REVISED
DRAFT RESTORATION PLAN
and
ENVIRONMENTAL ASSESSMENT

for the

ADVANCED FUEL FILTRATION SYSTEMS
EAST WALKER RIVER OIL SPILL

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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). 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.

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 (NRDA) 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. 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 implement the NRDA. Injury information collected by the Trustees was separated into two broad categories (natural resources and human recreational activities) and used to quantify the monetary damages that would compensate the public for the lost use and services of those natural resources as a result of the release of oil. Details of the NRDA injury and damage quantification are provided in Section 3.0.

During the initial 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 is a representative and an alternate representing 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 natural resources and/or recreational opportunities in various ways. 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 Area and Natural Resources of Concern

The scope of the affected environment and associated natural resources of concern addressed by this DRP/EA include the East and West Walker River watersheds. The East and West Walker River watersheds are located within the larger Walker River Basin which 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 Walker Rivers, which ultimately feed Walker Lake, originate in the Sierra Nevada of California at elevations between 10,007 and 12,303 feet above sea level (asl) (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 (Figure 1).

The main stem of the Walker River, although not within the scope of this DRP/EA, exhibits extremes in hydrologic conditions, typical of rivers in the Great Basin, from nearly dry during drought periods to high water from flood events. The surface flows of the Walker River 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 (WRBRIT 2003).

2.1 Human Influences[a]

The Walker River Basin has been inhabited by humans for at least 11,000 years (WRBRIT 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). The discovery of gold in the California Territory in 1848 accelerated settlement of the Great Basin. 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.

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 Lahontan cutthroat trout (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. In summary, the historic uses of water in the basin have contributed to declining water quantity, quality, and fragmentation of the Walker River Basin (WRBRIT 2003).

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

2.2 Surface Water Resources[b]

Surface water resources in the affected area include the East and West Walker River, lakes or reservoirs that store and/or release water, high altitude lakes in the Sierra Nevada, small water storage facilities, 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.

2.2.1 East Walker River Watershed

Headwaters of the East Walker River originate from several creeks in the eastern Sierra Nevada upstream of Bridgeport Valley, California. Bridgeport Reservoir and Twin Lakes are the only significant lake or water impoundment features within the East Walker River watershed and both are located in the Bridgeport Valley area (Figure 1).

Bridgeport Reservoir, with a storage capacity of approximately 40,000 acre-feet (af), is located at the downstream end of Bridgeport Valley. The Walker Irrigation District is responsible for day-to-day operation of Bridgeport Reservoir and directs the Federal Water Master to release water from the reservoir to serve agricultural needs in the East Walker River Basin below the reservoir and in Mason Valley (Figure 1). The California State Water Resources Control Board has regulatory interest of the reservoir since it is located in the state of California. Main tributaries to Bridgeport Reservoir include: East Walker River, Virginia Creek, Green Creek, Robinson Creek, Buckeye Creek, and Swauger Creek. 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.

Twin Lakes is a small water storage facility that consists of two portions (Upper and Lower). Twin Lakes lies at 7,726 feet elevation in the Toiyabe National Forest, just below the Hoover Wilderness in Mono County, California, and approximately 10 miles upstream of Bridgeport Reservoir. Lower Twin Lake Dam was constructed in 1888 on Robinson Creek to increase the natural lake's size and to control flows in Robinson Creek (CDFG, 1965). The primary use of the water is for stock watering in the Bridgeport Valley approximately 10 miles downstream. 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. Twin Lakes drain via Robinson Creek into an extensive wetland that is both natural and receives water from ditch irrigation.

The only other water storage feature in the East Walker River watershed is Green Lakes (East Lake, West Lake, and Green Lake) located in the Bridgeport Valley area with a collective storage right of 400 acre-feet.

[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)

Downstream of Bridgeport Valley and Bridgeport Reservoir are the areas referred to as the Upper East and Lower East Walker valleys. Between 1939 and 1993, the average annual flow of the river in this location was approximately 107,000 acre-feet per year (Thomas 1995).

Water quality of the East Walker River varies depending on seasonal stream flow. Total dissolved solids (TDS) ranges between 54 parts per million (ppm) in July near Bridgeport Reservoir to 139 ppm in October at Minister Road (Humberstone, 1999). These values remain 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 ranges between 7.1 and 12.3 mg/L (Humberstone, 1999).

2.2.2 West Walker River Watershed

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 the only significant lake or water impoundment feature in the West Walker watershed and is located on the Nevada-California border, approximately 26 miles south of Lake Tahoe in Mono County, California. Topaz Lake is an artificial reservoir that was formed by diverting waters from the West Walker River into a nearby basin that had previously contained a smaller, natural lake (formerly known as Alkali Lake). The initial construction took place in 1922, resulting in a reservoir with a capacity of 45,000 acre-feet (56,000,000 m^3). In 1937 a new levee raised the capacity to its current 59,440 acre-feet (73,320,000 m^3).

Small water storage facilities that exist in the West Walker watershed include: Black Junction Reservoir (350 af) located near Sonora Junction; Lobdell Lake (500 af) located at 9200 feet asl in the Sweetwater Range; and Poore Lake (1,200 af) located in Antelope Valley.

In terms of water quality, TDS can range approximately between 24 and 314 ppm (Humberstone 1999). These values remain 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. 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 (Humberstone, 1999). Dissolved oxygen levels will vary depending upon flow and season and can range between 5.2 and 13.7 mg/L (Humberstone, 1999). 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).

2.3 Habitat and Associated Wildlife Use [c]

The habitat of the affected area can be characterized in a number of different ways that are meaningful from an ecological or biological perspective. For the purposes of this DRP/EA, water is used as a primary feature to define habitats and can be delineated into two very general types: Lacustrine and (2) Riverine, riparian, and associated wetlands. Quality of the habitat is not intrinsic in the definition and therefore changes through time.

Wildlife use in the affected area is associated with specific types of habitats, although habitat use may be seasonal. 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.

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

Game fish occurring in Bridgeport Reservoir include rainbow (*Oncorhynchus mykiss*) and brown trout (*Salmo trutta*), Sacramento perch (*Archoplites interruptus*), and green sunfish (*Lepomis cyanellus*). Rainbow trout are stocked in Bridgeport reservoir by CDFG. The Bridgeport Fisheries Enhancement Program, sponsored by the Bridgeport Chamber of Commerce and other donors, plants brown trout into the reservoir and other local waters within the valley. Non-game fish occurring in Bridgeport Reservoir include carp (*Cyprinus carpio)*, tui chub (*Gila bicolor sp.*), Lahontan speckled dace (*Rhinichthys osculus robustus)*, and Tahoe and mountain suckers (*Catostomus sp*.). Wildlife such as waterfowl depend on the reservoir for foraging and resting habitat during migration periods. Pelicans (*Pelecanus sp*.), gulls (*Larus sp.*), egrets, and herons are common. Bald eagles are also present and use the area for winter roosting. 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

Topaz Lake is stocked annually with rainbow trout by both CDFG and 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.

Twin Lakes

Although LCT no longer inhabits Twin Lakes, CDFG has historic reports that Lower Twin Lake once supported satisfactory numbers of wild cutthroat trout as well as numerous Rocky Mountain whitefish (CDFG, 1965). USFWS also 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 CDFG. CDFG also reports that Kokanee salmon (*Oncorhynchus nerta*) and brown trout also occur in Twin Lakes as well (D. Becker, pers. comm.).

2.3.2 Riverine, Riparian, and Associated Wetlands

In general, the riparian zones play 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 affected area 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 East and West Walker River. Cattail (*Typha* spp.) and hardstem bulrush (*Scirpus acuta*) are abundant in riparian zone wetlands 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 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 (*Eleocharis* spp.).

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 and brown trout 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 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 (*Richardsonius egregious*), Lahontan speckled dace, Tahoe and mountain sucker, tui chub, common carp, Paiute sculpins (*Cottus beldingi*), 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.

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 Paiute sculpins, mountain whitefish, Lahontan redside, Lahontan speckled dace, Tahoe and mountain suckers, and tui chub. Common carp and largemouth bass (*Micropterus salmoides)* occur here, and brown trout and rainbow trout are stocked (NDOW 1997; Sada, 2000). 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).

2.4 Recreational Use[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 River Basin include boating, fishing, big and small game hunting, off-road vehicle use, sightseeing, hiking, kayaking, swimming, rock hounding, photography, nature study, bird watching, collecting plants, and rock climbing.

Recreational lands in the affected area are private or owned and administered by the U.S. Forest Service (USFS) or the state of California. 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 (camping and picnicking) and Desert Creek Campground (camping, fishing, and picnicking).

Approximately 48 miles of the West Walker River from its source in the Hoover Wilderness to the Topaz Lake Valley 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. 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. Boating and boat fishing, swimming, picnicking, and camping also occur at the three major lake/reservoirs in the affected area (Bridgeport, Topaz, and Twin Lakes). Public access to these areas includes land owned privately or administered by the USFS.

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.

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

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, 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.

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.

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.

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

CDFG 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 Bio-assessment Protocol, CDFG determined that benthic communities of 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 Restoration Project Alternatives

The proposed restoration projects 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.

Emphasis under the watershed approach is directed at all aspects of surface and ground water quality including physical, chemical, and biological parameters. This approach also is focused on increasing or enhancing existing recreational activities that are dependent upon the natural resource services provided within the watershed. 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 projects. These potential restoration projects have been prioritized and further developed to facilitate the evaluation of their feasibility. Following the public review process of this DRP/EA, these potential restoration projects will be further refined and new potential projects will be evaluated to develop a final project list for implementation.

4.2 Restoration Project 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.

4.2.1 Consistency with Trustee 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.

4.2.2 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.

4.2.3 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.

4.2.4 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.

4.2.5 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.

4.2.6 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.

4.2.7 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.

4.2.8 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.

4.3 Types of Restoration Projects Considered

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 two categories representing the types of work needed to compensate for the resources that were injured in the spill. These categories are In-stream/Riparian Restoration or Recreational Fishing/Human Use Improvement Projects. The following discussion describes the range of project types considered for implementation, but the actual projects selected as preferred alternatives is a subset of these types and are detailed in Section 5.0.

4.3.1 In-stream/Riparian Restoration

Riparian habitat is important to aquatic and terrestrial resources. A healthy complex of vegetation, including large canopy trees and understory vegetation, along with in-stream 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 re-vegetated 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 macro-invertebrates.

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 in-stream 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 in-stream structures, 3) removal and control of invasive plants, and 4) planting streamside 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.

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.

Constructing In-stream 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 native or game fish population.

Removal and Control of Invasive Plants

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 alone or 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.

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.

4.3.2 Recreational Fishing/Human Use 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.

5.0 Action Alternatives and Environmental Consequences

The Trustee Council, when developing the DRP/EA, identified two alternatives: a natural recovery (No Action) or implementation of approved restoration projects (Preferred) alterative. A reasonable number of restoration projects were developed under the Preferred Alternative that

provide for riparian and in-stream habitat restoration and recreational fishing improvements that will begin to compensate for the losses that occurred during the incident. The proposed restoration projects met the conditions of the Settlement Agreement and MOU, were evaluated and have been proposed through application of the evaluation criteria, and meet the goals and objectives outlined by the Trustee Council. Descriptions of the proposed restoration projects under consideration for the Preferred Alternative are provided in the following sections, including the 'no action' alternative. Approval and implementation of future restoration projects not identified by this DRP/EA, but associated with the types of restoration actions considered by the Trustees under this plan will require separate additional environmental analyses as required under the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA). Documentation of the environmental analyses of future restoration projects considered by the Trustees will be provided as supplemental information to the final restoration plan/EA along with public review and comments.

5.1 Natural Recovery (No Action Alternative)

NEPA requires the Trustees to consider a "no action" alternative, and the OPA regulations require consideration of a somewhat equivalent "natural recovery" option. Under this alternative, the Trustees would take no direct action to restore injured natural resources or compensate for lost services pending natural recovery. Instead, the Trustees would rely on natural processes for recovery of the injured natural resources. The principal advantages of the natural recovery approach are the ease of implementation and the absence of monetary costs. Natural processes rather than human intervention would determine the trajectory of 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 Trustees would not complete any restoration projects. The public would not be compensated 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 Implement Approved Restoration Projects (Preferred Alternative)

The Trustee Council has considered a number of initial 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 two categories representing the types of work needed to compensate for the resources that were injured in the spill. These categories are In-stream Riparian Restoration and Recreational Fishing/Human Use Improvements. Descriptions of initial projects under consideration are provided in the following sections and an overview of project locations is provided in Figure 2.

Project proposals not approved by the Trustee Council for implementation are provided in Appendix B. These proposals were not approved 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 may not have been approved as separate projects but were incorporated into other approved projects for implementation.

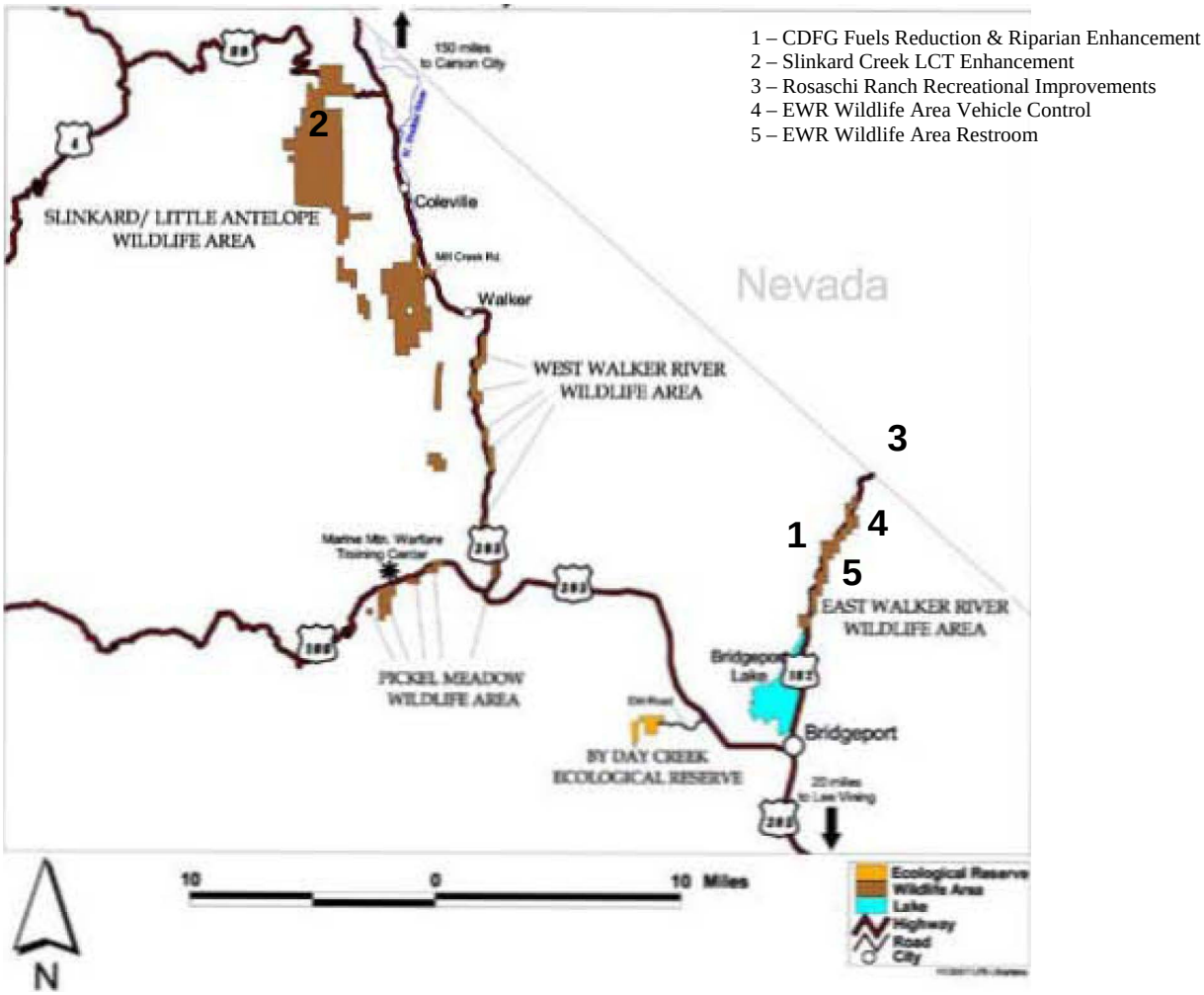

Figure 2. Locations of proposed restoration projects considered for the East Walker River Advanced Fuel Filtration Systems Oil Spill.

5.2.1 In-stream/Riparian Restoration

One in-stream/riparian restoration project is currently under consideration by this DRP/EA. Additional projects submitted during the public comment/solicitation period for this DRP/EA and meeting the criteria identified in Section 4.2 will be considered by the Trustees. Submitted projects that meet the evaluation criteria and are approved for funding would be subject to additional environmental analyses but tiered to the final restoration plan.

Project – CDFG Fuels Reduction & Riparian Enhancement Project (Proponent – CDFG)

Riparian and adjacent upslope meadow vegetation along the East 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 in-stream 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. It also 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.

The following equipment will be used to treat habitat along the East Walker River on State lands: A 95 horsepower masticator with a reciprocating head will be used to cut and grind large woody plants (trees, large brush). This machine is equipped with rubber tracks to reduce soil compaction. Chain saws and hand held pole saws will be used to cut both trees and limbs which will be fed into a Morbarch chipper that is hand fed brush and limbs up to 10 inches in diameter. Twelve horsepower DR mowers will be used in any areas such as meadows where mostly dry herbaceous vegetation needs to be cleared. The chipped and masticated material will be laid down as mulch to prevent erosion, preserve soil moisture, and retain nutrients. In areas of steep slopes where equipment cannot access, brush may be piled for burning.

<u>Location, Size, and Land Use</u>
The project would occur on the East Walker River Wildlife Area located immediately adjacent to the East Walker River and approximately 6 miles north of the town of Bridgeport, CA (Figure 3). The area is managed for recreational and natural wildlife habitat within a State Wildlife Area and includes riparian, meadow, and some upland habitats. It is estimated that up to a mile of riparian habitat could be treated covering 15 to 25 acres in size.

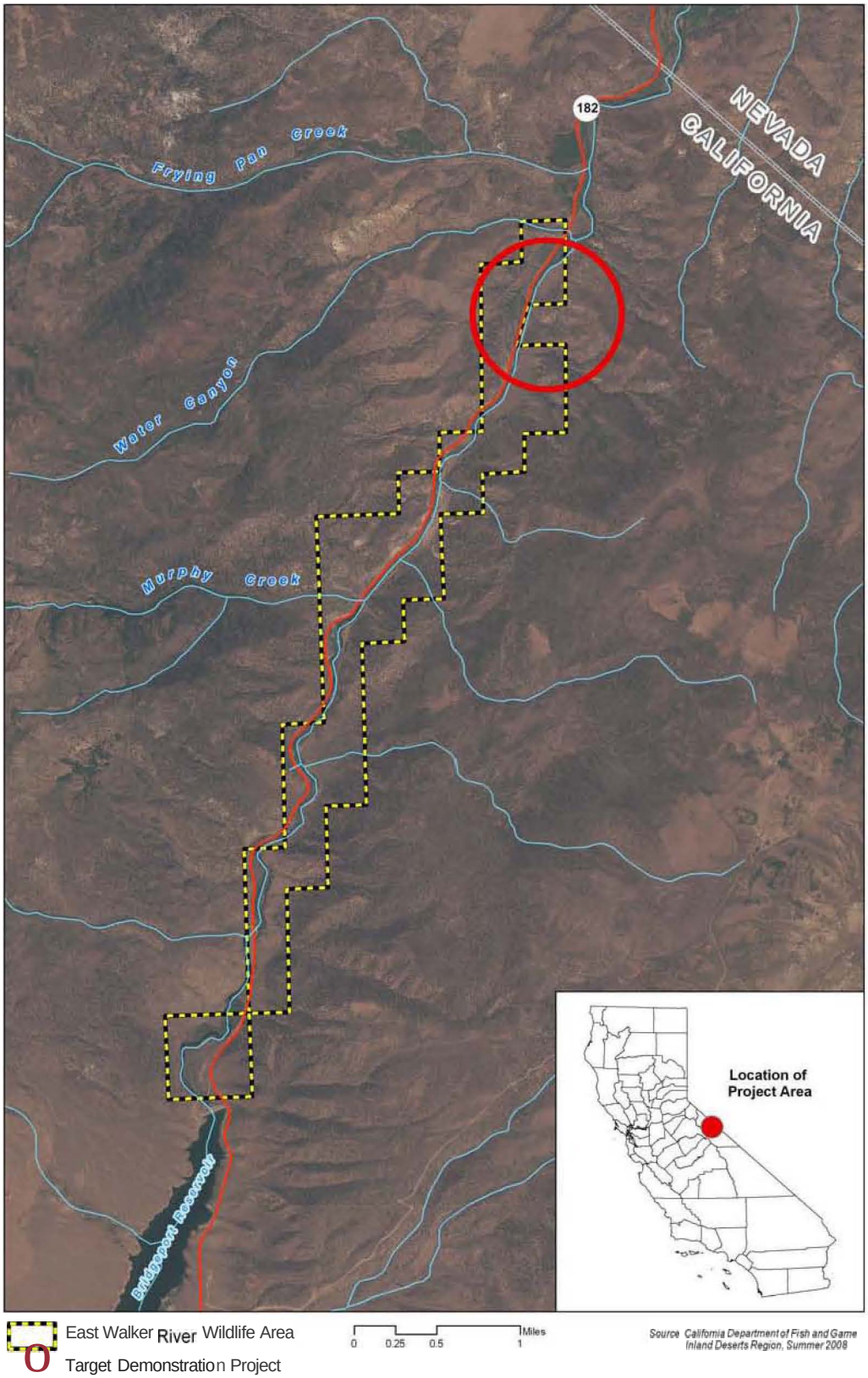

Figure 3. Location of the CDFG Fuels Reduction and Riparian Enhancement Project, East Walker River Wildlife Area, Mono County, California.

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.
- For environmental review purposes, this project would fall under CEQA 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 necessary to implement this project. Local CDFG Lands Program personnel have been appraised, and are in support of the project.

Environmental Consequences

Approximately 90 ten foot access points (breaks in the riparian corridor) would be created per mile of riparian vegetation along the highway increasing the recreational accessibility of the East Walker River to anglers.

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.

For any in-stream actions, some potential for mobilization of sediment would exist. In order to minimize the potential effects of these activities, the following project design features and Best Management Practices would be employed: 1) Silt dams or fences would be installed below mastication sites to limit the extent to which fine sediment may be transported downstream, lessening the area affected; 2) In-stream work would be scheduled between July 1st and September 15th when flows are at summer lows; 3) Absorbent booms would be installed below the project site which would trap sediments and any accidental spills of petroleum products.

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.

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 project to determine whether expansion of the project would be a higher priority than other proposals. Cost for this initial inspection would be conducted with participation of 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 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, CDFG 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 Riparian Habitat and Fuels Reduction 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

5.2.2 Recreational Fishing/Human Use Improvements

A total of four recreational fishing/human use projects are under consideration by this DRP/EA. Additional projects submitted during the public comment/solicitation period for this DRP/EA and meeting the criteria identified in Section 4.2 will be considered by the Trustees. Submitted projects that meet the evaluation criteria and are approved for funding would be subject to additional environmental analyses but tiered to the final restoration plan.

Project – Slinkard Creek Lahontan Cutthroat Trout Enhancement (Proponent – CDFG)

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, facilitating support for native trout restoration within the local community, as well as securing the upper Heritage Trout section of stream from brook trout (BK) invasion. All Walker Basin LCT restored recovery waters occur in the West Walker Basin, and were formerly managed as recreational fisheries. Most are currently closed to angling, with the exception of upper Slinkard, which is a special regulation Heritage Trout Water open to angling.

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 damaged the area. The creek and surrounding area burned upstream

of the 2003 fire line, this time affecting the upper section, which is separated from the lower portion by a manmade barrier that protects an upstream refuge population of LCT. In the past, BK has been found above the barrier, jeopardizing the integrity of the LCT restoration water.

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 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. Approximately 5 miles of LCT-inhabited stream would be gained from this restoration, and the existing upstream portion of the watershed would be secured from BK invasion.

Location, Size, and Land Use

This project would occur within the West Walker River watershed, primarily on the CDFG Slinkard Wildlife Area (figure 2) and a possible small section of BLM lands. Management of lands is primarily for wildlife habitat, with associated outdoor recreation. Approximately five miles of stream would be treated along lower Slinkard Creek (figure 4).

Feasibility

The project occurs on public lands, and the physical feasibility of an effective treatment is virtually assured. There are several options to remove non-native fish such as electrofishing, gill netting, seining, detonation cord use, and rotenone.

Use of detonation cord is technically feasible. CDFG deployed detonation cord in June of 2005 to remove BK and excess sediments that had settled into the channel. The treatment had limited success at removing BK and, where pushed into the substrate, successfully removed sediment.

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 CDFG 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 specific conditions, including native species restoration. The Resolution also directed the Executive Officer to execute a Memorandum of Understanding (MOU) with CDFG to facilitate the implementation of rotenone projects within the Lahontan Region. The MOU was executed on July 2, 1990.

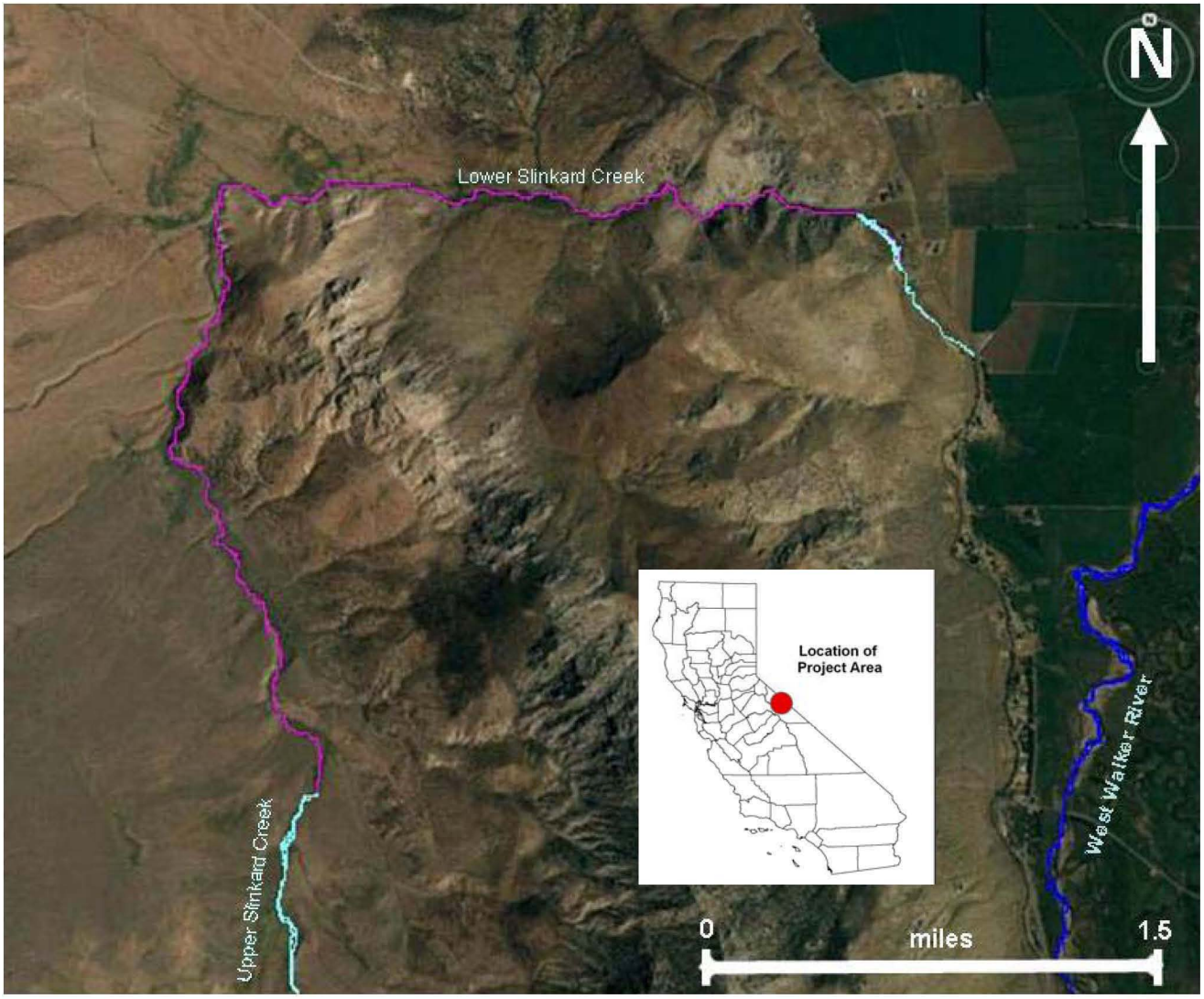

Figure 4. Location and approximate extent of the Slinkard Creek LCT Enhancement Project (treated stream segment is in purple).

A regulation change will be submitted to the California Fish and Game Commission to reduce the bag limit of fish allowed. A previous project upstream should facilitate the preparation of necessary documents.

Status of design and permitting is not needed in the preliminary stage of evaluation. The project falls under a Class 33 Categorical Exemption (15333)-small habitat restoration projects.

Environmental Consequences
LCT 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. Approximately five miles of stream would be restored.

Since one of the previous recreational activities at the project water was fishing or fishing related camping and hiking, there should be a short-term impact to recreation. However, fishing has been restricted prior to implementation of this project. After project completion, there would be increased opportunities to fish for LCT once the downstream population became established.

Rotenone Application

Rotenone was selected as the chemical to use for non-native fish removal 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 affect 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 for up to 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 re-colonization of impacted aquatic macro-invertebrates. 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 re-colonization of streams following their removal by natural or man-made events (Hynes 1972). Most, if not 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 hours would generally result in only mild and temporary changes to the aquatic macro-invertebrate 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 macro-invertebrates 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 to be less impacting to aquatic macro-invertebrates than natural events. Whelan (2002) summarized mechanisms that aquatic macro-invertebrates 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.

As previously stated, 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 1,000 times (X) 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 centimeters (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.

The EPA approves rotenone for the use intended in this project and 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 macro-invertebrates 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, the target stream is not 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.

An indirect effect would be a temporary increase in nutrient input to the water as a result of decomposition of fish that are killed. This effect would occur for 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.

Based upon monitoring data, lower Slinkard Creek may be treated in the following year to ensure complete removal of BK. Completion of the overall project would require 2 to 3 years.

Detonation Cord Treatment

A direct effect of the detonation cord treatment would be a temporary increase in the downstream sediment that was mobilized. This effect would occur for a very short period of approximately 24 hours. An indirect effect would be a temporary increase in nutrient input to the water as a result of decomposition of fish that are killed. This effect would occur for 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.

Budget

The Department already has detonation cord and personnel trained to implement the project. The Department also 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.

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 seasonal employees 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

Project - Rosaschi Ranch Outdoor Recreational Improvements (Proponent - NDOW and U.S. Forest Service – Bridgeport Ranger District)

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.

The majority of angling along the East Walker River in Nevada occurs at Rosaschi Ranch and the Elbow area. 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.

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

Location, Size, and Land Use

The Rosaschi Ranch is located on the East Walker River in Nevada immediately downstream of the California-Nevada border (Figure 2, project location #2). The river and ranch boundary are approximately 1.75-miles below the California-Nevada stateline, 7.25-miles below the spill site, and ends about 6.5 miles down stream. The actual project area begins at the bridge on Forest Road 028 and runs upstream of the East Walker River about 0.75-mile (Figure 5). The USFS acquired the property from the Rosaschi family in 1995 through the American Land Conservancy and the Bureau of Land Management. The purpose of the land acquisition was to improve the management of adjoining public land and allow multiple resource planning and management for wildlife, recreation, watershed, and riparian habitat.

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.

Environmental Consequences

The project will affect ~0.75-miles within the upland terrace and along riparian habitat near the river. Anglers and other outdoor enthusiasts will benefit from increased or improved access. 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. Recreation experiences would tend to be maintained or enhanced over time by providing better support facilities throughout the area. Management

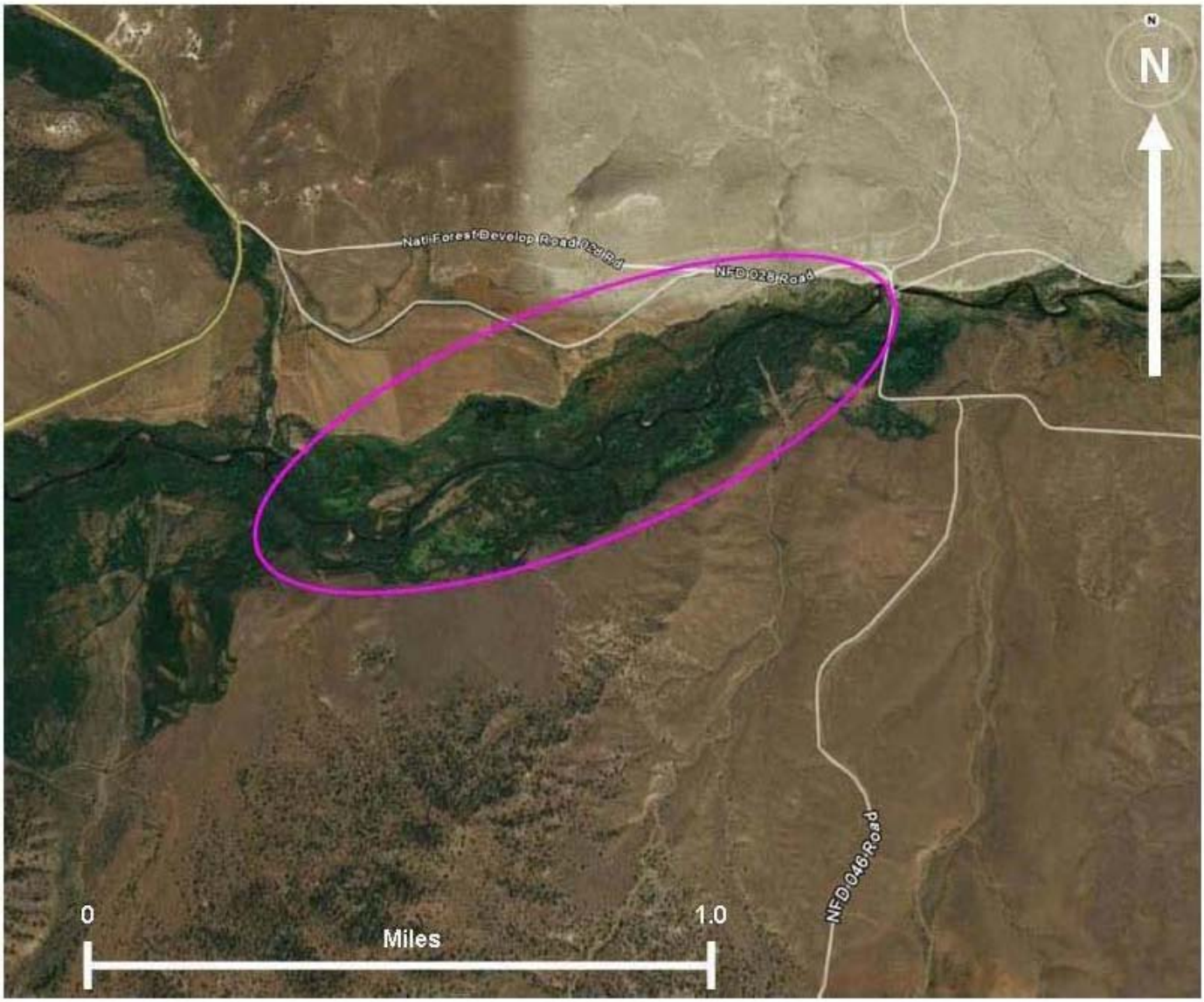

Figure 5. Areal extent (circled in purple) of the Rosaschi Ranch Outdoor Recreational Improvement Project, East Walker River, Nevada.

direction would encourage access such as trailheads and parking to be dispersed throughout the watershed so as to minimize overcrowding in the corridor. Capacity of recreation use would increase due to improved distribution of use over time and area. Angler opportunities would also increase because of habitat improvements.

Budget

The project design and budget is comprised of three phases (Table 4). Budget estimates under consideration by this DRP/EA include Phase I and II only. Funds for Phase I would be released and subsequent allocation of funds for Phase II would occur after Phase I is successfully completed. Phase III would be the sole responsibility of the Bridgeport Ranger District of the U.S. Forest Service.

Table 4. Estimated budget for implementation of the 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 (funded by U.S. Forest Service)				
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

Project - East Walker River Wildlife Area Vehicle Access Control (Proponent – CDFG)

CDFG owns and manages property adjacent to the East Walker River, downstream of Bridgeport Reservoir, primarily for access to angling. Currently, the East Walker River is managed as a Wild Trout Water, which attracts anglers from areas within and outside of California. This project would provide for the placement of boulders to prevent vehicular access in strategic areas along the river where currently vehicles are not controlled. 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 (see Figure 3). Approximately eleven boulder/barricades would be placed at impacted sites.

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.

Environmental Consequences

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.

Budget

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

Project - East Walker River Wildlife Area Restroom (Proponent – CDFG)

This project would place one or two vault toilets in high-use access areas. CDFG owns and manages property adjacent to the East Walker River, downstream of Bridgeport Reservoir, primarily for access to angling. Currently, the East Walker River 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.

Location, Size, and Land Use

The proposed project would occur on State lands immediately adjacent to the East Walker River (see Figure 3). 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. Land use of the area is for 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 CDFG 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.

Environmental Consequences

Dispersed litter and trash 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 the aesthetics of the area.

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. The cost for one single vault

toilet per USFS standards for adjacent to water is approximately **$25,000**. It is unknown if this includes placement, but it does 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.

5.3 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 a 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.

6.0 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 to appropriate groups who will coordinate the projects approved through this DRP/EA. The management and monitoring aspects of approved projects will not be paid by Council funds. However, the Trustee Council will have the opportunity to provide input to any management and monitoring plans developed for projects implemented with Council funds. There may be opportunities, however, where other in-stream/riparian restoration, recreational fishing/human use improvements, or combinations thereof can occur on, or in relation to 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 CDFG and NDOW, will assume oversight jurisdiction and authority. This oversight authority is to ensure that projects implemented with Council funds are properly and effectively protected, restored and managed for fish and wildlife and their associated habitats.

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

7.0 Project Implementation Schedule and Budget

Implementation of projects identified in this DRP/EA will be overseen by the East Walker River Trustee Council. The Trustee Council is responsible for approving all projects. Disbursal of NRDA funds to project implementers will be approved by Trustee Council resolution and implemented directly by the U.S. Fish and Wildlife Service under their responsibility as the Federal Lead Administrative Trustee. 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.

7.1 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 and approved by the Trustee Council.

7.2 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 in-stream riparian habitat, and recreational fishing/human use improvement projects 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.

8.0 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”.

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.

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