

DAG

Phase 1 -- MERCED RIVER SALMON HABITAT
ENHANCEMENT: River Miles 40 to 40.5
(Robinson/Gallo Project -- Ratzlaff Reach site)

REQUEST FOR FUNDING
From
January 1999 Early Implementation Category III

ECOSYSTEM RESTORATION PROJECTS AND PROGRAMS

Submitted By:

CALIFORNIA DEPARTMENT OF FISH AND GAME
Central Valley Bay-Delta Branch

In Conjunction with

CALIFORNIA DEPARTMENT OF WATER RESOURCES
Four Pumps Program

Prepared by:

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California Department of Fish and Game
Central Valley Bay-Delta Branch

I. TITLE PAGE:

a. **Project Title:** Phase 1: Robinson/Gallo Project-Ratzlaff Reach Site (Merced River Mile 40.0 to 40.5)

b. **Applicant:** California Department of Fish and Game

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c. **Participants/Collaborators in Implementation:**

- * California Department of Fish and Game
- * California Department of Water Resources
- * US Fish and Wildlife Service CVPIA-AFRP
- * Four Pumps Agreement Advisory Committee

d. **General Project Description/Executive Summary:** The Robinson/Gallo Project is characterized by 3.5 miles of gravel pits created during the last thirty years. The pits were excavated to a depth of fifteen to twenty feet, or about ten feet below the low water level. At that level the mining operation encountered a thick layer of clay. The berms which once separated the gravel pits from the river have been reduced over the years to low islands along the old river channel. Until early 1997, the reach still had one functioning berm at the upstream end of the project, but it failed due to sustained high flows during that January. Failure of berms in the proposed project site (Ratzlaff Reach Site) has allowed the river to flow through the large (45 acres) abandoned gravel pit. This allowed the river to abandon a river channel that was already heavily constricted and overgrown with vegetation. The failed berms have limited the river width to fifty feet in some areas.

The objectives of the project include isolating predator habitat and creating improved habitat for chinook salmon and salmonid species. The predator habitat will be eliminated by isolating approximately 45 acres of captured ponds from the channel. In order to improve spawning and rearing habitat for salmon, the channel will be reconfigured. This will include scaling the channel to fit the post-dam flow regime. Over the entire reach, the channel will be designed to include spawning riffles, runs, and pools, with a meander which fits the approximate slope and bankfull flow of 1700 cfs. The berms will be constructed to exclude a flow of at least 8000 cfs (25 year event), and will include "equalization saddles" and bank protection to minimize damage during high flows. An attached DWR Engineering Report outlines the project engineering criteria and modeling which generated the current project design (available if requested). The proposed project will also include the creation of floodplain which will be replanted with native riparian vegetation. A revegetation plan is currently being developed. CDWR, through the Four Pumps Program, will be responsible for project maintenance thorough out the 40-year project life.

Design specifics include:

- a. Pond area to be isolated: 45 acres
- b. Length of modified channel: 3000 ft
- c. On-site material volume to be manipulated: 220,000 yd³
- d. Volume of material to be purchased: 220,000 yd³
- e. Total area suitable for spawning to be constructed: 7000 yd² (CDFG 1998; USFWS 1997)

II. Proposed Scope of Work:

Proposed Project Schedule: Construction is currently planned for the summer 1999, but poor weather could force construction to be finished during summer 2000.

Deliverables:

- Quarterly Progress Reports - Construction, financial, monitoring, etc. (per contract start date)
- Detailed Monitoring Plans - Fisheries, Geomorphic, Revegetation (Winter-Spring 1999)
- Pre-project baseline monitoring report (Winter 1999)
- Final engineering designs, cost estimate, bid specs (Spring 1999)
- Project environmental documentation and permits - CEQA-NEPA (Spring 1999)
- Project supervision and construction report (Fall 2000)
- Post-Project monitoring for two years with end of year reports (Jan 2001, Sep 2002)
- Project performance evaluation and maintenance recommendation (2002).

III. Location and/or geographic boundaries of project:

The proposed project is in the San Joaquin Watershed Basin, six miles west south west of the town of Snelling, on the Merced River between river miles 40.0 and 40.5, two miles downstream of the Highway 59 bridge in Merced County. Sections 26 and 27 of the Township 5 South, Range 13 East, MDB&M, Winton 7.5 quadrangle map.

IV. Ecological Objectives and Related Benefits:

a. Background and Ecological/Biological/Technical Justification: The Merced River has undergone extensive modification over the years to provide agricultural and municipal water supply, flood control, and power generation, as well as raw materials such as gravel products and gold. As early as the 1870's, large canal systems were built to divert Merced River water for agricultural uses. Several dams were built to regulate flows, the largest being New Exchequer Dam (completed in 1967) which can store up to 1,032,000 acre-feet of water in its reservoir. Mining for gold and aggregate downstream of the dams has been extensive, leaving tailings and numerous pits within the river corridor.

The manipulation of the river has led to loss and degradation of native habitat. With the building of dams, access to spawning grounds upstream has been lost, and gravel recruitment is greatly reduced in reaches below the dams. The large in-stream ponds left by mining create habitat for introduced predator fish species which prey upon juvenile salmon. In an effort to better understand those problems influencing salmon production in the Merced River, CDFG biologists have identified several factors which, in concert, seem to have contributed to the decline of San Joaquin fall-run chinook salmon. Among those identified factors are degraded channel, poor gravel composition, low flows, high water temperatures, low intragravel oxygen content, predation on outmigrating juvenile salmon by warmwater fish such as large and smallmouth bass, and insufficient spawning habitat (CDFG, November 1993; CDFG Memo September 6, 1991, CDFG Memo November 23, 1987). Specific to the proposed project site, CDFG biologists estimate that 25 percent of the annual Merced River natural salmon spawning and production occurs upstream from the "Robinson/Gallo Project" site (B. Loudermilk, personal communication). This logically implies that a significant portion of the Merced River annual production of natural outmigrating salmon juveniles must successfully negotiate this man-made hazard.

Flow regulation leads to reduced peak flows and an overall reduction in the average flow in the river. These result in a general narrowing of the channel (J. Vick, 1995). The two-year flow event before dam construction (pre-Exchequer) was approximately 16,000 cfs (Exchequer gage). Flow records show that since New Exchequer Dam began operation, the two year event is approximately 2,300 cfs (Snelling gage). This means that the high flows which traditionally scoured and flushed vegetation from active gravel bars and banks and delivered coarse sediment are all but absent. As a result there is encroachment of vegetation which leads to narrowing and armoring of the channel.

A loss of gravel recruitment to the lower reaches of the river can also be attributed to dams. The river is "sediment starved" during higher flows, and tends to recruit sediment from channel banks and beds. Over time this results in channel degradation, which when combined with reduced flow can further narrow the channel and lead to abandoned floodplains. Prior to the January, 1997 flood event, the reach of Merced River upstream of the Highway 59 bridge had shown little evidence of degradation, although the river channel both immediately upstream and downstream of the bridge appeared to be degrading (J. Vick, 1995). During the 1997 high flow event, the berms which had confined the river to the historic channel in the project reach (RM 40 to 40.5) were breached, and as a result the river abandoned its channel in favor of the gravel pit with an invert several feet lower. This abandonment of the channel resulted in the loss of the little salmon spawning and nursery habitat which existed as well as allowing predators direct access to out migrating juvenile salmon.

The river now flows through these warm ponds of slow-moving water which are ideal habitat for large and smallmouth bass and other predators of juvenile salmon. A pilot study which investigated predation of juvenile salmon in ponded portions of the Tuolumne River indicated that small and largemouth bass were a legitimate predator of juvenile chinook salmon (EA, September 1990). A more recent juvenile outmigration study conducted on the Stanislaus River involving radio-tagged salmon smolts supports this hypothesis (Cramer, 1998). Additional anecdotal information from local recreational fishing interests cite the well known fact that instream ponded areas on the Stanislaus, Tuolumne, and Merced Rivers are known to provide excellent bass fishing. From this information, it is speculated that a similar salmon/predator relationship exists in all captured mining pits throughout the east-side San Joaquin basin tributaries. The juvenile salmon migrating downstream become disoriented in the slow moving waters of the pond and become overly vulnerable to predation by bass and other potential predators. Juvenile salmon transiting through these warm water ponds are less likely to survive than salmon smolts outmigrating in faster moving cool river water. Further, it is logical to assume that the captured ponds may also serve as a reproduction and rearing point from which the salmon predators might continually emigrate to recharge the river system.

Primary Project Benefits are:

- ◆ Eliminate juvenile salmon predator habitat *by isolating 45 acres of unnatural instream pond;*
- ◆ Increase the quantity and quality of spawning habitat for chinook salmon *by modifying 3000 feet of channel do create*

7,000 square yards of spawning habitat; reconfiguring spawning beds and the river course through the filled pond;

Secondary Project Benefits are:

- ◆ Increase the quantity and quality of rearing habitat for chinook salmon by increasing available in-channel habitat diversity;
- ◆ Improve river and floodplain dynamics by reconfiguring the channel to better conform with the present flow regime;
- ◆ Enhance riparian and seasonally inundated vegetation by increasing and revegetating floodplain at the project site which will be captured by the river during high flows.

b. Identify the scientific hypothesis/questions to be evaluated through the project: To evaluate the project success as well as adapt and maintain the project over the engineered life of the project, it is necessary that a monitoring program be included to address the identified project objectives. Monitoring activities are planned to address such questions as 1) will more salmon smolt survival increase past the project site after project completion; 2) will the project decrease river temperature; 3) what gravel replenishment rate is necessary to maintain the project; 4) how will the project influence river process and form. (See section V)

c. How this project relates to other previously funded projects: The proposed project will be Phase 1 of the currently planned Robinson/Gallo Salmon Restoration Project (previously called Merced River Salmon Habitat Enhancement Project) and would restore the lowest of the five identified reaches and isolate a significant ponded portion of the river (45 acres). Phase 2 of the Robinson/Gallo Salmon Restoration Project (identified funding includes CALFED obligation) will be construction of the Robinson Ranch and Gravel Mining Permit #304 project site by the Four Pumps/CALFED/AFRP Programs in the year 2000. The CDFG/CDWR Four Pumps Program has already expended over \$100,000 towards completion of preliminary engineering and environmental documentation in addition to obligating almost \$7 million towards future construction of the identified restoration sites.

V. Monitoring and Data Collection Methodology:

Monitoring of Physical River Processes

Figure 1 outlines a project monitoring program which is intended to address both project success as well as suggest necessary adaptive modifications:

Monitoring Relative Abundance of Fishes at Project and Reference Sites

The principal objective of this project is to improve the survival of out-migrating, fall run chinook salmon smolts.

Addition objectives are:

- 1) to create salmonid spawning and rearing habitat;
- 2) to improve existing salmonid spawning and rearing habitat;
- 3) to improve chinook salmon and steelhead rainbow trout migratory pathway;
- 4) to improve floodplain and river dynamics in the lower Merced River.

In order to determine if the objectives of the project are met, the following biological techniques would be conducted 1 time before project construction and for (at least) 2 years following project completion:

- 1) "MadoJet" marked and Passive Integrated Transponders (PIT) tagged salmon smolts would be released in the Merced River above the project site and recovered (trapped) in rotary screw traps below the project site; survival rates and migration rates (distance/time) would be estimated.
- 2) Temperature profiles of the Merced River would be taken above and below the project site; pre and post project data would be compared;
- 3) Water quality monitoring in the Merced River below the project site; pre and post project would be compared;
- 4) Visual survey (escapement survey) of spawning activity at the project site; pre and post data would be compared.

Figure 1. Physical monitoring plan for the Ratzlaff habitat restoration project.

| <u>Hypothesis</u> | <u>Monitoring Parameter</u> | <u>Data Evaluation</u> | <u>Study Priority and Status</u> |
|---|--|--|----------------------------------|
| <u>1. What are the baseline physical characteristics of the finished channel.</u> | <u>a. Cross sections and profile.</u> <u>b. Pebble counts.</u> <u>c. Bulk samples.</u> <u>d. Place tracer gravel.</u> <u>e. Topographic survey</u> | <u>Use baseline conditions to compare to data collected later.</u> | <u>High</u> |
| <u>2. Is the substrate mobile at 1,700 cfs and above.</u> | <u>a. Cross sections and profile.</u> <u>b. Pebble counts.</u> <u>c. Bulk samples.</u> <u>d. Evaluate and reset tracer gravel.</u> | <u>Utilize tracer gravel to indicate bed movement and initiate data collection. Compare data with baseline conditions.</u> | <u>High</u> |
| <u>3. Is the channel stable at flows of 6,000 cfs and above.</u> | <u>a. Cross sections and profile.</u> <u>b. Pebble counts.</u> <u>c. Bulk samples.</u> <u>d. Evaluate and reset tracer gravel.</u> | <u>Check project for stability after Reclamation Board design flow is reached. Compare data with baseline conditions.</u> | <u>High</u> |
| <u>4. What are the plan form changes if any after 5, 10, and 15 years.</u> | <u>a. Topographic survey of project.</u> <u>b. Pebble counts.</u> <u>c. Bulk samples.</u> <u>d. Evaluate and reset tracer gravel.</u> | <u>Use topographic surveys will indicate plan form changes from the original design parameters. Compare all data with baseline data and analyze for plan form changes.</u> | <u>High</u> |

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Biological/Fisheries Monitoring Plan / Quality Assurance Program Plan

The primary objective of this project is to improve the survival of out-migrating, fall run chinook salmon smolts.

Hypothesis: Given the same physical conditions (temperatures, flows etc.) at the project site, more salmon smolts will survive past the project site after the project is completed:

1. **Monitoring/Data collection:** A hydro/water quality lab recorder will be placed at a suitable location immediately down-stream of the project site during the spring out-migration period. This lab will remotely record temperature and basic water quality at one point in the Merced River. Data will be downloaded and compared each year (pre and post project data).
2. During the spring 1999 out-migration season, 3 repetitions of the following procedure would be completed. Two thousand (2,000) "MadoJet" marked salmon smolts would be released above the project site. A Merced Irrigation District (MID) rotary screw trap, operated approximately 4 miles downstream of the release site, would be monitored for the recapture of these marked fish. Appropriate statistical method (Ricker, W.E. 1945, 1958 and 1975) would be used to estimate survival and migration rates through the area. This would determine pre-project conditions. DFG biologists have completed some survival studies in this area that could also be used as pre-project data. The results of the this monitoring would also give project personnel an estimate of trapping efficiency and the number of PIT tagged release fish need to prove statically valid when used the following 2 years.
3. During the spring 2000 and 2001 out-migration season, 3 repetitions of the following procedure would be completed. One thousand (1,000) to 1,500 PIT tagged fish would be released above the project site. The MID operated screw trap would again be monitored for the recapture of these PIT tagged fish. Survival and migration rates through the area would be determined using Program MARK software (Burnham K.P. and White G.C., 1997). Pre and post project survival rates would be analyzed and compared. Physical data collected by the hydro/water quality lab would be incorporated into the analyses.

The secondary objective of the project is to improve and increase salmonid spawning and rearing habitat.

Hypothesis: Water temperature in the Merced River will decrease downstream of the project site after the project is completed:

1. **Monitoring/Data collection:** "Onset" temperature recorders would be placed in the Merced River at several appropriate locations above and below the project site before project construction. Temperature recorders would also be placed in the pond that will be isolated after the project is completed. Temperature recorders would be downloaded every 4 month and a temperature profiles of this reach developed. Temperature recorders would remain in place for 3 years. Pre and post data would be compared and analyzed. Analyses would use an accepted temperature model to incorporate temperature profile into salmonid habitat preferences. Physical cross sectional data, collected for geomorphic evaluation would also be used to document changes in fish habitat.
2. **Monitoring/Data collection:** Biological monitoring of the annual fall-run chinook salmon escapement is currently the responsibility of DFG's Region 4 personnel. DFG is required to annually estimate and monitor the adult chinook salmon escapement in the Merced River. Data currently gathered includes:
 - 1) A mark/recapture study to estimate population size, fish lengths and sex.
 - 2) Estimation of the number and temporal distribution of redds per each riffle.These escapement surveys would continue and this data would be utilized to evaluate the biological changes associated with the project construction.
3. **Coordination and Integration:** DFG, in conjunction with MID and other stakeholders, are developing a river wide fishery monitoring plan. At this time rotary screw trapping takes place at 2 locations on the Merced River. Smolt survival studies using coded wire tags (cwt) and "MadoJet" marked fish have been established. Annual salmon escapement surveys have documented populations since the 1953.

The monitoring at the Ratzlaff site has been designed to compliment existing monitoring programs. It will also give biologists a chance to develop new methods and techniques (PIT tagging, Program MARK analyses and numerical maximum likelihood statistics) for evaluation of salmon smolt survival, migration rates and probability of individual recapture. Also, the Ratzlaff site is the first of a series of project that will reconstruct 3 contiguous miles of the Merced River near Highway 59. As each sub-project is constructed, continued and additional monitoring of this 3 mile reach is planned. The monitoring proposed here will "dovetail" into the future monitoring plans for this reach providing a truer

evaluation of project success or failure and eventually salmon productivity. Equipment purchased for this project will be utilized during monitoring of future projects in this and other reaches.

Biological/Fishery Monitoring Reports

Preliminary Report: February 1, 2000. Summation of the data collect from February-December 1999.

Final Report: January 1, 2002. Discussion of report will include the following:

1. Comparison of pre and post project spawning activities.
2. Comparison of pre and post project temperature profile.
3. Comparison of pre and post project water quality.
4. Comparison of pre and post project salmon smolt survival through study reach.
5. Comparison of pre and post project salmon smolt migration time through study reach.
6. Evaluation of PIT tagging and Program MARK analyses.

VI. Technical Feasibility and timing:

a. What alternatives were evaluated and why they were not selected: There are two major alternatives for this project 1) *to leave the project site in the current degraded condition, and 2) to completely fill the captured mining site and turn it into floodplain/wetland habitat.* Alternative 1 was not chosen because it does not contribute any positive benefit to the planned restoration efforts for this part of the Merced River and continue to negatively impact juvenile salmon outmigration. Alternative 2 was not chosen because of the extreme costs involved in relation to the overall benefits which such a project might produce. A complete technical justification for the proposed project design parameters is explained in the Ratzlaff Project DWR Engineering Report (December 1998).

c. What environmental documents will be prepared for the project: A Negative Declaration document has been prepared to meet state CEQA requirements. This document will be filed by mid-January 1999. To meet federal NEPA requirements, an Environmental Assessment is currently being prepared by USFWS staff. The USACOE will take the lead in the review of this document.

d. What permits or agreements need to be in place: USACOE Dredge and Fill Permit in accordance with Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act (using General Permit 008); California Regional Water Quality Control Board Clean Water Act Section 401 water quality certification; California Mining and Geology Board certification of Surface Mining and Reclamation Act compliance (exemption based on onsite excavation and active floodplain reclamation activities); California Department of Fish and Game 1601 Streambed Alteration Agreement (currently being prepared); California State Lands Commission lease; California Reclamation Board floodway permit; and approval of the County of Merced Planning Commission.

VII. Project cost and cost-sharing: (see Tables 1-4 for complete budget)

| | |
|---------------|--------------------|
| Four Pumps | \$3,030,000 |
| CVPIA-AFRP | \$ 250,000 |
| CALFED | <u>\$1,584,002</u> |
| Project Total | \$4,864,002 |

VIII. Local Impacts, Support and involvement: Local and environmental support for this project was acknowledged at the CALFED/SJRMP San Joaquin River Fishery Technical Team meeting in January 1997 when the participants acknowledged strong support for the entire Robinson/Gallo project planning process. The local landowner and the Merced County Planning Department are supportive and actively participating in the project planning process. Landowner access agreements will be developed prior to any construction. Positive discussions regarding long-term riparian/grazing easements and gravel supplementation material are currently underway between CDFG and the landowners. California Department of Transportation (CalTrans) has expressed a positive interest in the proposed project because the past river alignment has negatively impacting the J59 bridge. They have been involved in project preliminary engineering and have expressed an interest in participating in the upstream projects at some point. Discussions with CalTrans are currently in progress. No third party impacts are anticipated at this time.

IX. Applicant's Ability: The CDFG is the legislative mandated "trustee of the State's fish and wildlife resources" and has for several decades been involved with salmon restoration actions within California. Specific to the Central Valley, since the 1986 Delta Fish Protection Agreement (Four Pumps Agreement) between CDFG and CDWR, the Four Pumps program has been instrumental in facilitating several salmon restoration actions within the San Joaquin and Sacramento River tributaries.

The Four Pumps Program is unique in that it allow the two agreement parties, CDFG and CDWR, to draw upon the specialized talents and expertise which are available within the two California Resources Departments. During the ten-year existence of the program, the quality of projects and staff capabilities of the program has increased significantly with program experience and stakeholder involvement. Four Pumps restorations actions within the Central Valley continue to remain in the forefront of Central Valley salmon restoration planning efforts.

X. Compatibility with Non-Ecosystem Objectives: The proposed project is designed to improve riverine ecosystem quality and quantity which is one primary objective of the CALFED Program. The proposed project is not intended to conflict with any stated non-ecosystem CALFED objectives such as water supply reliability and most likely will help to improve instream water quality by isolating a major settling pond as well as improving levee system integrity to maintain proper channel flow within the immediate area. The proposed project provides the following solution principles:

- Reduces conflicts in the system both biologically as well as with current land use practices;
- The project is equitable to all landowners and users;
- The project is durable and has a engineered life expectancy of 40-years;
- The project is implementable because of landowner and stakeholder involvement in the design process;
- The project does not have significant redirected impacts such as land use changes related to project implementation.

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TABLE 1.

MERCED RIVER SALMON HABITAT ENHANCEMENT
Ratzlaff Reach Site

ANTICIPATED COST-SHARE BREAKDOWN

| PROJECT PHASE/TASK | 4-PUMPS (LUMP SUM ACCOUNT) | 4-PUMPS (ANNUAL ACCOUNT) | CALFED | AFRP | TOTAL |
|--|----------------------------------|--------------------------------|--------------------|------------------|--------------------|
| 1. PROJECT MANAGEMENT - DWR (INCLUDED IN CONTINGENCY FUNDS) | | | | | |
| 2. ENVIRONMENTAL DOCUMENTS & PERMITS | | \$65,000 | | | \$65,000 |
| 3. DESIGN ENGINEERING | | | | | |
| 3.1 PRELIMINARY SURVEY AND ENGINEERING | \$30,000 | | | | \$30,000 |
| 3.2 FINAL DESIGN ENGINEERING | | \$70,000 | | | \$70,000 |
| | | | | | \$100,000 |
| 4. CONSTRUCTION | | | | | |
| 4.1 COST ESTIMATE, SPECS; BID PROCESS; CONTRACT MANAGEMENT | | \$150,000 | | | \$150,000 |
| 4.2 CONSTRUCTION MANAGEMENT & SURVEY | | \$339,840 | | | \$339,840 |
| 4.3 CONSTRUCTION | | \$1,529,634 | \$1,584,002 | \$250,000 | \$3,363,636 |
| | | | | | \$3,853,476 |
| 5. REVEGETATION/HABITAT ENHANCEMENT | | | | | |
| 5.1 REVEGETATION/HABITAT ENHANCEMENT | | \$134,852 | | | \$134,852 |
| 5.2 REVEGETATION MONITORING & EVALUATION | | \$15,148 | | | \$15,148 |
| | | | | | \$150,000 |
| 6. FISHERIES MONITORING & EVALUATION | | \$103,175 | | | \$103,175 |
| 7. GEOMORPHIC MONITORING, EVALUATION, & ADJUSTMENTS | | | | | |
| 7.1 GEOMORPHIC MONITORING & EVALUATION | | \$75,000 | | | \$75,000 |
| 7.2 GEOMORPHIC ADJUSTMENTS (Maintenance) | | \$120,000 | | | \$120,000 |
| | | | | | \$195,000 |
| CONTINGENCY (10% Construction & Maintenance) | | \$397,348 | | | \$397,348 |
| TOTALS | \$30,000 | \$3,000,000 | \$1,584,002 | \$250,000 | \$4,864,002 |

| FUNDING SOURCE | AMOUNT | |
|--------------------------------------|--------------|-------------------------------------|
| Four Pumps (Preliminary engineering) | \$ 30,000 | (Funds expended and work completed) |
| Four Pumps (Approved project) | \$ 3,000,000 | (Funds partially expended) |
| CVPIA - AFRP | \$ 250,000 | |
| CALFED | \$ 1,584,002 | |
| TOTAL \$ 4,864,002 | | |

TABLE 2.

MERCED RIVER SALMON HABITAT ENHANCEMENT
Ratzlaff Reach Site

CALFED BUDGET

| PROJECT PHASE/TASK | DIRECT LABOR HRS. | DIRECT SALARY & BENEFITS | SERVICE CONTRACTS | MATERIAL & ACQUISITION COSTS | MISC. & DIRECT COSTS | OVERHEAD & INDIRECT COSTS | TOTAL COST |
|---|-------------------------|--------------------------------|----------------------|------------------------------------|----------------------------|---------------------------------|---------------|
| 1. PROJECT MANAGEMENT - DWR | | | | | | | |
| 2. ENVIRONMENTAL DOCUMENTS & PERMITS | | | | | | | |
| 3. DESIGN ENGINEERING | | | | | | | |
| 3.1 PRELIMINARY SURVEY AND ENGINEERING | | | | | | | |
| 3.2 FINAL DESIGN ENGINEERING | | | | | | | |
| 4. CONSTRUCTION | | | | | | | |
| 4.1 COST ESTIMATE, SPECS, BID PROCESS; CONTRACT MANAGEMENT | | | | | | | |
| 4.2 CONSTRUCTION MANAGEMENT & SURVEY | | | | | | | |
| 4.3 CONSTRUCTION | | | | \$1,584,002 | | | \$1,584,002 |
| | | | | | | | \$1,584,002 |
| 5. REVEGETATION/ HABITAT ENHANCEMENT | | | | | | | |
| 5.1 REVEGETATION/HABITAT ENHANCEMENT | | | | | | | |
| 5.2 REVEGETATION MONITORING & EVALUATION | | | | | | | |
| 6. FISHERIES MONITORING & EVALUATION | | | | | | | |
| 7. GEOMORPHIC MONITORING, EVALUATION, & ADJUSTMENTS | | | | | | | |
| 7.1 GEOMORPHIC MONITORING & EVALUATION | | | | | | | |
| 7.2 GEOMORPHIC ADJUSTMENTS | | | | | | | |
| CONTINGENCY (10% OF PROJECT TOTAL) | | | | | | | |
| TOTALS | | | | | | | \$1,584,002 |

Note: Itemized budget information available for all project elements if necessary.

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

Project: **Merced River - Redbluff / Oak Project - Habitat Reach**
Feature: **River Restoration for Fish Spawning**
Estimator:
Cbk. by (optional):

Type Estimate: **2088**
Estimate #: **1511-2222**
From Inhibit: **8-January-1988**

Inhibit Markup: **0.8008**
Manual Input: **1.1474**
Used: **1.1474**

COST ESTIMATING SPREADSHEET

Material Discount: **100.00%**

Subcontract Discount: **100.00%**

| Item No. | DESCRIPTION | QUANTITY | UNIT | LABOR UNIT COST | LABOR DIRECT TOTAL COST | MATERIAL UNIT COST | MATERIAL DIRECT TOTAL COST | SALES TAX 7.36% | EQUIPMENT UNIT COST | EQUIPMENT DIRECT TOTAL COST | SUBCONTRACT UNIT COST | SUBCONTRACT DIRECT TOTAL COST | DIRECT TOTAL COST | DP = TOTAL CONTRACT PRICE | UNIT PRICE | ADJUSTED UNIT PRICE | ADJUSTED UNIT PRICE |
|----------|----------------------|----------|------|-----------------|-------------------------|--------------------|----------------------------|-----------------|---------------------|-----------------------------|-----------------------|-------------------------------|-------------------|---------------------------|-------------|---------------------|---------------------|
| 1 | Web and Damels | 1 | LB | 28,198.44 | 28,198.44 | \$400.00 | \$400.00 | \$28.00 | \$10,432.80 | \$10,432.80 | \$10,000.00 | \$10,000.00 | \$27,068.44 | \$31,037.87 | \$31,037.87 | \$31,000.00 | \$30,000.00 |
| 2 | Clearing | 5 | AC | \$0.00 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | \$4,040.00 | \$20,200.00 | \$20,200.00 | \$25,177.48 | \$4,825.98 | \$4,825.50 | \$5,712.00 |
| 3 | Random PE (pk) | 320,000 | CY | \$1.86 | \$595,200.00 | \$7.70 | \$1,864,000.00 | \$78,158.00 | \$2.40 | \$528,000.00 | \$0.00 | \$0.00 | \$2,985,268.00 | \$3,056,228.33 | \$13.86 | \$12.90 | \$13.20 |
| 4 | Crusher (8" - 12") | 2,800 | CY | \$5.27 | \$14,816.00 | \$15.30 | \$42,840.00 | \$2,667.80 | \$7.47 | \$20,768.00 | \$0.00 | \$0.00 | \$80,741.80 | \$82,988.00 | \$33.10 | \$33.00 | \$31.00 |
| 5 | Gravel (1/4 to 3/4") | 2,800 | CY | \$4.22 | \$10,868.00 | \$23.80 | \$66,500.00 | \$2,773.13 | \$6.35 | \$23,375.00 | \$0.00 | \$0.00 | \$98,186.13 | \$118,377.73 | \$44.15 | \$44.00 | \$50.00 |
| 6 | Road Aggregate | 3,000 | CY | \$1.86 | \$4,950.00 | \$10.80 | \$32,400.00 | \$2,348.00 | \$0.90 | \$2,700.00 | \$0.00 | \$0.00 | \$42,458.00 | \$48,717.44 | \$16.24 | \$16.20 | \$16.20 |

DIRECT COST

\$401,808.44

\$1,828,140.00

\$98,883.83

\$585,318.90

\$30,200.00

\$1,932,834.37

\$3,384,204.78

\$1,915,803.93

LEGEND
Prime Work
Sub Work

| PROFIT | |
|---------------|------------|
| Markup | Percentage |
| Labor | 10.00% |
| Material | 5.00% |
| Equipment | 10.00% |
| Subcontractor | 5.00% |

| | | | |
|-----------------------------|-------------|-----------|-----------------------------|
| DIRECT COST | \$2,832,024 | | |
| INDIRECT COST | \$76,283 | 2.40% | % Indirect Cost/Direct Cost |
| SUBTOTAL | \$2,908,308 | | Decrease Indirect |
| HOME OFFICE OVERHEAD | 5.00% | \$145,120 | Decrease Indirect |
| PROFIT | \$211,224 | 7.25% | % Profit |
| TOTAL COST | \$3,264,652 | | |
| DP = TOTAL COST/DIRECT COST | 1.1474 | | |

Please note the following:

- * Home Office Overhead is now separate from profit.
- * You need to enter percent or 1 for Mat's. and Subcontractor Discounts for the calculations to be made.
- * You need to enter a percent or 1 for the Indirect Cost Discount.
- * Sales tax is now a direct cost item.

TABLE 2 (continued)
Itemized Construction Budget

1-021236

1-021236

TABLE 3

**MERCED RIVER SALMON HABITAT ENHANCEMENT
Ratzlaff Reach Site**

**PROJECT BUDGET
STATE FISCAL YEAR**

| PROJECT PHASE/TASK | FY 97-98 | FY 98-99 | FY 99-00 | FY 00-01 | FY 01-02+ | TOTAL |
|---|-----------------|------------------------|------------------------|------------------|------------------|--------------------|
| 1 PROJECT MANAGEMENT - DWR (INCLUDED IN CONTINGENCY FUNDS) | | | | | | |
| 2 ENVIRONMENTAL DOCUMENTS & PERMITS | | \$65,000 | | | | \$65,000 |
| 3 DESIGN ENGINEERING | | | | | | |
| 3.1 PRELIMINARY SURVEY AND ENGINEERING* | \$30,000 | | | | | \$30,000 |
| 3.2 FINAL DESIGN ENGINEERING | \$55,185 | \$14,815 | | | | \$70,000 |
| 4. CONSTRUCTION | | | | | | |
| 4.1 COST ESTIMATE, SPECS, BID PROCESS, CONTRACT MANAGEMENT | | \$75,000 | \$75,000 | | | \$150,000 |
| 4.2 CONSTRUCTION MANAGEMENT & SURVEY | | \$127,440 | \$212,400 | | | \$339,840 |
| 4.3 CONSTRUCTION | | \$1,261,364 (3 mo.) | \$2,102,272 (5 mo.) | | | \$3,363,636 |
| | | | | | | \$3,853,476 |
| 5. REVEGETATION/ HABITAT ENHANCEMENT | | | | | | |
| 5.1 REVEGETATION/HABITAT ENHANCEMENT | | \$20,000 | \$70,000 | \$34,852 | \$10,000 | \$134,852 |
| 5.2 REVEGETATION MONITORING & EVALUATION | | | | \$3,787 | \$11,361 | \$15,148 |
| 6. FISHERIES MONITORING & EVALUATION | | \$20,000 | \$40,000 | \$30,000 | \$13,178 | \$103,178 |
| 7. GEOMORPHIC MONITORING, EVALUATION, & ADJUSTMENTS | | | | | | |
| 7.1 GEOMORPHIC MONITORING & EVALUATION | | | \$15,000 | \$10,000 | \$50,000 | \$75,000 |
| 7.2 GEOMORPHIC ADJUSTMENTS (Maintenance) | | | | \$40,000 | \$80,000 | \$120,000 |
| CONTINGENCY (10% Construction & Maintenance) | \$1,550 | \$175,000 | \$145,000 | \$51,000 | \$24,798 | \$397,348 |
| TOTALS | \$85,735 | \$1,758,619 | \$2,859,672 | \$169,839 | \$189,337 | \$4,864,002 |

* EXPENDITURE IN PRIOR FISCAL YEAR

TABLE 4

MERCED RIVER SALMON HABITAT ENHANCEMENT
Ratzlaff Reach Site

CALFED QUARTERLY BUDGET

| PROJECT PHASE/TASK | QUARTERLY BUDGET APR-JUN 99 | QUARTERLY BUDGET JUL-SEP 99 | QUARTERLY BUDGET OCT-DEC 00 | QUARTERLY BUDGET JAN-MAR 00 | QUARTERLY BUDGET APR-JUN 00 | TOTAL BUDGET |
|---|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|--------------------|
| 1. PROJECT MANAGEMENT - DWR | | | | | | |
| 2. ENVIRONMENTAL DOCUMENTS & PERMITS | | | | | | |
| 3. DESIGN ENGINEERING | | | | | | |
| 3.1 PRELIMINARY SURVEY AND ENGINEERING | | | | | | |
| 3.2 FINAL DESIGN ENGINEERING | | | | | | |
| 4. CONSTRUCTION | | | | | | |
| 4.1 COST ESTIMATE, SPECS, BID PROCESS, CONTRACT MANAGEMENT | | | | | | |
| 4.2 CONSTRUCTION MANAGEMENT & SURVEY | | | | | | |
| 4.3 CONSTRUCTION | | \$1,584,002 | \$0 | \$0 | | <u>\$1,584,002</u> |
| | | | | | | <u>\$1,584,002</u> |
| 5. REVEGETATION/ HABITAT ENHANCEMENT | | | | | | |
| 5.1 REVEGETATION/HABITAT ENHANCEMENT | | | | | | |
| 5.2 REVEGETATION MONITORING & EVALUATION | | | | | | |
| 6. FISHERIES MONITORING & EVALUATION | | | | | | |
| 7. GEOMORPHIC MONITORING, EVALUATION, & ADJUSTMENTS | | | | | | |
| 7.1 GEOMORPHIC MONITORING & EVALUATION | | | | | | |
| 7.2 GEOMORPHIC ADJUSTMENTS | | | | | | |
| CONTINGENCY (10% OF PROJECT TOTAL) | | | | | | |
| TOTALS | | \$1,584,002 | \$0 | \$0 | | \$1,584,002 |

NOTE: QUARTERLY BUDGET SUBJECT TO CHANGE BASED ON ACTUAL CONSTRUCTION START DATE.