

Section 1: Summary Information

1. Project title:	Lower Clear Creek Aquatic Habitat and Waste Discharge Improvement Project
2. Applicant name:	Western Shasta Resource Conservation District
3. Contact person:	Mary Mitchell
4. Address:	6270 Parallel Road
5. City, State, Zip:	Anderson, CA, 96007
6. Telephone #:	530-365-7332 x 202
7. Fax #:	530-365-7271
8. Email address:	Mary@westernshastarcd.org
9. Agency Type:	Federal Agency <input type="checkbox"/> State Agency <input type="checkbox"/> Local Agency <input checked="" type="checkbox"/> Nonprofit Organization <input type="checkbox"/> University (CSU/UC) <input type="checkbox"/> Native American Indian Tribe <input type="checkbox"/>
10. Certified nonprofit organization:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
11. New grantee:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
12. Amount requested:	\$2,759,566
13. Total project cost:	\$3,235,395
14. Topic Area(s):	Primary: Ecosystem Water and Sediment Quality Secondary: Lowland Floodplains and Bypasses; Non-native Invasive Species; Riparian Habitat; and River Channel Restoration
15. ERP Project type:	Primary: Full-scale Implementation Secondary: Pilot/Demonstration
16. Ecosystem Element:	Primary: Coarse sediment Supply Secondary: Contaminants ; Natural Floodplain and Flood Processes; Central Valley Streamflows
17. Water Quality Constituent:	Primary: Mercury Secondary: Other
18. At-Risk species benefited:	Central Valley spring-run chinook salmon, Central Valley fall/late-fall-run chinook salmon (<i>Oncorhynchus tshawytscha</i>) and (<i>Oncorhynchus mykiss</i>) Central Valley steelhead, along with several Multi Species Conservation Strategy bird, reptilian, and amphibian species.
19. Project objectives:	The objectives of the Lower Clear Creek Project are to remove the long-term impacts of mercury contamination in the Project area environment, while creating a cost-effective 20-year supply of spawning gravel from dredger tailings for use in Lower Clear Creek, and create 5.72 acres of new wetlands.
20. Time frame:	Assuming the grant contract term begins November 1, 2011 and all environmental documentation and permits have been obtained by the consultant in early 2012, and after a site evaluation for bird nests, with site preparation in summer 2012, gravel processing and wetland and spoils area construction, recontouring and wetland construction in summer 2013 and planting in 2014, with final reporting by October 2014.

Section 2: Location Information

1. Township, Range, Section: and the 7.5 USGS Quad map name.	Township 31 North, Range 6 West, Section 36 and Township 31 North, Range 5 West, Section 31 within the Olinda, California U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle.
2. Latitude, Longitude (in decimal degrees, Geographic, NAD83):	-122.482814 W 40.490358 N
3. Location description:	The property is located along Clear Creek ~7.5 miles upstream of the confluence with the Sacramento River southwest of Redding, Shasta County, CA
4. County(ies):	Shasta County
5. Directions:	From the intersection of Highway 273 and Clear Creek Road, drive west 7.5 miles, which is east of the intersection of Cloverdale Road and Clear Creek Road.
6. Ecological Management Region:	Alluvial River - Floodplain
7. Ecological Management Zone(s):	North Sacramento Valley Ecological Management Zone
8. Ecological Management Unit(s):	Clear Creek
9. Watershed Plan(s):	<i>Lower Clear Creek Watershed Analysis</i> , WSRCD 1996. <i>Lower Clear Creek Watershed Management Plan</i> , WSRCD 1998.
10. Project area:	35 acres out of 111 acre study area.
11. Land use statement:	Current land use in the surrounding area consists of rural residential to the south and vacant land to the east, west, and north. Current land use in the project area is public use; however, access to the location is limited. Future land use will continue to be public use in the project area after the gravel project is finalized.
12. Project area ownership:	% Private _____ % State _____ % Federal <u>100</u>
13. Project area with landowners support of proposal:	BLM

Section 3: Landowners, Access and Permits

Landowners Granting Access for Project: Bureau of Land Management (Attachment #1)	
Owner Interest: Title (parcel numbers 208-210-001-000, 208-210-002-000 and 35 acres)	
1. Permits:	A) Reclamation Board encroachment permit B) Temporary Entry Permits from landowners C) RWQCB 401 Waiver D) NEPA Document E) CEQA Document F) Endangered Species Act Consultation (NMFS) G) Endangered Species Act Consultation (USFWS) H) California Endangered Species Act (CESA) (CDFG) I) Army Corps of Engineers Nationwide Permit J) Lake and Streambed Alteration Agreement, 1600 Permit (CDFG) K) Shasta County Encroachment Permit
2. Lead CEQA agency:	CDFG
3. Required mitigation:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>

Section 4: Project Objectives Outline

1. List task information:

Goal 1: Endangered and Other At-risk Species and Native Biotic Communities

Objective 1: Achieve recover and a large self-sustaining population of the following at-risk native species dependent of the Delta, Suisun Bay, and Suisun Marsh: Central Valley winter-, spring-and fall/late fall chinook salmon.

This Objective will be accomplished through annual spawning gravel injections to improve species habitat.

Objective 2: Contribute to the recovery of the following at-risk native species: western yellow-billed cuckoo, California yellow warbler.

This Objective will be accomplished by increasing wetland and riparian habitat for nesting and rearing habitat.

Objective 4: Maintain the abundance and distribution of the following species, California red-legged frog and western pond turtle.

These species will be supported by increased wetland habitat created by this project.

Goal 2: Ecological Processes

Objective 7: Restore coarse sediment supplies to sediment-starved rivers downstream of reservoirs to support the restoration and maintenance of functional natural riverine habitats.

This project will provide gravel injections for approximately 20 years below Whiskeytown Dam through the Lower Clear Creek Watershed to improve vital anadromous fish habitat.

Goal 3: Habitats

Objective 2: Restore large expanses of all major aquatic, wetland, and riparian habitats, and sufficient connectivity among habitats, in the Central Valley and its rivers to support recovery and restoration of native species and biotic communities and rehabilitation of ecological processes. These habitat types include riparian and shaded riverine aquatic, instream, fresh emergent wetlands, seasonal wetlands, other floodplain habitats, lacustrine, and other freshwater fish habitats.

This project will restore 5.72 acres of wetland and revegetate riparian habitat and future instream habitat by providing 237,130 tons of spawning gravel.

Objective 7: Limit the spread or, when possible and appropriate, eradicate populations of non-native invasive species through focused management efforts.

This project will eradicate populations of non-native invasive species during site preparation and post-processing restoration activities.

Goal 4: Water and Sediment Quality

Objective 1: Reduce the loadings and concentrations of toxic contaminants in all aquatic environments in the Bay-Delta estuary and watershed to levels that do not adversely affect aquatic organisms, wildlife, and human health.

This project will test fine materials generated from the tailings through the gravel screening process for mercury and remove contaminated fines from the floodplain to a secure storage site to prevent further mercury contaminants from entering the environment.

2. Additional objectives:

- Remove mercury from contaminated dredger tailings, thereby eliminating the potential for it to enter and travel through the aquatic system to the Sacramento River and the Delta and/or transform into methylmercury in the wetlands along Clear Creek;

- Create floodplain micro-topography that simulates observed pre-dam high flow scour channels or abandoned primary channels;
- Revegetate the areas previously covered with dredger tailings, thereby expanding critical riparian habitat;
- Develop a cost-effective source of spawning gravel for use in the Lower Clear Creek Watershed.

3. Source(s) of above information:

- North State Resources, Inc. 2008. *Long-Term Clear Creek Spawning Gravel Source Feasibility Study Data Report*.
- River Partners, 2011. *Lower Clear Creek Mercury Abatement Project Proposal*.
- Letter from Fish and Wildlife Service (FWS) to the Bureau of Reclamation (BOR) summarizing Fisheries Monitoring Data from 1999 to 2009.
- North State Resources, Inc. October 2010. *Technical Memorandum Clear Creek Spawning Gravel Source Project Mercury Assessment*.
- North State Resources, Inc. July 25, 2007. *Long-Term Clear Creek Gravel Source Feasibility Investigation Final Draft Quality Assurance and Quality Control Project Plan (QAPP)*.

Section 5: Conflict of Interest

Last Name	First Name	Organization	Role
Mitchell	Mary	WSRCD	Primary Contact/Investigator
Teubert	Ryan	WSRCD	Co-Primary Investigator
Bryan	Leslie	WSRCD	Supporting Staff
Teubert	Maureen	WSRCD	Supporting Staff
Aschbacher	Rachel	WSRCD	Supporting Staff
Ricks	Russell	New Empire Aggregate	Sub-contractor
Diridoni	Gary	BLM	BLM contact for project area
Bratcher	Patricia	CDFG	CDFG contact for project area

Section 6: Project Tasks and Results Outline

1. Detailed Project Description

The **issues** addressed in the Lower Clear Creek Aquatic Habitat and Waste Discharge Improvement Project (Project) in Shasta County (MAP #1) are: reducing mercury loading to the Sacramento River and Delta; providing an economical annual long-term supply of spawning gravel for threatened and endangered anadromous fish; and recreating wetlands in a watershed that was turned upside down by gold and gravel mining. These issues are of importance due to the problems of varying levels of mercury contamination in the fine particle size fraction within mining tailing, the need to find a more economical and long-term source of spawning gravel in an important anadromous fisheries system where gravel recruitment is blocked by Whiskeytown Dam, and restoring wetlands in a watershed where over 600 acres of potential wetlands have been identified and mapped.

The **questions** or unknowns to be addressed include: 1) Low levels of mercury contamination have been found on the project property, but heavier mercury contamination and hot spots were found on a nearby property. Due to the localized nature of mercury hot spots, it is unknown if the level of mercury contamination on the project property contains pockets of heavier levels of contamination. 2) Whether the fines screened from the tailings can be tested thoroughly enough to provide a clear determination whether the fines need to be transferred to a lined site out of the floodplain and capped to prevent further leaching into the creek or fall within background levels to enable the fines to be used for revegetation of the newly created seasonal wetlands.

The overarching **goal** for the Project is to re-establish critical ecological functions, processes, and characteristics, within contemporary regulated flow and sediment conditions that best promote recovery

and maintenance of resilient, naturally reproducing salmonid populations and natural animal and plant communities while remediating a hazardous material contaminated site.

The **objectives** of the Project are to: 1) Remove the negative impacts of any mercury contaminant on the aquatic environment, the terrestrial ecosystem, and people. 2) Create a long-term economical supply of spawning gravel for the system by providing 20 years of suitable spawning gravel (237,130 tons) for threatened and endangered anadromous fish at an estimated savings of \$2,524,805 or \$10.65 per ton. 3) Recreate wetlands to improve aquatic and terrestrial habitats in the Lower Clear Creek Watershed. Previously completed objectives were addressed in the *Long-Term Clear Creek Gravel Source Feasibility Investigation* (NSR 2008), which included completion of site surveys to document and map the approximate location of property lines and corners, a detailed geo-referenced site topography survey, and delineated wetlands and other waters of the U.S.; surface and subsurface data collection necessary to spatially represent the vertical and horizontal particle size distribution of the gravels and annual groundwater levels; mercury source data collected to spatially represent the distribution of inorganic mercury and methylmercury; a gravel feasibility analysis of the feasibility of using dredge-mined tailings (i.e., gravel) to be stored at the Cloverview property for spawning gravel supplementation and the best location or use for the remaining size fractions (i.e., <¼ inches and >5 inches); and a conceptual floodplain design with criteria for restoring the floodplain of Clear Creek at the site.

The Project location is on land owned by the Bureau of Land Management in the Lower Clear Creek Watershed, southwest of Redding in Shasta County, CA. (Map #2) known as the Cloverview property (Map #3).

A Phase One site assessment has been completed by North State Resources (NSR) and project design, environmental documentation, and permitting is currently being completed by NSR under a separate contract with the Bureau of Reclamation (BOR). Project tasks for this proposal include: site preparation and grading, temporary installation of a gravel screening plant, screening mining tailings into size-specific spawning gravel and stockpiling for future use while stockpiling boulders for future in-stream habitat improvement, testing fines for mercury contamination and, as needed, transferring the fines to a lined site outside the floodplain to be capped to eliminate further mercury impact on water quality, wetland creation and planting, re-grading the work sites, re-vegetation, and monitoring. The first year after this Project 17,000 tons of spawning gravel are expected to be injected into gravel-starved reaches throughout the watershed in locations previously identified where injection designs have been chosen by the multi-agency Lower Clear Creek Technical Team (Technical Team). Some of the areas of gravel extraction will be redesigned and planted to create 5.72 acres of new wetlands in the watershed. An intermittent creek will be re-routed via its historic channel into the newly-created wetlands to provide a fresh water source that will help decrease methylation.

In order to create the most realistic low-cost budget based on actual costs in a similar operation by a highly qualified contractor, a Memorandum of Understanding was signed between Western Shasta Resource Conservation District (WSRCD) and Russell Ricks owner operator of New Empire Aggregate (NEA) to use NEA as the sole source for the gravel plant installation and operation (Attachment #2). For the past fifteen years, WSRCD has received on average 3-5 bids each on 11 gravel injection projects, but the gravel typically came from one of two gravel operations in Shasta County of which NEA was one. NEA has been in the gravel business for over twenty years, and has owned gravel operations in Cottonwood Creek since 2005. His plant is portable with all equipment set on wheels with stackable conveyors. NEA has only worked in tailings for the past five years and understands the permitting and regulatory process and has adapted his processes for maximum efficiency. WSRCD has worked with NEA as the low bidder in two previous spawning gravel injection projects in the Lower Clear Creek Watershed. The partnership with NEA has enabled WSRCD to obtain what we believe is the most realistic and cost effective price estimate for this Project.

Assuming the grant contract term begins November 1, 2011 and all environmental documentation and permits have been obtained by the consultant in early 2012, and after a site evaluation for bird nests, with site preparation in summer 2012, gravel processing and wetland and spoils area construction, recontouring and wetland construction in summer 2013 and planting in 2014, with final reporting by

October 2014.

This proposal was made possible by the Central Valley Project Improvement Act (CVPIA), which funded the *Lower Clear Creek Mercury Abatement Project Proposal*, *Clear Creek Spawning Gravel Source Project Mercury Assessment*, *Long-Term Clear Creek Gravel Source Feasibility Investigation Quality Assurance and Quality Control Project Plan*, as well as a letter detailing U. S. Fish and Wildlife Service findings of the fisheries monitoring in Clear Creek. In addition, CVPIA is committed to funding the completion of all environmental documents and permits for this Project. The Project is supported by CALFED through previous funding and objectives to recover Priority Group I Salmonid Species on Clear Creek; the U. S. Bureau of Reclamation (Reclamation) and the U.S. Fish and Wildlife Service (USFWS) through previous funding and Section 3406 of the CVPIA; BLM, through cost sharing and property acquisition; the Anadromous Fish Restoration Program (AFRP); and multiple agencies on the Technical Team involved with project design, engineering and restoration. The design of the Project was funded by Reclamation, which administers CVPIA funds that are provided for Clear Creek Restoration (CVPIA 3406(b)(12)).

Rehabilitation of salmonid spawning habitat in regulated rivers through spawning bed enhancement is commonly used to mitigate altered sediment and flow regimes and associated declines in salmonid communities (Wheaton et al. 2004). Similar projects are being implemented on the Trinity and Merced Rivers. In the Trinity River system, the plan is to introduce long-term periodic gravel and cobble supply in the first fifteen miles below Lewiston Dam at a rate equal to that transported by high flow releases to maintain cobble and gravel storage, enabling the river to create and maintain complex instream habitat (Trinity River Restoration Record of Decision, 2000).

The Phase I Site Assessment completed for both the BLM and CDFG property of the Cloverview area (North State Resources 2008) estimated 2,800 tons of fine sediment less than 2 mm in diameter are located in the whole project area. Therefore tailings will be excavated down to native soil and the fines moved out of the floodplain.

2. Background and Conceptual Models

a. Background: Since 1996, a unique partnership between local, state, and federal agencies, and local stakeholders resulted in a step-by-step plan for restoration of the large-scale destruction that occurred in the Clear Creek drainage system as a result of decades of gold and gravel mining, dam construction and water diversion from the mid 1800s through the 1940s. These historical alterations resulted in mercury contamination, impaired fluvial geomorphic processes, a damaged channel and devastated salmonid populations. To date the multi-agency Technical Team has guided the restoration process and since 1995, the WSRCD has received and implemented 79 state and federal grants totaling over \$15,300,000 for restoration activities in Lower Clear Creek and BLM has spent over \$7 million to purchase or trade land to obtain ownership of 98% of the Lower Clear Creek floodway and riparian habitat in order to support restoration effort and restore salmonid populations.

Clear Creek originates near 6,000 ft elevation in the Trinity Mountains, and flows south between the Trinity River basin to the west and the Sacramento River basin to the east. Upper Clear Creek flows into Whiskeytown Lake (Elevation 1,210 ft) at Oak Bottom, 11 miles west of Redding (Map #4). The lower section of Clear Creek (lower Clear Creek) flows south from Whiskeytown Dam for approximately 8 miles, then east for 8 miles before joining the Sacramento River five miles south of Redding. Clear Creek provides spawning and rearing habitat for anadromous fish, as well as habitat for a wide variety of native terrestrial species including state- and federally-listed species such as spring-run Chinook (*Oncorhynchus tshawytscha*) rainbow trout/steelhead (*O. mykiss*), fall-run (*O. tshawytscha*) and late-fall run Chinook (*O. tshawytscha*), northwestern pond turtle (*Actinemys marmorata marmorata*), bald eagle (*Haliaeetus leucocephalus*), yellow warbler (*Dendroica petechia*), and foothill yellow-legged frog (*Rana boylei*).

The California Department of Conservation has determined that about 216 mining sites are present within the basin (Tetra Tech 2005) and estimate that about 36% of these abandoned mine lands (AML) have a moderate probability of releasing hazardous substances and "that cumulatively AML sites

in the watershed may pose a highly significant chemical threat to the environment." Clear Creek is one of two watersheds in the Northwestern California Bioregion listed with the highest potential for impacts from hydraulic mining (California's Abandoned Mines, *A Report on the Magnitude and Scope of the Issue in the State, Volume I*. Department of Conservation, Office of Mine Reclamation. Abandoned Mine Lands, June 2000).

As mentioned above, the Technical Team developed the Clear Creek Floodway Restoration Project to improve the river ecosystem health in Lower Clear Creek. The Technical Team and the Lower Clear Creek CRMP developed the *Lower Clear Creek Watershed Management Plan*, (Western Shasta Resource Conservation District, 1998), which identified numerous actions to restore native anadromous fisheries within Clear Creek. The proposed Project is consistent with the vision and goals for restoration established by the CRMP process. There is also strong local and statewide impetus for restoring ecosystem elements (channel morphology, sediment transport processes, riparian community) to aid in the recovery of four Priority I salmonid species.

Clear Creek is perhaps one of the best locations for this project because of the following opportunities:

- **Government Ownership of Floodway.** The BLM owns almost the entire floodway and is working toward acquiring the few remaining parcels in coming years.
- **Timeline to implement restoration.** The proposed Project has already undergone a feasibility study, mercury sampling, design, and near completion of associated environmental documents and permits.
- **The success of the Clear Creek Technical Team.** In October 2006, the Technical Team received the **2006 Riparian Challenge Award** from the Western Division of the American Fisheries Society for the Lower Clear Creek Floodway Rehabilitation Project. Then in December 2006, the Team received the **California Governor's Environmental and Economic Leadership Award** for Ecosystem Restoration for the Lower Clear Creek Floodway Rehabilitation Project.

b. Conceptual Model: The Technical Team updated its ecological monitoring plan (Western Shasta Resource Conservation District, 2005) and completed a gravel management plan (Graham Matthews & Associates, 2007). New conceptual models were updated based on prior models, CALFED Environmental Water Program (EWP) models, recommendations on mercury contamination in the watershed (Tetra Tech, Inc. 2005); and the results of monitoring data collected to date as part of the adaptive management process on Lower Clear Creek. The models illustrate the current understanding of the Lower Clear Creek system and illustrate how changes in resource inputs to the current system through restoration actions enable natural processes to restore structure and induce positive habitat responses that lead to increases in the diversity and productivity of biotic communities.

Problems with mercury contamination arise when a number of factors occur:

- 1) Mercury is elevated above natural concentrations in the ecosystem;
- 2) Bacterial transformations convert inorganic mercury into methyl mercury;
- 3) Methyl mercury bioaccumulates in the wetland food web at harmful concentrations; and
- 4) Mercury and/or methyl mercury is exported to other ecosystems where it, in turn, bioaccumulates.

The Technical Team believes this combination of factors led to problems with mercury bioaccumulation in local biota, and similarly, contributes to problems outside of the Clear Creek watershed. The monitoring plan assesses the effectiveness of the Project by evaluating:

- The reduction in mercury on the floodplain in areas where it could be transported downstream;
- Changes in the structure of the physical channel and floodplains through geomorphic monitoring;
- Changes in terrestrial habitat through riparian revegetation monitoring, including an evaluation of the functional ability of constructed features to naturally recruit vegetation and key physical factors that drive vegetation response and wetland habitat creation; and
- Geomorphological changes in the aquatic habitat where injected gravel is placed, which will increase the amount of available spawning habitat.

In Clear Creek, aggregate mining and gold dredging left contaminated soils in place that have

contaminated areas downstream. These mining activities, in addition to the construction of Whiskeytown Dam, also reduced coarse sediment supply to the river by removing stored sediment from the channel and floodplain and/or trapping coarse sediment that is in transport on the streambed.

The ecosystem-based approach to restoration stemming from various conceptual models centers on re-establishing the critical geomorphic and hydrologic processes that sustain alluvial rivers. The ERP and Strategic Plan support this by “proposing an integrated-systems approach that attempts to protect and recover multiple species by restoring or mimicking the natural physical processes that create and maintain diverse and healthy habitats” (CALFED Strategic Plan pg 2-6).

3. Approach and Scope of Work

a. Feasibility Study (Completed; not part of Proposed Action)

Under authorization from Reclamation, NSR conducted a feasibility assessment of the fluvial-derived sediment stored in dredger tailings on two parcels at the Cloverview Property (one owned by BLM, one owned by CDFG) to determine the feasibility of its use for restoring salmon spawning habitat in Clear Creek. The focus of this assessment was determination of the particle size distribution, presence and relative proportions of total mercury (Hg) and methyl mercury (MeHg), and the volume and weight of variously sized gravels in the dredger tailings.

The field investigation included collection of bulk sediment samples from test pits distributed in a randomized manner, stratified by areal extent, across the site. Data were also collected from biological site surveys, delineation of waters of the United States, installation of groundwater measuring wells, and topographic surveys for use in this assessment. All field efforts described in the following paragraphs were performed during 2007 and 2008. A total of 19 sediment samples were tested for total mercury (Hg) and methylmercury (MeHg). Additional sampling for mercury occurred in 2010 (NSR 2010).

For the entire study site, the measured-in-place volume of tailings was calculated at about 514,700 cubic yards, and the weight of gravel was estimated to be about 823,500 tons. The gravel weight was calculated using an average bulk density of 1.6 tons/cubic yard for sandy gravel. This value is similar to the bulk density measured by SHN Engineering Consultants at Reading Bar (SHN, 2002). The usable gravel volume is limited by seasonal groundwater levels and the land surface elevation relative to Lower Clear Creek. The gravel harvest and reclamation design for the purposes of this feasibility analysis excluded any excavation below the existing water table and did not allow creation of pits that will collect surface water.

For the BLM property, the measured dry weight of available spawning-size gravel is ~237,130 tons. This amount is based on the disturbed dry weight of the measured in-place spawning-size gravel volume, groundwater depths, and the reclamation design finished slope of graded areas. Groundwater level data was used to determine the bottom elevation of each sites excavation.

The Technical Team and GMA (2006) recommend injecting about 17,000 tons of gravel each year for five years with a 10-year average of 12,800 tons per year into designated designed sites in Clear Creek. Under this scenario, about 85,000 tons of gravel are planned to be injected in the first five years. For the following 5 years at 12,800 tons/year and 10 years at 8,813 tons/year for a total of 237,130 tons of gravel.

b. Approach

WSRCD has implemented eleven grant agreements for over 150,000 tons of gravel injections throughout the Lower Clear Creek Watershed since 1995. The approved and designed injection sites are located all along the 17-mile stretch of Clear Creek. A couple of the sites require specialized equipment to correctly position the gravel. The benefit of creating stockpiles of gravel on BLM property puts the piles in a central location (Map #5) to the various injection sites, which will lower the haul cost considerably with an estimated savings of \$2,324,781 over the life of the project.

The Technical Team determines which sites should be addressed each year as well as the volume of gravel to be injected per site. In 2010, the bids received by WSRCD for gravel and placement at four sites in Lower Clear Creek Watershed ranged from \$19.82 to \$24.35/ton with an average \$22.87

for the whole project. The accepted low bid was \$19.82. Although the obvious variable is the hauling cost, how the contractors price the gravel vs. hauling in the bid documents traditionally shows significant variation.

The NSR 2008 feasibility study for this Project reported a commercial gravel/haul/place rate of \$18 – \$25 per ton. To determine cost savings, the following analysis uses WSRCD's \$22.87/ton in 2010 increased 3%/year for three years to \$25/ton when the first year of gravel injections will occur from the Project site.

First Five Years (using 3% inflation)

Cost of Commercial Gravel

17,000 tons per year or 85,000 tons for the first five years

Average cost to haul and place escalates from \$25/ton to \$28.14/ton

Cost of \$2,256,383

Cost of Project gravel:

17,000 tons per year or 85,000 tons for the first five years

Project gravel processing \$11.50/ton, haul and placement \$2-12/ton or an average of \$8/ton for a total \$19.50/ton.

Average cost escalates from \$19.50/ton to \$20.50/ton

Total Cost of \$1,699,542

Projected cost savings of \$556,840 for the first five years.

Twenty Years (using 3% inflation)

237,130 tons of spawning gravel

Cost of Commercial gravel: \$7,490,283

Cost of Project gravel: \$5,165,503

Projected cost savings of \$2,324,781 over twenty years.

There is approximately 237,130 tons of spawning-sized gravel available at the BLM Cloverview property (NSR 2008). About 35% of the gravel will be used in the first five years. The results suggest that processing the Cloverview Property dredger tailings for spawning gravel will cost significantly less than purchasing gravel from commercial sources. If the Project is not fully funded, a scaled down approach can be designed. Processing costs are expected to be higher for areas where the gravels have elevated total Hg concentrations.

c. Project Proposal Approach

The proposed action will involve gravel extraction and processing on the BLM Cloverview property and stockpiling the gravel. The stockpiled gravel will be available to the Technical Team for use at various injection sites along the creek as described in the Environmental Assessment (U.S. Bureau of Land Management and National Park Service 2008).

The proposed action will involve several activities on the Cloverview property to extract, process, store, and use the gravel. These activities will occur within the construction limits encompassing 35 acres. Grading may occur throughout the primary activity areas to extract gravel and restore riverine, wetland, and upland habitat.

After grading, several secondary activity areas within the primary activity areas will be used to process, stockpile, and store gravel and other materials extracted from the property and to create ephemeral, freshwater emergent wetlands. Access roads between the activity areas will be used to haul materials and move equipment. A crossing will be established across Clear Creek to provide access between the northern and southern portions of the parcel. A secondary access road off of Cloverview Drive maybe used when the temporary crossing is not in place.

The labeling of the secondary activity areas and access routes and the size of the area in acres or length in feet based on the geographic information system (GIS) project layers, which are shown on Maps #6, 7, 8, and 9.

The first phase of construction will involve surveying and staking the boundaries of the primary activity areas, the proposed road alignments, and the boundaries of spoils and stockpile areas within the primary activity areas and to identify the limits of vegetation removal and grading. Access routes will be designated within the primary activity areas, and roads between the areas will be established, along with the Clear Creek crossing, as described below. Next, vegetation will be removed from the primary activity areas to prepare for grading, processing, and recontouring activities. Trees and shrubs will be stockpiled in designated areas for future use in erosion control and revegetation efforts. Slash and larger woody material may be processed as chips, stockpiled in designated areas and used as mulch for future erosion control and revegetation efforts. Dredge tailing deposits within the primary activity areas will be excavated and hauled to the processor for sorting and subsequently to designated stockpiles or spoil areas. Portions will be recontoured to create seasonal freshwater emergent wetlands, while other areas will be recontoured to create floodplain or upland features.

Secondary Activity Areas – Crossing: Heavy equipment will be provided access from the north via Clear Creek Road where an existing dirt road terminates at a locked gate. This road will be extended across Clear Creek using a temporary crossing. The temporary crossing will likely involve either two culverts and a flatbed railroad car bridge or a constructed fill with five culverts (Attachments #3 and #4, respectively). In either case, fill material will be placed at both ends of the crossing to establish a 15 percent slope from the land onto the crossing. All fill material used in construction of the crossing will be washed clean gravel or cobble and will come from a locally available commercial source. The crossing will be ~16 feet wide and 180 feet long. The running surface of the crossing will be constructed at an elevation of about 573 feet msl with a design capacity of 300 cubic feet per second (cfs) in order to prevent flooding of the roadway during the anticipated operational season of June through November. Under either option, the crossing will be designed to permit fish passage, be temporary in nature and may be removed or partially dismantled and reestablished on a periodic basis to allow for longer term access to the project area south of Clear Creek (e.g., to access stockpiles for use elsewhere along Clear Creek).

Secondary Activity Areas – Processing: The processing area (P-1) (Map #4) will be used under the proposed action and will encompass ~1.2 acres. The processing area will be cleared and leveled to accommodate heavy equipment and a gravel processing plant. A temporary settling basin will be constructed to discharge water and allow fines to settle out after processing the dredger tailings. The basin will prevent the discharge from entering Clear Creek or other jurisdictional waters.

Excavated material will be hauled to the processing area using dump trucks and will be temporarily stored in a designated area before being sorted. The initial processing will entail sorting the raw material with coarse screen using loaders to separate the material into three size fractions (oversized or greater than 5 inches, 5 inches to 3/8 inch, and everything less than 3/8 inch). Spawning-size gravel will be washed and hauled to the stockpile area for later use at injection sites. The oversized material will be hauled to stockpile areas. The fine sediment excavated from the primary activity areas will be removed and tested for mercury. Contaminated fines will be contained within the spoils area to ensure that any mercury associated with this material is isolated from surface or groundwater sources. Non-contaminated fines will be used for site restoration purposes within the primary activity areas.

Water will be pumped from Clear Creek into temporary storage for use during gravel processing operations. Water for dust control purposes will also be available. A diversion point will be designated within the parcel, and water will be piped using a temporary network to the processing area. After being used for processing, the water will be discharged into settling basins to percolate into the ground consistent with federal, state, and local requirements. Some pipe may require burial to provide for vehicular access through the property. If water is pumped from an in-stream location, any pump intake will be in conformance with criteria established by the National Marine Fisheries Service and CDFG to prevent impacts to aquatic organisms.

Secondary Activity Areas – Stockpiles: Three stockpile areas are designated on the BLM parcel: one north of the creek encompassing approximately 3 acres can store 117,237 cubic yards and one south of the creek encompassing approximately 2.5 acres can store 99,534 cubic yards. One additional stockpile location is shown to the north of Clear Creek Road; this site is not necessary but may provide easier access to stockpiles for future gravel injection activities. Long-term access to the stockpile areas will remain until all spawning-size gravel has been removed up to 20 years after this grant has terminated. Once the stockpiles are removed, the area will be revegetated by the BLM in accordance with their best management practices (BMPs).

Secondary Activity Areas – Spoils: The spoils areas will be used to dispose of fine sediment with mercury contamination at upland locations that will not provide any opportunity for contact with surface water sources. Spoil area SP-1 (Map #4) will encompass approximately 2.5 acres on the southern portion of the BLM parcel. After testing the fines for mercury contamination, if the fines require handling in accordance with the Hazardous Waste Control Act (27 CCR Section 22480(b) (2)), the designated spoil areas that will contain these fines will be developed consistent with the requirements for Group B mine wastes with mercury concentrations above the mercury threshold effect level (Hg TEL).

d. Other Activities

Recontouring and Revegetation: Following the extraction activities, portions of the primary activity areas will be recontoured to expand floodplain areas within that will be susceptible to inundation during annual high flows, create fresh emergent wetlands, and restore the upland environments. The extraction and placement of alluvial materials within the Cloverview property will result in the establishment of wetland features (e.g., ephemeral, fresh emergent wetlands) and riparian habitat. Approximately 5.72 acres in the southeast portion of the BLM parcel will be recontoured to meet slope and drainage requirements necessary for establishing freshwater emergent wetlands. The upland portions of the excavation and processing areas will be revegetated using a native seed mix consistent with BLM requirements to minimize the potential for reestablishment of non-native plant species consistent with requirements for erosion control. The revegetation of seasonal wetlands will be established via natural recruitment from sources within and adjacent to the project area. A native seed mix as specified by BLM may be used to establish ground cover within these created wetlands for short-term erosion control. Native trees and shrubs may be provided by the BLM. Topsoil may need to be imported to cover piles of oversize material and aid in the reestablishment of native vegetation. In addition, these piles may be actively revegetated by planting or seeding with native species.

Erosion Control and Water Pollution Prevention: Project activities will comply with a Stormwater Pollution Prevention Plan (SWPPP) approved by state and federal agencies and specified Best Management Practices (BMP).

In-Water Activities: A review of restoration projects recently completed in Lower Clear Creek indicates that in-water activities may be limited by high flow events between October and June during normal water years. Construction and decommissioning of the creek crossing will require the use of heavy equipment adjacent to, and in some cases within, the wetted perimeter of Clear Creek. During construction or removal of the crossing, one or more temporary diversion structures (e.g., coffer dams) may be required to provide a dry work area and prevent fill material from being washed downstream. The culverts and/or bridge portions of the crossing will be placed at the specified locations, then fill material placed on top and in between as needed.

Gravel Injection: Stockpiled gravel will be used at off-site spawning sites along the creek, as determined by the Technical Team over the next two decades. Off-site spawning sites have been evaluated in the BLM and NPS EA (2008) or will be analyzed in other appropriate environmental compliance documents; thus, they are not described in detail in this document.

Air Pollution and Dust Control: Efforts will be made to minimize air pollution and reduce greenhouse gas emissions related to construction operations. NEA will comply with all applicable air pollution control rules, regulations, ordinances, and statutes.

Solid Waste Removal: All waste material generated as a result of the project will be removed from the Cloview property consistent with federal, state, and local requirements.

Schedule and Phases: Implementation of the proposed action cannot begin until the environmental review processes and all applicable environmental approvals have been acquired. Construction designs will also be finalized and approved by the lead agencies. Assuming the grant contract term begins November 1, 2011 and all environmental documentation and permits have been obtained by the consultant in early 2012, and after a site evaluation for bird nests, with site preparation in summer 2012, gravel processing and wetland and spoils area construction, recontouring and wetland construction in summer 2013 and planting in 2014, with final reporting by October 2014.

4. Deliverables

Assuming all environmental documentation and permits are obtained by March 1, 2012:

- | | |
|--------|---|
| Task 1 | Quarterly Technical Team meetings on the project
Deliverables: Meeting agendas, sign in sheets, minutes |
| Task 2 | Public outreach and education
Deliverables: Press releases, pre- and post-construction public meetings, (agendas, sign-in sheets, minutes), educational brochures |
| Task 3 | Site Preparation
Deliverables: Contractor agreement, photo documentation, maps showing survey and staked areas, road locations |
| Task 4 | Construction: Excavate, process and stockpile sorted gravel and spoil materials
Deliverables: Photo documentation, cubic yard estimates for each pile, test results for mercury in fines |
| Task 5 | Post-Construction
Deliverables: Photo documentation, monitoring report, as-builts, spawning gravel injection report |
| Task 6 | Project Reports
Deliverables: quarterly progress reports, draft and final project report |
| Task 7 | Final Grant Report
Deliverable: Final grant report |

5. Feasibility

The project approach, as presented in the previous sections and supported by the Conceptual Models and other studies for Lower Clear Creek, was developed by the Technical Team as the most feasible and appropriate restoration approach available. Similar projects are being implemented on the Trinity and Merced Rivers. Removing/isolating contaminated soils, along with large-scale reconstruction of the Lower Clear Creek floodway, has the highest probability of achieving the project goals of addressing the negative impacts of mercury and re-establishing the critical ecosystem components within contemporary regulated conditions.

Designs for the entire Project are being completed by NSR under contract with Reclamation to ensure a comprehensive design prior to implementing any single phase. The overall design for reconstruction of the floodplain is presented in the *Lower Clear Creek Floodway Rehabilitation Project; Channel Reconstruction, Riparian Vegetation, and Wetland Creation Design Document* (McBain & Trush, et al. 1999). This document was peer reviewed, and Phases 2A, 2B, 3A and 3B have been successfully implemented. WSRCD, the Technical Team, the Project Consultant Team (NSR) have demonstrated the ability to successfully plan, design, implement and monitor large-scale restoration projects, both in a timely manner and within budget. If awarded, WSRCD and the Technical Team will

implement the Proposed Project as scheduled.

The Project is subject to all local, state, and federal environmental regulatory requirements. Reclamation, BLM, as Co-Lead Federal Agencies, and CDFG, state Lead Agency, will soon submit a Joint Proposed Mitigated Negative Declaration/Finding of No Significant Impact and Initial Study/Environmental Assessment for the Lower Clear Long Term Gravel Project (IS/EA) in spring 2011. The IS/EA encompasses the project boundaries and identifies all potentially significant impacts associated with the Proposed Project. An updated and expanded wetlands delineation of the project area is being completed and a biological assessment will be completed by federal lead agencies to meet the requirements of the federal Endangered Species Act.

In addition to environmental compliance documents, numerous permits are required for the Project: Reclamation Board encroachment permit, Temporary Entry Permits from landowners, RWQCB 401 Waiver, NEPA Document, CEQA Document, Endangered Species Act Consultation (NMFS), Endangered Species Act Consultation (USFWS), California Endangered Species Act (CESA), Lake or Stream Bed Alteration Agreement 1600 (CDFG), Army Corps of Engineers Nationwide Permit. NSR and WSRCD have successfully obtained permits for other restoration projects on Clear Creek and elsewhere. The Project is fairly similar in design and construction techniques to other restoration projects on Clear Creek (Phases 2 through 3), therefore it is unlikely that any difficulties will be encountered in obtaining permits.

6. Relevance to the CALFED ERP **ERP and CVPIA Priorities**

The Project directly and indirectly addresses several ERP goals and milestones, the ERP Draft Stage 1 Implementation Plan, and CVPIA priorities:

CALFED ERP: Goal 2 (CALFED ERP Program Plan Volumes I and II, appendix to CALFED EIS/EIR, 2000): *“Rehabilitate natural processes in the Bay-Delta estuary and its watershed to fully support, with minimal ongoing human intervention, natural aquatic and associated terrestrial biotic communities and habitats, in ways that favor native members of those communities”*

The Project will be recontoured to bring the floodplain to its natural state by removing dredger tailings, which constrict the channel and does not allow the stream to inundate its floodplain. A revegetation plan will direct floodplain revegetation.

Goal 6 (CALFED ERP Program Plan Volumes I and II, appendix to CALFED EIS/EIR, 2000): *“Improve and/or maintain water and sediment quality conditions that fully support healthy and diverse aquatic ecosystems in the Bay-Delta estuary and watershed, and eliminate, to the extent possible, toxic impacts to aquatic organisms, wildlife, and people.”*

The Project will directly address water and sediment quality by removing mercury and fine sediments from the floodplain where it has the potential to enter the waterway.

Regional Priority 5: (CALFED ERP Draft Stage 1 Implementation Plan 2001): *“Ensure that restoration is not threatened by degraded environmental water quality” (Elements “Mercury” and “Implications of mine wastes for restoration).*

Implementation of this Project will reduce the potential for mercury to be released into the system and travel downstream, which would otherwise negatively affect restoration work that has occurred downstream (e.g. Phases 2 and 3) and beyond.

Restoration Priority 1: *Develop and implement habitat management and restoration actions in collaboration with local groups, such as the Sacramento River Conservation Area Non-Profit Organization.*

The Project has been conducted in collaboration with the Lower Clear Creek Coordinated Resource Management Planning (CRMP) Group and the Technical Team. Via information provided via quarterly

Technical Team meeting agendas, communication is maintained with many user and interested groups. A scoping notice for NEPA/CEQA scoping compliance was mailed in summer 2010.

Restoration Priority 2: *Restore fish habitat and fish passage particularly for spring-run chinook salmon and steelhead trout and conduct passage studies.*

CALFED, CVPIA and other government agencies have invested heavily in the return of spring-run salmon and steelhead in Clear Creek, including funding for removal of Saeltzer Dam in 2000. With this migration barrier removed, spring-run salmon can over-summer in deep, coldwater pools in the Clear Creek canyon reaches below Whiskeytown Dam. Gravel augmentation is providing needed spawning habitat for these species. The Project is anticipated to provide additional spawning habitat for steelhead and spring-run chinook. In addition, floodplain restoration and removal of potential contaminants will provide additional benefits to anadromous salmonids in the watershed and Bay Delta.

Restoration Priority 3: *Conduct adaptive management experiments in regard to natural and modified flow regimes to promote ecosystem functions or otherwise support restoration actions.*

While the Project does not target experiments with different flow regimes, it is conducive to monitoring the effects of high flows that result from natural floods as well as dam releases due to the creation of a new, accessible floodplain. Additionally there is the potential for CALFED EWP flows to be released on Clear Creek. The project is testing whether fluvial processes can be restored in a highly regulated river such as Clear Creek at a smaller scale than existed naturally, as a strategy to restore and maintain channel morphology, riparian vegetation, and salmonid populations.

Restoration Priority 4: *Restore geomorphic processes in stream and riparian corridors.*

The Clear Creek Floodway Rehabilitation Project is founded fundamentally on the goal of re-establishing ecological processes as the most effective way to maintain the river ecosystem. The Project provides one more completed element that addresses the larger goal for the Clear Creek waterway.

Restoration Priority 5: *Implement actions to prevent, control and reduce impacts of non-native invasive species in the region.*

The Project will remove non-native invasive plant species. The habitat will then be monitored for re-establishment in order to provide information necessary to implement measures to control existing populations and prevent colonization in the restored areas. Portions of the Project area is known to contain Tree of Heaven (*Ailanthus altissima*), black locust (*Robinia pseudoacacia*), scarlet wisteria (*Sebania punicea*) and Himalayan Blackberry (*Rubus discolor*). Replanting soon after construction with native riparian canopy and understory species increases the opportunity for native vegetation to become established and reduces the opportunity for non-native invasive species to spread within the Clear Creek floodway.

MSCS Big R Species:

The Project will monitor actions taken to promote the ecosystem recovery of three Multi Species Conservation Strategy (MSCS) Recovery (big R) species, Central Valley spring run chinook salmon, Central Valley fall/late-fall-run chinook salmon (*Oncorhynchus tshawytscha*) and (*Oncorhynchus mykiss*) Central Valley steelhead, along with several MSCS bird, reptilian, and amphibian species.

ERP Restoration Program Milestones for the Sacramento River Basin: The Project measures progress toward ERP milestones in mercury reduction (Milestones 217 through 221), ecological processes, habitats and stressor reductions, including coarse sediment supply through the implementation of gravel augmentation and the assessment of natural sediment transport processes linked to stream channel maintenance, erosion and deposition, maintenance of fish spawning areas and regeneration of riparian revegetation.

CVPIA Priorities: The general purposes of the CVPIA are identified by Congress in Section 3402(a) to “protect, restore, and enhance fish, wildlife, and associated habitats in the Central Valley and Trinity River basins of California.” Section 3406 (b) 12 describes specific actions to be implemented in Clear Creek, including the development of a comprehensive program to provide flows to restore salmon and steelhead habitat below Whiskeytown Dam. The Project, in conjunction with other Lower Clear Creek restoration efforts, allows the development and implementation of this program by restoring wetland habitats. Additional justification is provided in the Revised Draft Restoration Plan for the AFRP, which places ‘High’ priority on Action Item 2: “Halt further habitat degradations and restore channel conditions from the effects of past gravel mining.”

Relationship to Other Ecosystem Restoration Actions, Monitoring Programs, or System-wide

Ecosystem Benefits: The Project meets the requirements of Section 79190 of the California Water Code because it is identified in the CALFED EIS/EIR as a CALFED Stage 1 action (Ecosystem Restoration Program Draft Stage 1 Implementation Plan August 6, 2001 pp 52-54). It will augment the supply of spawning gravel in a very cost effective manner, and it will address the issue of mercury contamination in dredger tailings (page 53-54).

7. Expected quantitative results (project summary):

A total of approximately 419,000 cubic yards of mine dredger tailings will be processed resulting in 237,130 tons of available spawning gravel for gravel augmentation of the streambed and 176,000 cubic yards of usable gravel in addition to the spawning gravel. Approximately 5.72 acres will be recontoured to meet slope and drainage requirements necessary for establishing freshwater emergent wetlands. Processed areas will be revegetated using BLM approved revegetation procedures.

8. Other products and results:

- Remove mercury from contaminated dredger tailings, thereby eliminating the potential for it to enter and travel down through aquatic system to the Sacramento River and the Delta and/or transform into methylmercury in the wetlands along Clear Creek;
- Create floodplain micro-topography that simulates observed pre-dam high flow scour channels or abandoned primary channels;
- Revegetate the areas previously covered with dredger tailings, thereby expanding critical riparian habitat; and
- Develop a cost-effective source of spawning gravel for use in the Lower Clear Creek Watershed.

9. Qualifications

TECHNICAL ROLES

Francis Berg, Assistant Field Manager, Bureau of Land Management, has graduate courses in Environmental Administration and Archaeology from the University of California-Riverside; a B.A. in Anthropology from Riverside City College, Riverside, CA; and an Associate of Arts. Francis has been the Assistant Field Manager at the Redding Field Office since 1991.

Gary Diridoni, Wildlife Biologist, Bureau of Land Management (BLM), is currently pursuing a Marine and Freshwater Fisheries Management Graduate Certificate through Oregon State University. Gary completed a double major B.S. in Wildlife Management and Interdisciplinary Studies Ecosystem Conservation with minors in Zoology, Environmental Ethics and Biostatistics through Humboldt State University. Gary has worked for the BLM since 2002.

Don Reck, Environmental and Natural Resources Division Manager, Bureau of Reclamation Northern California Area Office, has a M.S. in Natural Resources, Fishery Emphasis, a B.S. in Biology, and an A.A. in Engineering. Don has been with Reclamation since 2006.

Matthew Brown, Fisheries Biologist, US Fish and Wildlife Service, has a M.S. in Biology from Arizona State University and a B.A. in Biology from the University of California-Santa Cruz. Matthew is a member of the Restoration Team and oversees all fisheries monitoring on Clear Creek.

Patricia Bratcher, Staff Environmental Scientist, California Department of Fish and Game: Ms. Bratcher is the Habitat Restoration Coordinator for the California Department of Fish and Game on the upper Sacramento River. She has a Bachelor's degree (Magna Cum Laude) in Environmental Biology from California State University, Fresno in 1988.

ADMINISTRATIVE ROLE

Mary Mitchell, WSRCD District Manager. Mary has a B. S. in Forest Industries Management from The Ohio State University in Columbus, Ohio and has over 30 years experience in business and project management.

Rhonda Darling, WSRCD Chief Financial Officer. Rhonda has a Business Degree from Santa Barbara Business College and has worked in the public and private sector for 30 years.

WSRCD is a special district of the State of California. It is run by a volunteer seven-member board of directors appointed by the Shasta County Board of Supervisors. Staff includes a District Manager, Chief Financial Officer, Assistant Financial Officer, three Project Managers (including two Registered Professional Foresters), wildlife biologist, two GIS specialists, archaeologist, geologist, wetland delineation specialist, certified erosion control specialist, certified herbicide applicator, field supervisors and field technicians.

PROJECT MANAGEMENT

Ryan Teubert, WSRCD Projects Manager, has a B. S. in Forestry Conservation with a double Minor in Watershed Management and Environmental Ethics from Humboldt State University. Ryan has extensive experience in field hydrology.

Dave DeMar, WSRCD Projects Manager, has a Masters of Arts in Cultural Resource Management from Eastern New Mexico University, and a BA in Geography and Anthropology from CSU Chico. Dave is certified by the Army Corps of Engineers in Wetland Delineation and is a certified archaeologist as well as GIS Specialist.

CONSULTANTS

North State Resources, Inc. (NSR) - NSR analysts specialize in the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) identifying and implementing effective approaches to compliance. NSR's staff includes experts in wildlife biology, fisheries, botany, wetland science, restoration ecology, fuels modeling, and heritage resources.

CONTRACTOR

Russell Ricks, New Empire Aggregate (NEA) - has been in the gravel business for over twenty years, and has owned gravel operations in Cottonwood Creek since 2005. NEA has worked in tailings for the past five years and understands the permitting and regulatory process and has adapted his processes for maximum efficiency.

SCIENTIFIC CONTRIBUTORS

The Technical Team is comprised of representatives of various federal, state and local resource agencies. Although over thirty representatives attend the meetings at various times, the key participants are: Don Reck, Bureau of Reclamation; Matt Brown, U.S. Fish & Wildlife Service; Patricia Bratcher, California Dept. of Fish and Game; Naseem Alston, NOAA Fisheries / NMFS; Francis Berg, Gary Diridoni, and

Ron Rogers, U.S. Bureau of Land Management; Graham Matthews, Graham Matthews & Associates; Ryan Burnett, PRBO Conservation Science; and Jeff Souza, Tehama Environmental Solutions.

FUNDED PROJECTS

CALFED Grants Received by WSRCD

No. 98-F15 for Phase 2 and Phase 3A of the Lower Clear Creek Floodway Rehabilitation Project. Total funding: \$3,627,419. Completed 2005. (RCD #26-21)
No. 99-N16 Clear Creek Prescription. \$256,260. 2002. (RCD #35-01)
No. 03-075-555-0 LCC Spawning Gravel. \$335,489. 2006. (RCD #26-52)
No. 04-162-555-0 County-wide Ecosystem Improvements. \$821,727. 2009. (RCD #35-23)
46-0000-1797 Shasta West Watershed Assessment. \$131,600. 2005. (RCD #27-13)
No. 03-074-555-0 Bear Creek Watershed Assessment/ \$140,806. 2006. (RCD #30-06)
No. 03-106-555-0 Cow Creek Water Quality. \$67,160. 2006. (RCD #33-11)
No. 46-0000-1798 Watershed Information Model. \$378,899. 2005. (RCD #35-12)
No. 46-0000-4716 Shasta West Watershed Management Plan. \$104,350. 2008. (RCD #27-22)
No. PO585510 LCC Phase 3B. \$3,482,451. Current until 6-30-12. (RCD #26-70)
No. PO510601 LCC Monitoring. \$1,308,448. Current until 4-30-11. (RCD #26-71)
No. R10-PX-20252 LCC Video. \$10,000. Current until 4-30-12. (RCD #26-79)

CVPIA grants received by WSRCD

No. 6-FG-20-14240 Lower Clear Creek CRMP Organization. \$33,672. 2001. (RCD #26-07)
No. 7-FG-20-14560 LCC Erosion Inventory. \$192,752. 2001. (RCD #26-09)
No. 7-FG-20-14610 LCC Fuel Inventory. \$15,112. 1998. (RCD #26-10)
No. 7-FG-20-14720 LCC Photogrammetry Survey. \$39,087. 1997. (RCD #25-12)
No. 7-FG-20-15290 LCC Spawning Gravel. \$408,000. 2000. (RCD #26-13)
No. 8-FG-20-16890 LCC Phase I Channel. \$382,383. 2000. (RCD #26-19)
No. 00-FG-200079 LCC Spawning Gravel. \$325,000. 2003. (RCD #26-27)
No. 00-FG-230718 LCC Spawning Gravel. \$98,850. 2001. (RCD #26-30)
No. 01-FG-230725 LCC DVD \$7,395. 2002. (RCD #26-37)
No. 01-FG-200131 LCC Phase 3 and 4 Design. \$115,000. 2002. (RCD #26-39)
No. 02-FG-230736 LCC CRMP Coordination. \$19,744. 2003. (RCD #26-42)
No. 02-FG-200047 LCC Floodway Rehabilitation Phase 3A. \$200,000. 2002. (RCD #26-43)
No. 03-FG-200008 LCC Spawning Gravel. \$75,000. 2003. (RCD #26-44)
No. 03-FG-200008 LCC Spawning Gravel. \$140,000. 2004. (RCD #26-46)
No. 04-FG-202019 LCC Spawning Gravel. \$255,088. 2008. (RCD #26-54)
No. 04-FG-230795 LCC Mercury Synthesis. \$25,000. 2005. (RCD #26-55)
No. 04-FG-230796 LCC Coarse Sediment Study. \$70,053. 2006. (RCD #26-56)
No. 06-FG-230820 LCC Phase 3B Permitting. \$32,000. 2007. (RCD #26-67)
No. 06-FG-202055 LCC Spawning Gravel. \$368,000. 2007. (RCD #26-68)
No. 07-FG-200186 LCC Spawning Gravel. \$600,000. 2008. (RCD #26-73)

Total WSRCD spawning gravel grants from CALFED and CVPIA: \$2,562,427.

Section 7: Project Budget – 1. Budget

Lower Clear Creek Aquatic Habitat and Waste Discharge Improvement Project					
PERSONAL SERVICES			Total		
Staff Level	Hours	Rate/ Hour	Requested	Match	Total
RCD District Manager: Yr 1-55 hrs @ \$31/hr = \$1705; Yr 2-45 hrs @ \$32=\$1440; Yr 3-40 hrs @ \$33=\$1320. Total 140 hrs \$4,465	140	31.89	4,465		4,465
RCD Project Manager: Yr 1-1240 hrs @ \$25/hr = \$31,000; Yr 2-1240 hrs @ \$26=\$32,240; Yr 3-686 hrs @ \$27 = \$18,522. Total 3166 hrs \$81,762	3166	25.83	81,762		81,762
RCD Project Coordinator: Yr 1-1040 hrs @ \$20/hr = \$20,800; Yr 2- 1040 hrs @ \$21=\$21,840; Yr 3-520 hrs @ \$22 = \$11,960. Total 2600 hrs \$54,600	2600	21.00	54,600		54,600
RCD GIS Specialist: Yr 1-40 hrs @ \$27 = \$1080; Yr 2-90 hrs @ \$28=\$2,520; Yr 3- 120 hrs @ \$29 = \$3480. Total 250 hrs \$11,000	250	28.32	7,080		7,080
RCD Lead Tech: Yr 1-120 hrs @\$16 = \$1920; Yr 2-160 hrs @ \$17 = \$2720; Yr 3-346 hrs @\$18 = \$6228. Total 626 hrs \$10,868	626	17.36	10,868		10,868
RCD Technicians (3): Yr 1-360 hrs @ \$12 = \$4360; Yr 2-480 hrs @ \$13 = \$6240; Yr 3-960 hrs @ \$14 = \$13,440. Total 1800 hrs \$26,546	1800	13.36	24,040		24,040
Subtotal			182,815		182,815
Staff Benefits @ 27%			49,360		49,360
TOTAL PERSONAL SERVICES			232,175		232,175
OPERATING EXPENSES					
Subcontractor Costs: NEA \$2,010,500 = Clearing and grubbing 35 acres @\$2,500/acre = \$87,500; Site preparation 35 acres @ \$714.28/acre=\$25,000; Haul bridge, place, site, remove \$30,000; equipment mobilization and demobilization \$35,000 ea = \$70,000; haul and feed gravel 176,000 cu yds @ \$3.85/cu yds = \$572,000; process gravel 176,000 cu yds @ \$6.00/cu yd = \$1,056,000; wetland construction 5.72 acres @ \$8,741/acre = \$50,000; spoils area construction 2.45 acres at \$44,898/acre (proof rolled subgrade, clay liner, leachate collection and recovery system, geocomposite drainage fabric, 20' of spoil material, top geocomposite drainage fabric, and cap) \$110,000; secondary access road construction \$10,000. NEA Total \$2,010,500; Bird surveys \$15,000; Engineering staking 200 hrs @ \$80/hr = \$16,000; Lab testing of fines for mercury \$9,254 (testing at 700 cu yd level)=135 samples @ \$68.55 including inflation) plus contingency of \$16,757 (if testing at the 250 cu yd level is required, 243 tests @ \$68.96.) Total \$1,990,811.			2,217,511	* See Below	2,217,511
Materials/field supplies for erosion control \$25,000, revegetation 35 acres \$26,000			51,000		51,000
Rent/leased field equipment (straw blower, mule, water trailer, chipper, etc.			15,000		15,000
Printing and Duplicating			475		475
Office Supplies			775		775

Permitting (assuming NSR does 96%)	10,000	393,762	403,762
Travel/mileage: Yr 1 - 237 trips @ 20 mi/trip= 4740 mi @\$0.60 = \$2844. Yr 2 - 329 trips @ 20mi trip= 6580 mi @ \$0.62=\$4080; Yr 3 - 177 trips @20 mi/trip= 3540 mi @\$0.64= \$2266. Total 14,860 mi \$9,190	9,190		9,190
Communication – leased radios, cell	700		700
Workers' Compensation rate 7% of \$182,815 = \$12,797	12,797		12,797
Total Operating Expenses	2,167,448	393,762	2,561,210
SUBTOTAL	2,399,623	393,762	2,793,385
OVERHEAD @ 15% MATCH 3.42% (see Administrative overhead)	359,943	82,067	442,010
GRAND TOTAL	2,759,566	475,829	3,235,395

* Due to Reclamation/CVPIA funds spent for the studies for this proposal and commitment to obtaining the permits, the Technical Team anticipates Reclamation/CVPIA will fund the future gravel injections for approximately \$600,000. This amount has not been counted as match in this proposal since it is anticipated future funding.

2. Budget justification: The budget for fines testing for mercury could require either a composite test for every 250 cubic yards or every 700 cubic yards. The calculation is shown at 700 cubic yards with an added contingency amount if the 250 level is required.

3. Administrative overhead: On February 22, 2011, WSRCD received a fully executed State and Local Department/Agency Indirect Cost Negotiation Agreement effective for 2010-2011 and 2011-2012 of 18.42% applicable to all programs and locations. 15% is being used for this application and the balance used as match.

10. Literature Cited

Ashley, Roger P, et al. 2002. *Preliminary Report on Mercury Geochemistry of Placer Gold Dredge Tailings, Sediments, Bedrock, and Waters in the Clear Creek Restoration Area, Shasta County, California*. U.S. Geologic Survey.

CALFED. 2000. *CALFED ERP Program Plan Volumes I and II*.

CALFED. 2001. *Ecosystem Restoration Program Draft Stage 1 Implementation Plan*.

CA Department of Conservation. 2000. *California's Abandoned Mines: A Report on the Magnitude and Scope of the Issue in the State, Volume I*.

CA Department of Water Resources. 1986. *Clear Creek Fishery Study; Northern District, Sacramento, CA*.

Graham Matthews & Associates. 2003. *Clear Creek Floodplain Rehabilitation Project: WY2003 Geomorphic Monitoring Report*.

Graham Matthews & Associates. 2004. *Clear Creek Floodplain Rehabilitation Project: WY2004 Geomorphic Monitoring Report*.

Graham Matthews & Associates. 2007. *Clear Creek Geomorphic Monitoring Project: WY2006 Annual Report*.

Graham Matthews & Associates. 2007. *2006 Update to the Clear Creek Gravel Management Plan*.

McBain & Trush, et al. 1999. *Lower Clear Creek Floodway Rehabilitation Project: Channel Reconstruction Riparian Vegetation, and Wetland Creation Design Document*.

Moore, Dr. Johnnie N., 2002. *Final Report in Sediments from Mine-impacted Rivers: Clear Creek, California Project*. Department of Geology, University of Montana.

North State Resources, Inc. 2008. *Long-Term Clear Creek Spawning Gravel Source Feasibility Study Data Report*.

North State Resources, Inc. 2008. *Lower Clear Creek Phase I Site Assessment*.

North State Resources, Inc. 2010. *Clear Creek Spawning Gravel Source Project Mercury Assessment*.

North State Resources, Inc., 2007. *Long-term Clear Creek Gravel Source Feasibility Study: Final Draft Quality Assurance and Quality Control Project Plan (QAPP)*.

SHN Consulting Engineers & Geologists. 2002. *Bulk Density of Reading Bar Spawning Gravel*.

SHN Consulting Engineers & Geologists. 2002. *Aggregate Feasibility Study: Lower Clear Creek Floodway Rehabilitation Project, Shasta County, California*.

Tetra Tech, Inc. 2005. *Mercury Synthesis and Data Summary Report for Lower Clear Creek*.

U. S. Fish and Wildlife Service. 2010. *Letter on Fisheries Monitoring in Clear Creek*.

Western Shasta Resource Conservation District. 1998. *Lower Clear Creek Watershed Management Plan*.

Western Shasta Resource Conservation District. 1996. *Lower Clear Creek Watershed Analysis*.

Western Shasta Resource Conservation District. 2000. *Lower Clear Creek Spawning Gravel Restoration Projects, 1997-2000*.

Provisional Landowner Access Agreement

Western Shasta Resource Conservation District

6270 Parallel Road

Anderson, CA 96007

Access/Entry Agreement for the

Lower Clear Creek Aquatic Habitat and Waste Discharge Improvement Project

I. PURPOSE

The following agreement details the requirements of both the landowner and the Western Shasta Resource Conservation District (RCD) regarding the Lower Clear Creek Aquatic Habitat and Waste Discharge Improvement Project. Said property is located approximately 7.5 miles upstream of Lower Clear Creek, tributary to the Sacramento River.

I, Bureau of Land Management, hereinafter called "Landowner", am aware that a habitat restoration project grant application has been submitted to the CALFED Ecosystem Restoration Program (ERP) for funding. The project has been explained to me by the RCD. I support the goals of the project. If the project is selected for funding, the Landowner will enter into a ten-year landowner agreement that will be project specific.

II. ACCESS PERMISSION

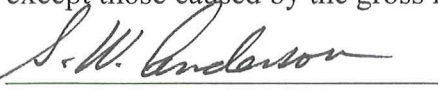
Landowner hereby grants the RCD, Department of Fish and Game (DFG), NOAA's National Marine Fisheries Service (NOAA Fisheries Service), and U.S. Fish and Wildlife Service (USFWS) representatives permission to enter onto real property owned by the Landowner to perform pre-project evaluation. Access shall be limited to those portions of Landowner's real property where actual restoration work is proposed to be performed and those additional portions of real property that must be traversed to gain access to the work site. The applicant will contact the Landowner at least 72 hours prior to any visit. At no time will DFG, NOAA Fisheries Service, or USFWS representatives access the property without the applicant, unless expressly given permission by the Landowner.

III. DURATION OF NOTICE

The term of this agreement shall commence upon signing of this Agreement and terminate on December 31, 2011.

IV. LIABILITIES

Reasonable precautions will be exercised by the RCD to avoid damage to persons and property. The RCD agrees to indemnify and hold harmless the Landowner and agrees to pay for reasonable damages proximately caused by reason of the uses authorized by this agreement, except those caused by the gross negligence or intentional conduct of the Landowner.


Steve Anderson, Field Manager
Bureau of Land Management
355 Hemsted Drive
Redding, CA 96001
(530) 224-2102

Date: February 25, 2011

**COOPERATIVE AGREEMENT BETWEEN
WESTERN SHASTA RESOURCE CONSERVATION DISTRICT
AND
RUSSELL RICKS CONSTRUCTION
FOR THE
LOWER CLEAR CREEK LONG-TERM GRAVEL MANAGEMENT PROJECT**

I. STATEMENT OF JOINT OBJECTIVES

A. Purpose. This Agreement (Agreement) is made and entered into by Western Shasta Resource Conservation District (WSRCD) and Russell Ricks Construction (RRC) also known as New Empire Aggregate, Inc., to describe the relationship of the parties in the implementation of a grant agreement (if funded) through the CALFED Ecosystem Restoration Program 2010/2011 for the purpose of implementing the Lower Clear Creek Aquatic Habitat and Waste Discharge Improvement Project.

The project to be implemented by WSRCD and RRC assists the Bureau of Land Management (BLM) with long term gravel and fines management in the Lower Clear Creek Watershed for ecosystem restoration to benefit threatened and endangered anadromous fish and improve water quality.

This Agreement supports the development and implementation of a multi-year spawning gravel sorting and injection project on BLM property, known as the Cloverview property (Map #1), to restore and protect the health of fisheries and improve water quality in Lower Clear Creek, the Sacramento River and the Bay-Delta. The parties to this Agreement will help manage the spawning habitat through a strong partnership with the multi-agency Lower Clear Creek Technical Team, which has a special focus on floodplain rehabilitation and fisheries restoration.

B. Benefits. The activity to be undertaken through this Agreement furthers the goals of the CALFED Ecosystem Restoration Program to improve ecosystem quality and improve water quality through:

- * Restoration projects that enhance aquatic habitat in the Sacramento River and Bay-Delta; and
- * Projects that control waste discharges that contribute to water quality problems in the Bay- Delta.

II. DEFINITIONS

A. Grant Award Recipient: The Grant Award Recipient is WSRCD, who is authorized to assume the obligations imposed by the State and Federal laws, regulations, requirements, and conditions that apply to grant awards.

B. Federal Fiscal Year (FY): The Federal fiscal year, which begins on October 1 of one year and extends through September 30 of the following year.

C. Project Administrator (PA): The PA is the WSRCD District Manager, the person designated

to assure the project conforms to the grant contract, obtain signatures and approval for all subcontracts, insure financial management of the project conforms to the grant budget, submit all grant invoices with deliverables, and assure that all grant reports are completed and submitted on time.

D. Project Manager (PM): The PM is the WSRCD Project Manager, the person designated for the purpose of administering the technical aspect of this agreement and implementing the project in accordance with the grant application and the grant agreement.

E. Project Officer (PO): The PO is Russell Ricks, RRC owner, the person designated for the gravel screening and the heavy equipment work associated with the project. RRC is not authorized to issue changes or in any other way amend the grant agreement or obligate the WSRCD or BLM in any way. These actions can only be issued by the PA with a written amendment to the contract agreement between the PA and PO, signed by the WSRCD Board of Directors.

F. Project-Specific Definitions:

1. Non-Spawning Gravel, also known as “pea gravel”, size is 0.38’ to 0.08”.
2. Gravel Sorting Equipment includes the gravel sorting plant, gravel sorting screens, loaders and other heavy equipment including dump trucks for hauling the sorted materials.
3. Fine Sediments include all sediment less the 0.38”. This is further divided into three categories: 0.38” to 0.08” non-spawning gravel, 0.08” to 0.0024” sand, and sediment less than 0.0024” as silt/clay.
4. Suitable Spawning Gravel size is 5” to 0.38”. This is further divided into three categories: 5” – 0.75” course gravel, 0.75” to 0.5” medium gravel, and 0.5 to 0.38” fine gravel.
5. Tailings include 1850-1950 mining era remnant dredger tailings consisting of cobbles (greater than 5” in size), suitable spawning gravel, non-spawning gravel, and other fine sediments as defined above.
6. Stockpiles will be areas used for temporary storage of spawning-size gravel until it is needed for use at injection sites along Clear Creek and for storage of other processed materials. The boundaries of the stockpile areas will be staked once the vegetation has been removed from the primary activity areas. Stockpiles will be no higher than 20 feet with side-slopes at a 2:1 grade. Earth berms would be constructed around the stockpile areas to control runoff.
7. Wetlands: This habitat is characterized by moderate to dense patches of emergent and submergent wetland plant species with occasional open-water areas. Dominant species include broad-leaf cattail (*Typha latifolia*), hard-stem bulrush (*Scirpus acutus*), swordleaf juncus (*Juncus ensifolius*), and smartweed (*Polygonum lapathifolium*.). Willows, such as,

arroyo willow and dusky willow (*S. melanopsis*) often occur on the margins of these features.

Wetlands are further divided into seasonal wetland, fresh emergent wetland, riparian wetland, and fresh emergent wetland/riparian wetland.

- Seasonal wetlands dry earlier in the season effectively limiting the types of hydrophytic vegetation occurring in these features.
- Fresh emergent wetlands and fresh emergent/riparian wetlands occur in areas with longer durations of inundation.
- Riparian wetlands are associated with the fringes of the fresh emergent wetlands or with the banks of Clear Creek.

III. PROJECT MANAGEMENT PLAN

A. WSRCD agrees to:

1. Provide for administration, services, facilities, equipment, materials, supplies, and personnel for some activities under this Agreement.
2. Maintain supervision and oversight of personnel, sub-cooperators, contractor activities, and all phases of performance under this Agreement.
3. Select qualified vendors, partners, and cooperators to complete projects.
4. Ensure that any construction over \$2,000 conducted by non-WSRCD personnel will abide by required Davis-Bacon prevailing wages and all applicable terms and conditions.
5. Maintain communication with BLM personnel on the progress of the project.
6. Work closely with RRC to organize and implement the project tasks for the greatest benefit, highest efficiency and lowest cost.

B. RRC agrees to:

1. Provide heavy equipment, materials, supplies and other personnel needed for the satisfactory completion of on-the-ground work related to preparing the Cloverview property for gravel sorting, for extracting, sorting and stockpiling gravel and constructing a fines disposal site and closing said site for the grant project.
2. Maintain supervision and oversight of all personnel working under the direction and guidance of RRC.
3. Ensure that any construction over \$2,000 conducted by non-WSRCD personnel will abide by required Davis-Bacon prevailing wages and all applicable terms and conditions.
4. Work closely with WSRCD to organize and implement the project tasks for the greatest

benefit, highest efficiency and lowest cost.

IV. RATE DETERMINATION

A. RATES

1. Current Agreement Rates: The budget submitted with the CALFED grant application includes the current rates and estimated costs of completing the project for both WSRCD and RRC.
2. Rate Redetermination: Agreement unit prices (Rates) may be redetermined as set forth in this section with prior approval of the granting agency.

V. TERM OF AGREEMENT

This Agreement shall become effective on the date of execution by both parties and shall remain in effect for the term of the grant contract, if funded, or until December 1, 2011, if not funded.

VI. KEY OFFICIALS

A. Project Administrator (PA)

Mary Mitchell, District Manager
Western Shasta Resource Conservation District
6270 Parallel Road
Anderson CA 96007
Telephone: 530 365-7332 x 202
Fax: 530 365-7271
Email: mary@westernshastarc.org

B. Project Manager (PM)

Ryan Teubert
Western Shasta Resource Conservation District
6270 Parallel Road
Anderson CA 96007
Telephone: 530 365-7332 x 209
Fax: 530 365-7271
Email: ryan@westernshastarc.org

C. Project Officer (PO)

Russell Ricks
Russell Ricks Construction
New Empire Aggregate, Inc.
Anderson CA 96007
Telephone: (530) 262-4475
Fax: (530) 347-1207
Email: rricks1035@aol.com

VII. STANDARD TERMS AND CONDITIONS

A. Amendments and Integration. This Agreement supercedes all previous agreements or understandings, and constitutes the entire understanding between the parties with respect to the above referenced services, terms of compensation, and otherwise. This Agreement shall not be amended, except in a writing that is executed by authorized representatives of both parties.

B. Independent Contractor. The RRC shall, during the entire term of this Agreement, be construed to be an independent agent and nothing in this Agreement is intended nor shall be construed to create an employer-employee relationship, a joint venture relationship, or to allow WSRCD to exercise discretion or control over the professional manner in which the RRC performs the services which are the subject matter of this Agreement.

C. Indemnification.

- a. WSRCD shall protect, defend, indemnify and hold the RRC harmless from any loss, damage, injury, claim, lawsuit, liability and legal responsibility arising out of the negligent or intentional acts or omissions of itself or any of its agents or employees in connection with services provided pursuant to this Agreement. Such obligations shall extend to the RRC itself and its officers, employees and agents.
- a. The RRC shall protect, defend, indemnify and hold WSRCD harmless from any loss, damage, injury, claim, lawsuit, liability and legal responsibility arising out of the negligent or intentional acts or omissions of itself or any of its agents or employees in connection with services provided pursuant to this Agreement. Such obligations shall extend to the WSRCD itself and its officers, employees and agents.

D. Insurance. RRC shall obtain and maintain for the duration of this Agreement, comprehensive general liability insurance and/or other insurance necessary to protect the parties hereto, with a minimum coverage limit of two million dollars (\$2,000,000) and shall provide WSRCD with a certificate evidencing same with WSRCD being named an additional insured. CONTRACTOR's above described insurance shall serve as the primary insurance coverage for any claim arising from or relating to the services to be performed hereunder.

E. Non-discrimination. The RCD will not discriminate in employment practices or in the delivery of services on the basis of race, color, creed, national origin, sex, age, marital status or physical or mental handicap.

Signed by:

 DIRECTOR

Phil Schoefer, President
WSRCD Board of Directors

Date: Feb 28, 2011



Russell Ricks, Owner

2/25/11

2/25/11

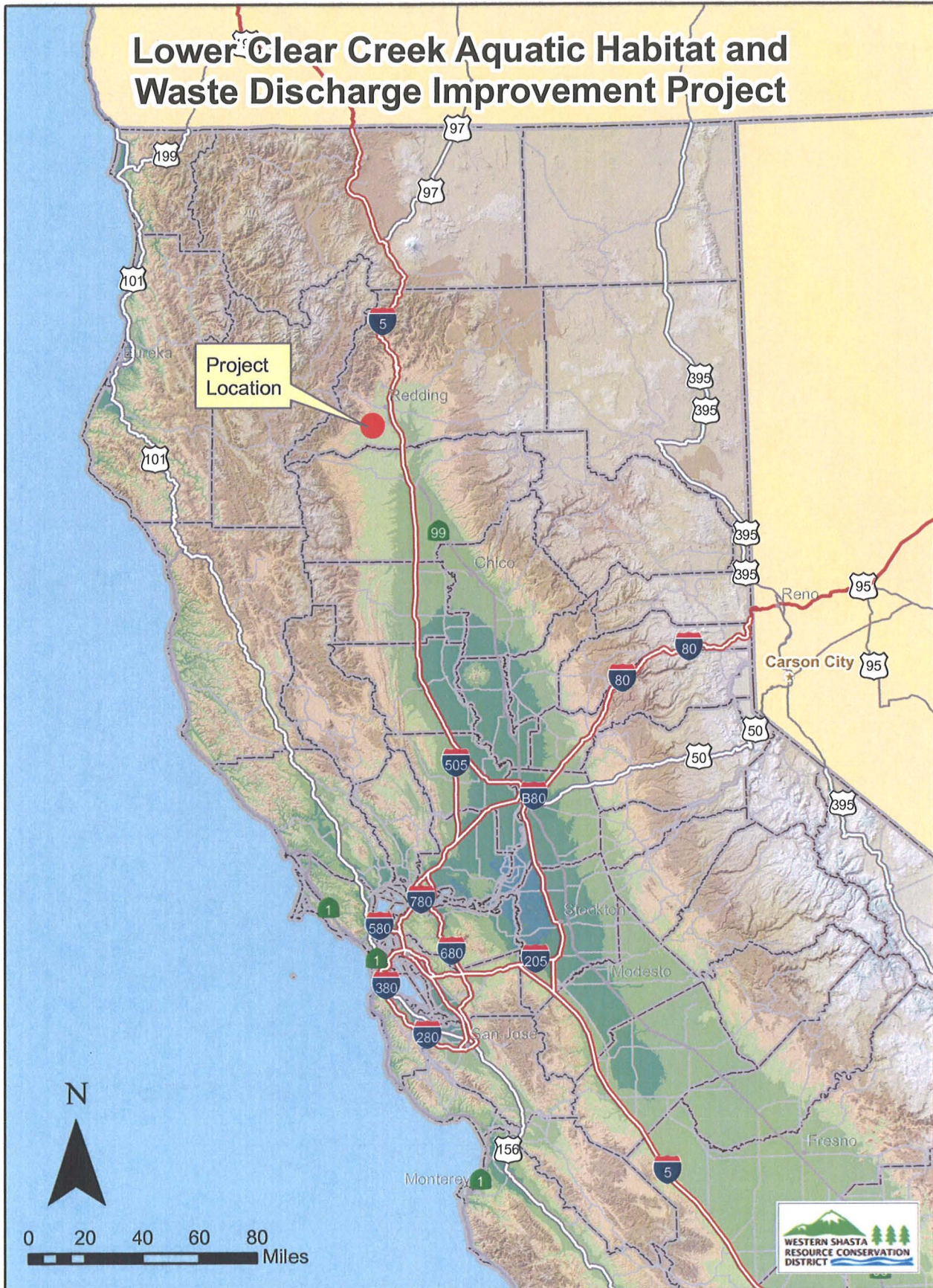
<u>ITEM</u>	<u>DESCRIPTION</u>	<u>QTY</u>	<u>Unit</u>	<u>Bid unit</u>	<u>Bid total</u>
1	Clearing & Grubbing	35	acre	\$ 2,500.00	\$ 87,500.00
2	Site Preparation	1	LS	\$ 25,000.00	\$ 25,000.00
3	Haul Bridge	1	LS	\$ 30,000.00	\$ 30,000.00
4	Mobilization & Demobilization	1	LS	\$ 70,000.00	\$ 70,000.00
5	Haul Feed Material to Plant	176,000	CY	\$ 3.25	\$ 572,000.00
6	Process Material	176,000	CY	\$ 6.00	\$ 1,056,000.00

Total Cost \$ 1,840,500.00



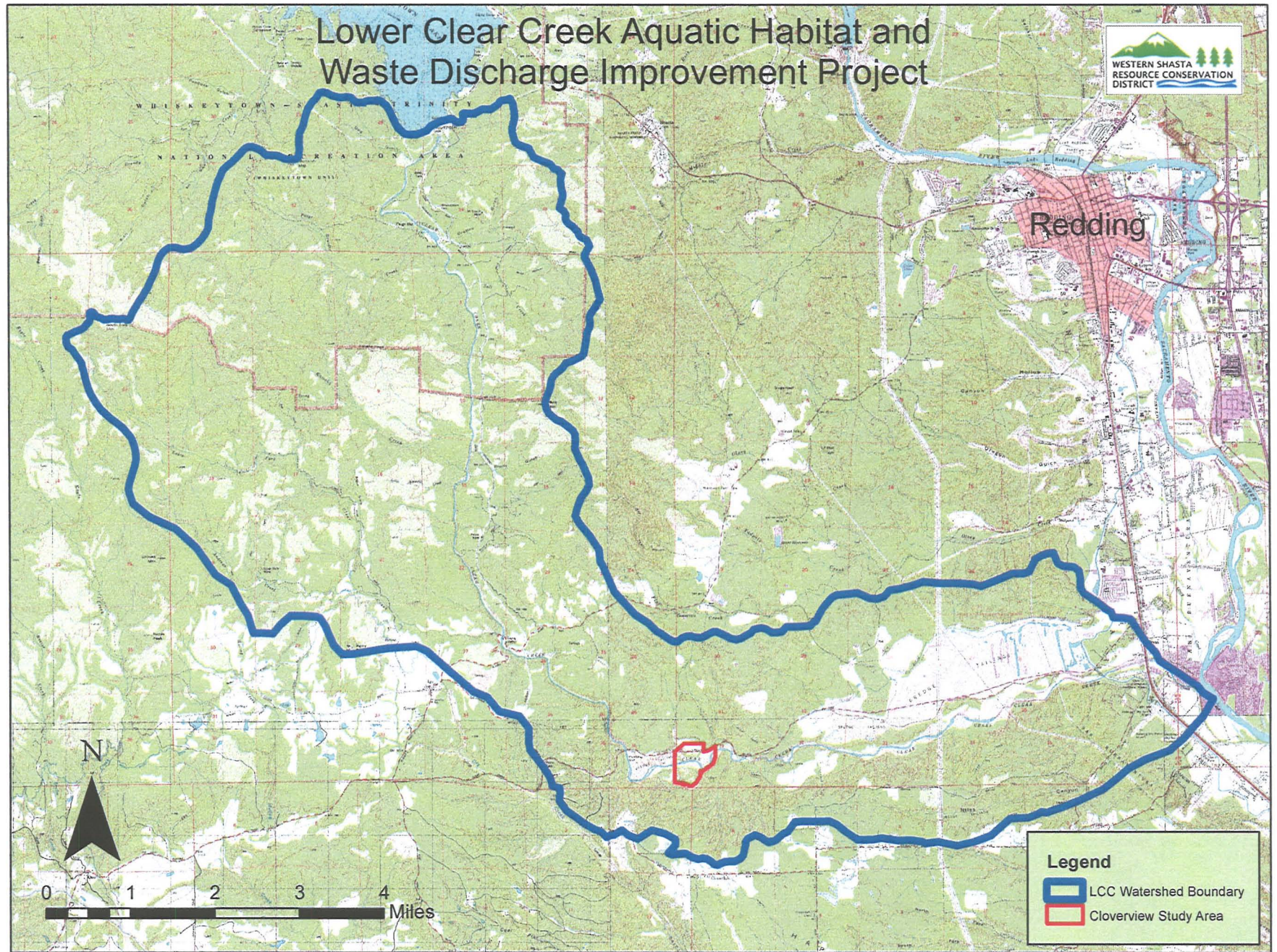


Map #1





Lower Clear Creek Aquatic Habitat and Waste Discharge Improvement Project

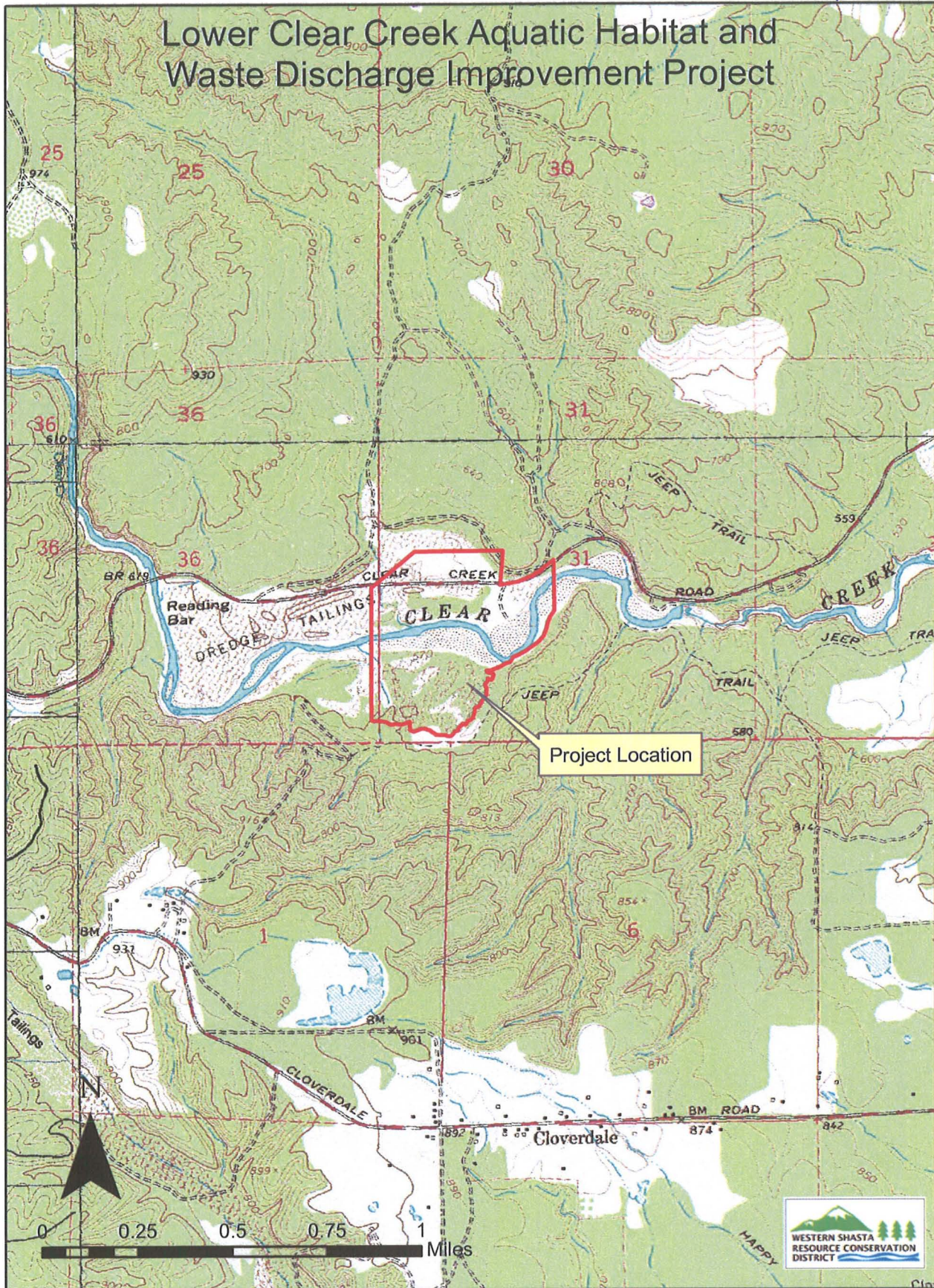


Legend

- LCC Watershed Boundary
- Cloverview Study Area

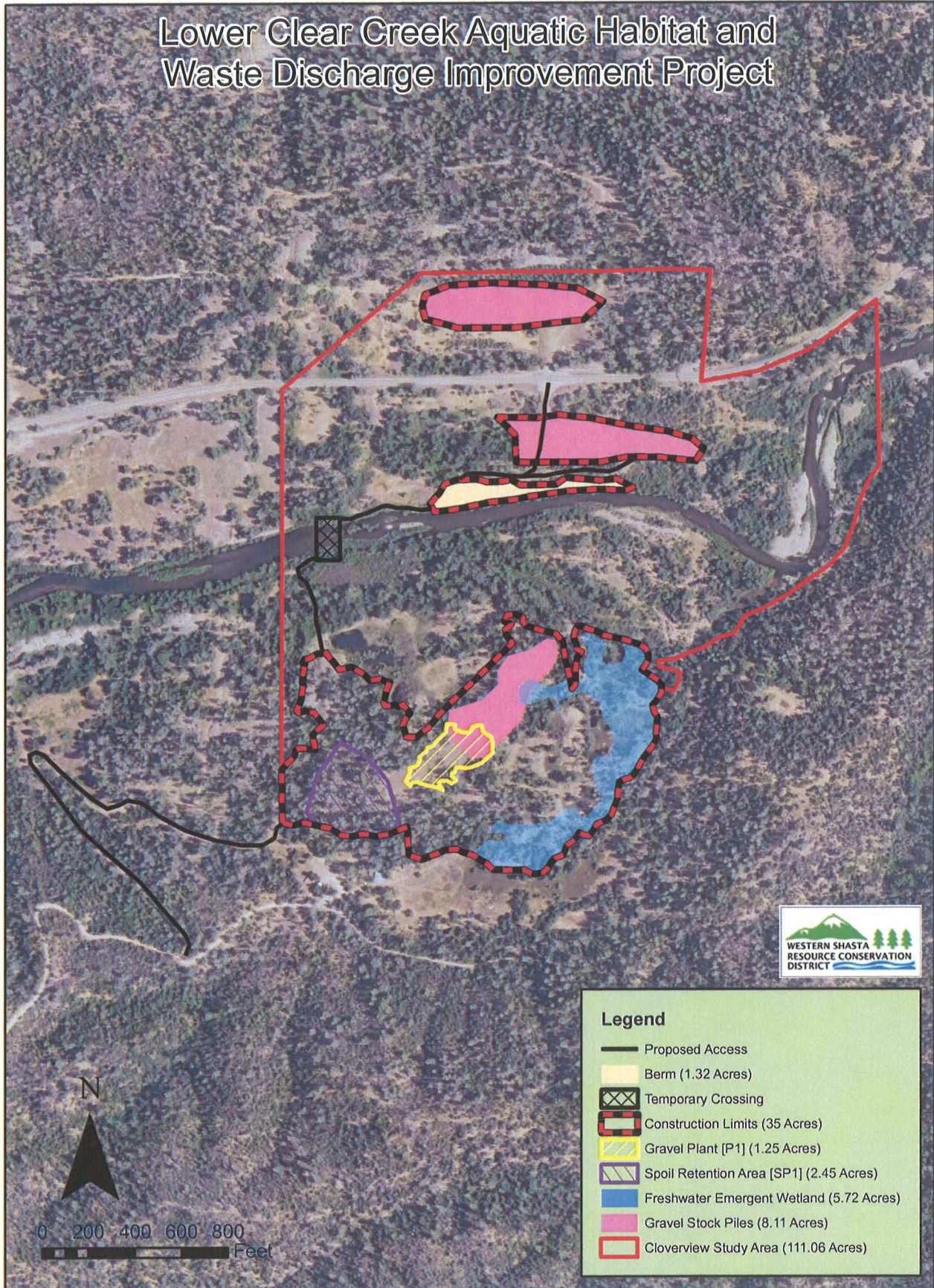
Map #2

Map #3



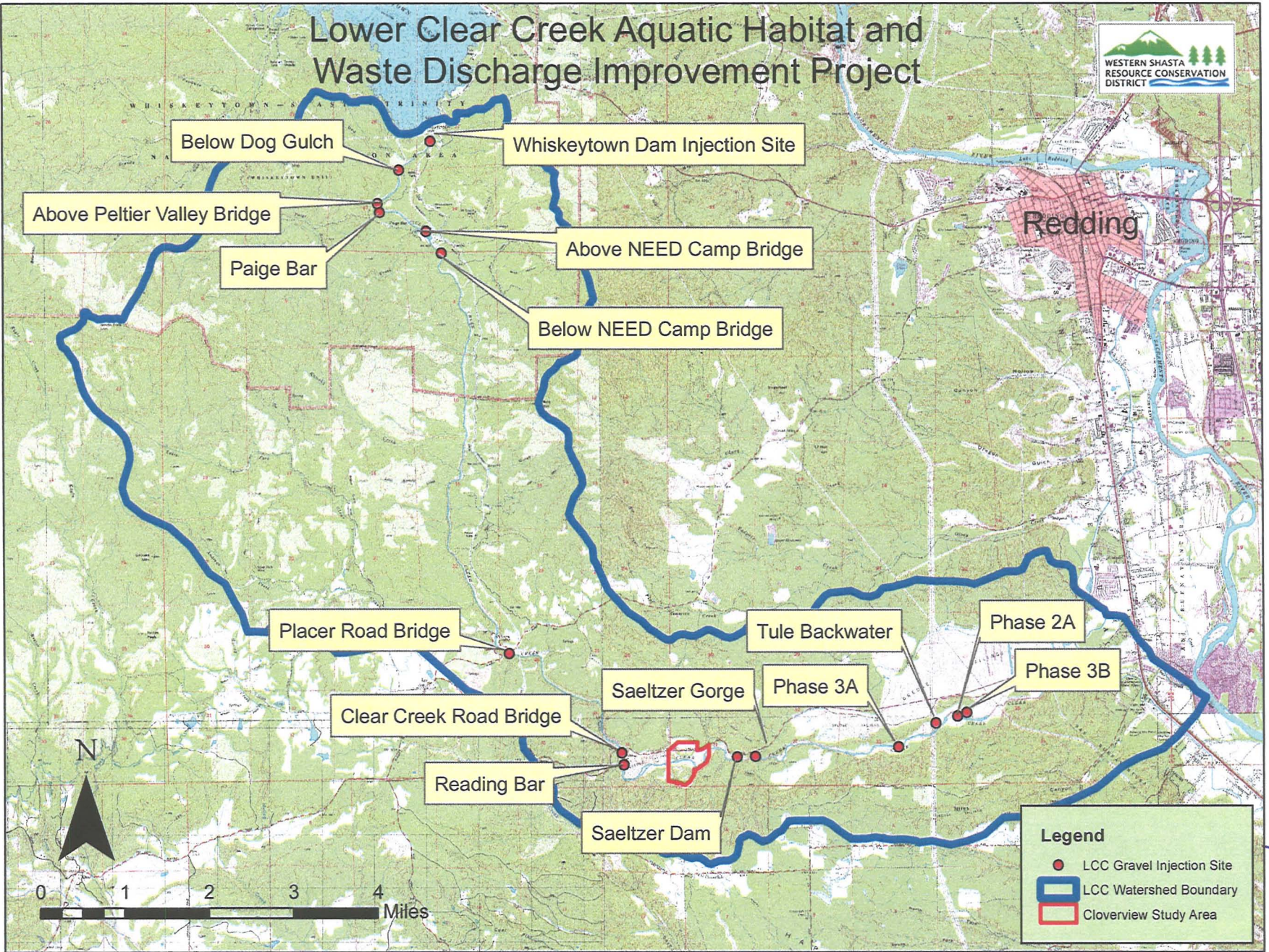
Map # 4

Lower Clear Creek Aquatic Habitat and Waste Discharge Improvement Project





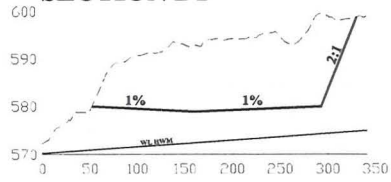
Lower Clear Creek Aquatic Habitat and Waste Discharge Improvement Project



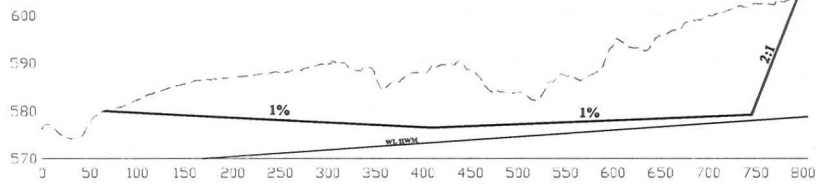
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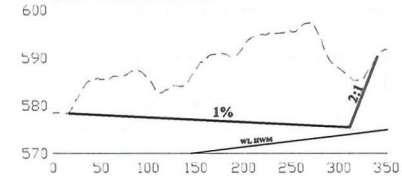
SECTION D1



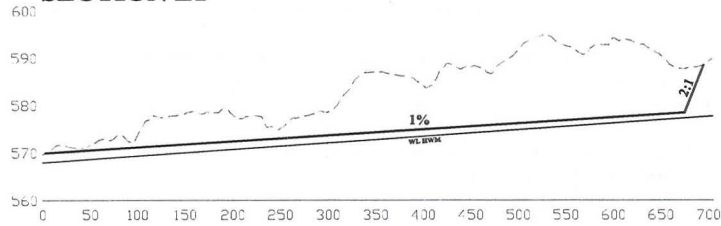
SECTION D2



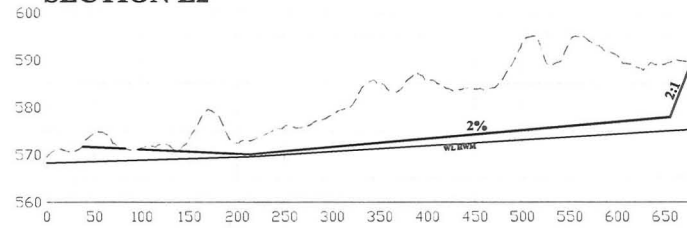
SECTION F1



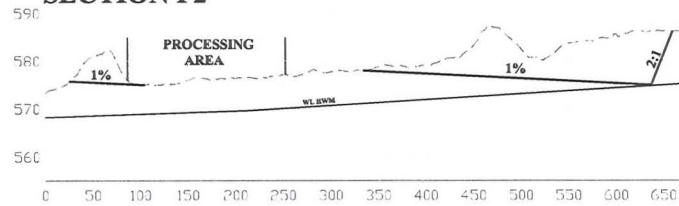
SECTION E1



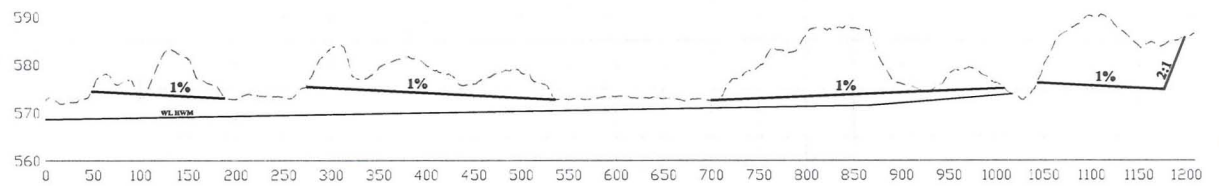
SECTION E2



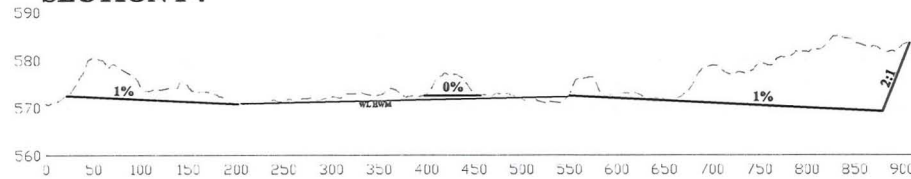
SECTION F2



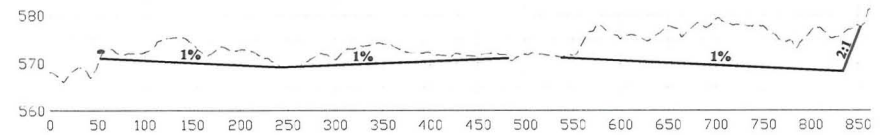
SECTION F3



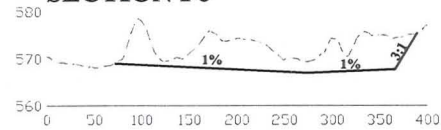
SECTION F4



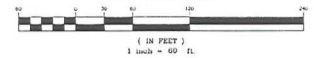
SECTION F5



SECTION F6



GRAPHIC SCALE

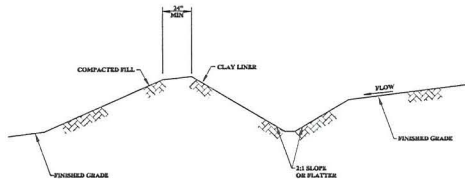


NORTH STATE RESOURCES INC.
5900 BUCKLEBURN, REDDING, CA
**LOWER CLEAR CREEK
SPAWNING GRAVEL SOURCE PROJECT**
CLOVERVIEW SITE

AREA D-F PROFILES

DRAWN BY: J. FITZGERALD	CHECKED:
DRAWN BY: J. FITZGERALD	TRAC. APPR.:
APPROVED:	
CAMP FRYER Consulting Civil Engr., Ltd. Company	CAMP FRYER Consulting Civil Engr., Ltd. Company
CLAYTON, CA	CLAYTON, CA
DATE: 10/1/07	DATE: 10/1/07

Map # 7

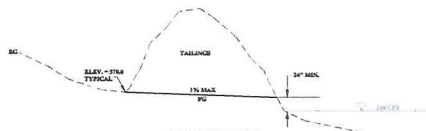


TYPICAL EARTH BERM
NOT TO SCALE

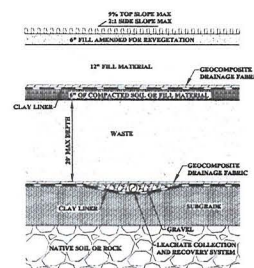
- NOTES:
1. STABILIZE INLET, OUTLET AND SLOPES WITH CLAY LINER.
 2. PROPERLY COMPACT THE SUBGRADE.
 3. BERMS TO BE PERPENDICULAR TO DRAINAGE BERM TO BE TAPERED SO THAT THEY FOLLOW FINISHED GRADE, AND ARE LOWEST AT THE DRAINAGE DITCH.



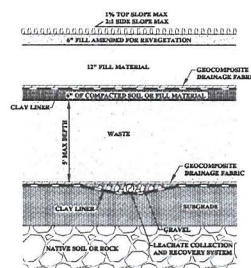
RE-VEGETATION
NOT TO SCALE



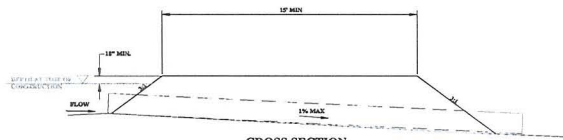
NORTH BERM
NOT TO SCALE



SPOIL AREA 1
NOT TO SCALE



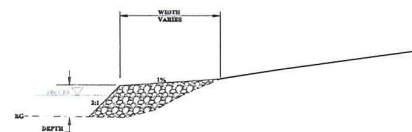
SPOIL AREA 2
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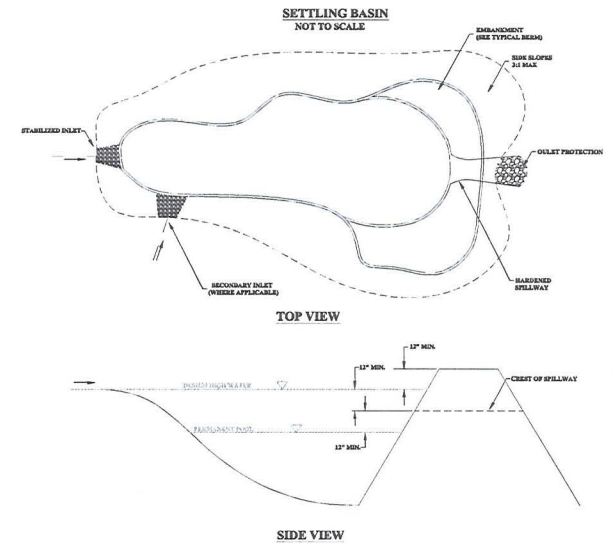
CROSS SECTION

TEMPORARY CROSSING
NOT TO SCALE

- NOTES:
1. CULVERT SIZED TO ALLOW 150% FLOW AT TIME OF CONSTRUCTION.



GRAVEL INJECTION
NOT TO SCALE



TOP VIEW

SIDE VIEW

NORTH STATE RESOURCES INC. 5000 BUCKLEY BLVD., REDDING, CA. LOWER CLEAR CREEK SPAWNING GRAVEL SOURCE PROJECT. CLOVERVIEW SITE	
TYPICALS	
DRAWN BY: J. FITZGERALD CHECKED BY: J. FITZGERALD APPROVED BY: J. FITZGERALD DATE: 10/1/01	TECH. APPR.: APPROVED BY: J. FITZGERALD DATE: 10/1/01
NORTH STATE RESOURCES INC. 5000 BUCKLEY BLVD., REDDING, CA. 96001-1111 TEL: 530/241-1111 FAX: 530/241-1111	NORTH STATE RESOURCES INC. 5000 BUCKLEY BLVD., REDDING, CA. 96001-1111 TEL: 530/241-1111 FAX: 530/241-1111

Map # 6