal supplies both recreational and water quality benefits. The presence of restroom facilities and trash receptacles would allow recreationists a more comfortable experience on the river and improve their aesthetic enjoyment .

Land Use

Recreational and natural wildlife habitat within a State Wildlife Area.

Feasibility

- A partnership with Mono County or another entity for maintenance would have to be implemented prior to carrying out this option, unless interest will be available from Trustee Council funds, as the Department has no personnel that are available for maintenance. A contract for dump and trash services could be obtained and potentially financed through the local Fish and Game Commission fines monies or the Sierra Nevada Conservancy. It is unknown if the presence of vault toilets and trash receptacles would create an attractive nuisance regarding trash issues.
- This project would fall under Categorical Exemption, Title 14, Section 15304, Class 4, example d.
- Mono County has been approached and would be supportive of utilizing Fish and Game Commission funds for maintenance dumping needs. It is unclear whether a company/entity exists that would cover weekly maintenance of the facilities, but a local fishing group may cover these costs. No permits are deemed necessary to implement this project. Local Lands Program personnel have been apprised of the project and are in support.

Budget

Agency costs would include time only for onsite flagging of project locations. GPS of sites has already created waypoints of problem areas. Agency time would be expended to identify funds or write a contract to provide cleaning and supply of the vaults.
~$25,000 for one single vault toilet per USFS standards for adjacent to water, unknown if this includes placement, but includes finish grading. It would be desirable to create a maintenance fund/contract for weekly cleaning/supplies as well as pumping of the toilets as needed, for a five year period to allow the Department a period of time to work with local entities and apply for grants to deal with maintenance.

Appendix D.
Public Comments Received on the Draft DRP/EA and Responses by the East Walker River Trustee Council

To be provided in the final DRP/EA upon completion of the public review period.

Notice of Exemption

Form D

To: Office of Planning and Research
P.O. Box 3044, Room 212
Sacramento, CA 95812-3044

County Clerk
County of _____

_____

_____

From: (Public Agency) _____

_____

_____
(Address)

Project Title: _____

Project Location - Specific:

Project Location – City: _____ Project Location – County: _____

Description of Nature, Purpose and Beneficiaries of Project:

Name of Public Agency Approving Project: _____

Name of Person or Agency Carrying Out Project: _____

Exempt Status: **(check one)**

- ☐ Ministerial (Sec. 21080(b)(1); 15268);
- ☐ Declared Emergency (Sec. 21080(b)(3); 15269(a));
- ☐ Emergency Project (Sec. 21080(b)(4); 15269(b)(c));
- ☐ Categorical Exemption. State type and section number: _____
- ☐ Statutory Exemptions. State code number: _____

Reasons why project is exempt:

Lead Agency
Contact Person: _____ Area Code/Telephone/Extension: _____

If filed by applicant:

1. Attach certified document of exemption finding.
2. Has a Notice of Exemption been filed by the public agency approving the project? ☐ Yes ☐ No

Signature: _____ Date: _____ Title: _____

☐ Signed by Lead Agency
☐ Signed by Applicant

Date received for filing at OPR: _____

Revised 2005