Summary Information

San Joaquin County Resource Conservation District

Murphy Creek restoration monitoring project

Amount sought: $583,054

Duration: 36 months

Lead investigator: Dr. Michael Bryan, Robertson−Bryan, Inc.

Short Description

In 2002, the SJRCD and EBMUD were awarded a CALFED grant for the Murphy Creek Restoration Project. Sparrowk Dam, the downstream−most dam in Murphy Creek, was removed in August 2003, opening an additional 0.8 mile of potential spawning and rearing habitat to anadromous salmonids. Cattle exclusion fencing was installed in the area along the previous impoundment location and an effort to remove non−native riparian vegetation has been implemented. This project will determine the extent to which restoration actions undertaken by the MCRP have resulted in measurable increases and/or improvements in habitat for spawning and rearing of anadromous salmonids, production of anadromous salmonids, the relative proportion of native fish fauna, and the water quality in Murphy Creek. A secondary goal is to identify additional hydrologic, physical, chemical, and biological factors that may be limiting production of anadromous salmonids.

Executive Summary

Murphy Creek, a tributary to the Mokelumne River, traverses Amador and San Joaquin counties. Several dams creating impoundments for livestock watering and irrigation are present throughout the Murphy Creek system. Chinook salmon and steelhead have historically used the creek for spawning and rearing, but numbers have declined substantially in recent decades. In 2002, the San Joaquin Resource Conservation District and East Bay Municipal Utility District were awarded a CALFED grant for the Murphy Creek Restoration Project. Under this restoration project, Sparrowk Dam, the downstream−most dam in Murphy Creek, was removed in August 2003, opening an additional 0.8 mile of potential spawning and rearing habitat to anadromous salmonids. In addition, cattle exclusion fencing was installed in the area along the previous impoundment location and an effort to remove non−native riparian vegetation has been implemented.

The primary goal of the proposed restoration monitoring program is to determine the extent to which restoration actions undertaken by the MCRP have resulted in measurable increases and/or improvements in habitat for spawning and rearing of anadromous salmonids, production of anadromous salmonids, the relative proportion of native fish fauna, and the water quality in Murphy Creek. A secondary goal is to identify additional hydrologic, physical, chemical, and biological factors that may be limiting production of anadromous salmonids in Murphy Creek and to use this information as a basis for recommending additional restoration actions.

Restoration monitoring will rely on a comprehensive three−year assessment of hydrologic, physical, chemical, and biological conditions in Murphy Creek. This project will provide a temporal and spatial characterization of the creek's flow regime, thermal regime, instream and riparian habitat composition, fish community, and benthic macroinvertebrate community. Data collected over the course of this monitoring project will be compared to available pre−restoration (i.e., baseline) data to determine if spatial and/or temporal trends indicate improved conditions in Murphy Creek resulting from Murphy Creek Restoration Project actions.

The Murphy Creek Restoration Project implements the following CALFED goals: 1) recovery of at−risk species, 2) rehabilitation of ecosystem processes, 3) enhancement of harvestable species, and 4) restoration of functioning habitats. In addition, the Murphy Creek Restoration Project is fully integrated with several programs supporting CALFED goals, including the East Bay Municipal Utility District (EBMUD) Lower Mokelumne River Project Water Quality and Resource Management Program – Lower Mokelumne River Joint Settlement Agreement, the Central Valley Project Improvement Act / Anadromous Fish Restoration Plan, the Cosumnes and Mokelumne River Flood Plains Integrated Resources Management Plan, and the Lodi−Woodbridge Winegrape Commission (LWWC).

1 PROJECT DESCRIPTION: PROJECT GOALS AND SCOPE OF WORK

1.1 Background

Murphy Creek, a tributary to the Mokelumne River, traverses Amador and San Joaquin counties and enters the Mokelumne River approximately 1,700 feet downstream of Camanche Dam in the Eastside Delta Tributaries Area of the CALFED Ecological Management Zone in the Bay-Delta Watershed (Figure 1). Land uses in the watershed are predominantly agricultural, consisting primarily of cattle grazing and vineyards with limited low-density rural residential uses. Murphy Creek is approximately 5 miles long and its watershed drains an area of approximately 3,100 acres.

Murphy Creek has several reservoirs within its stream channel that bar fish passage and reduce gravel recruitment into the Mokelumne River. The reservoirs, created with earthen dams approximately 20 feet high, provide water for livestock and vineyard operations. Cattle grazing occurs within the riparian zone and has reduced riparian vegetative cover, particularly the intermediate shrub layer. In addition, cattle access has resulted in degradation of Murphy Creek's water quality by increasing its sediment load and most likely increased its bacteria, nutrient (e.g., nitrogen, phosphorous), and pesticide load.

Long-established riparian landowners recall observing relatively large numbers of adult chinook salmon (*Oncorhynchus tshawytscha*) spawning in Murphy Creek, but these fish have been observed only rarely in recent years. Fish community surveys in Murphy Creek have been conducted by fisheries biologists from East Bay Municipal Utility District (EBMUD) since 1990. These surveys have documented juvenile steelhead (*Oncorhynchus mykiss*) and chinook salmon in lower reaches of the creek in the years 2000–2001. EBMUD has concluded that these were Mokelumne River-derived fish that used Murphy Creek as seasonal rearing habitat in some years when conditions were appropriate. These surveys have also documented a fish community dominated by non-native species in reaches upstream of the impoundments. Adult chinook salmon were last documented in Murphy Creek in December 1996.

In 2001, the landowners along Murphy Creek initiated a watershed stewardship effort to accomplish several goals, including restoration of spawning/rearing habitat for chinook salmon and Central Valley ESU steelhead, improvement of the instream flow regime to benefit anadromous salmonids, and improvement of Murphy Creek water quality. In 2002, the San Joaquin Resource Conservation District (SJRCD) and EBMUD were awarded a CALFED grant for the Murphy Creek Restoration Project (MCRP).

Under the MCRP, Sparrowk Dam, the downstream-most dam in Murphy Creek, was removed in August 2003. Removal of this fish migration barrier opened approximately 0.8 mile of stream to anadromous salmonids, thereby resulting in a total distance of 1.55 miles between Mokelumne River and the dam located at East Ranchero Road (i.e., Ranchero Dam) (Figure 1), which is now the downstream-most man-made barrier on Murphy Creek. Cattle exclusion fencing has been installed along some portions of Murphy Creek.

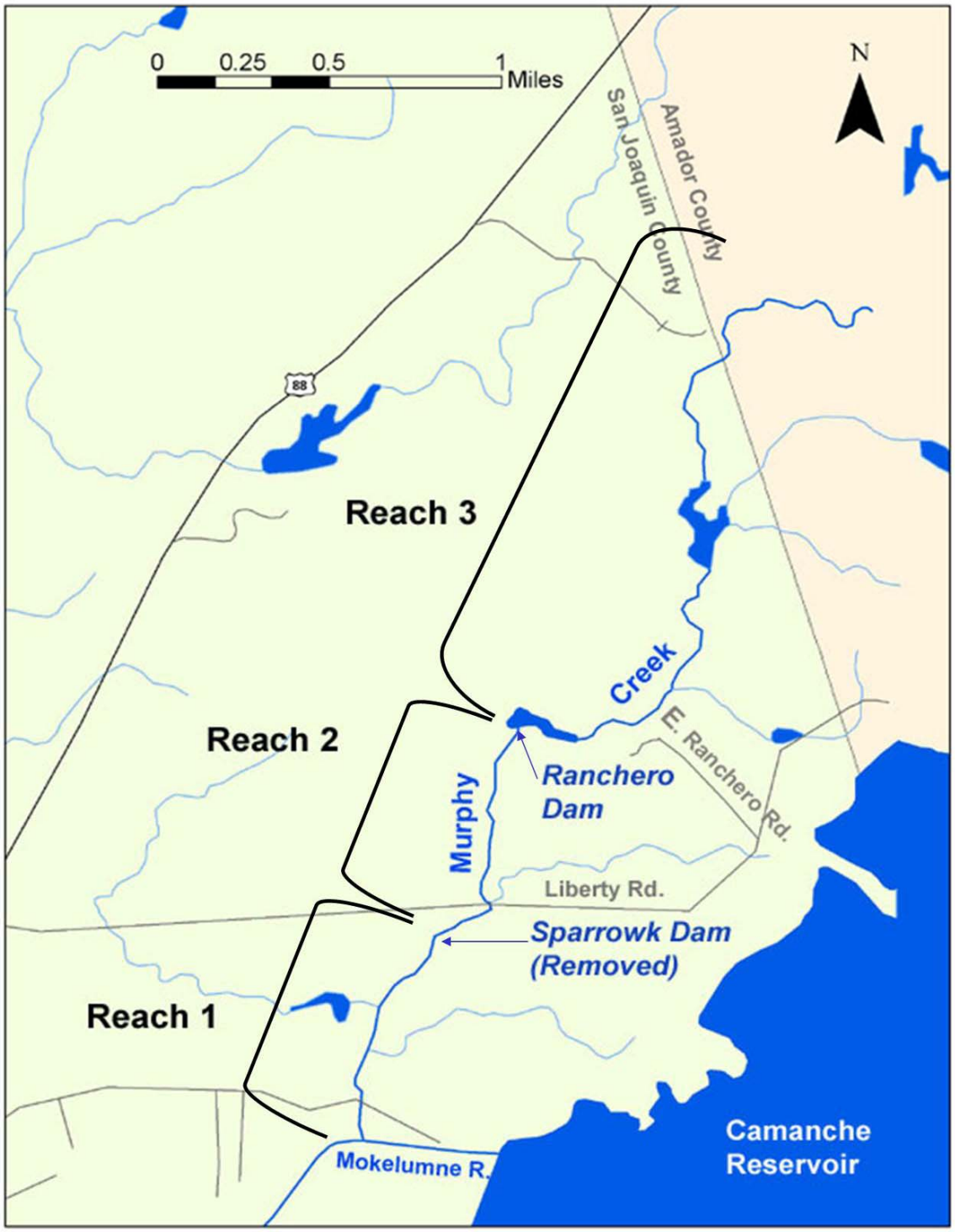

Figure 1. Locations of Ranchero Dam, proposed restoration monitoring reaches, and the former location of Sparrowk Dam on Murphy Creek, San Joaquin and Amador counties, California.

1.2 Proposed Project Goals and Objectives

The primary goal of the proposed restoration monitoring program is to determine the extent to which restoration actions undertaken by the MCRP have resulted in measurable increases and/or improvements in:

- Suitable habitat for spawning and rearing of anadromous salmonids,
- Production of anadromous salmonids,
- The relative proportion of native fish fauna, and
- Murphy Creek's water quality.

A second goal of the proposed restoration monitoring program is to identify additional physical, chemical, and biological factors that may be limiting production of anadromous salmonids in Murphy Creek and to use this information as a basis for recommending additional restoration actions. The following objectives will be implemented to achieve these goals:

- Compile and summarize all available relevant hydrologic, physical, chemical, and biological data collected for Murphy Creek prior to implementation of the MCRP (i.e., pre-project condition) to serve as baseline data for comparison to post-project conditions, and any data collected since implementation of the MCRP;
- Characterize the following hydrologic, physical, chemical, and biological conditions in Murphy Creek over a 3-year period:
    - Instream and riparian physical habitat (e.g., channel unit composition, substrate composition, available cover);
    - Seasonal hydrologic regime;
    - Seasonal water temperature regime;
    - Benthic macroinvertebrate community;
    - Existing fish community of Murphy Creek and the relative proportions of native and non-native fish species;
    - Relative abundance, distribution, and immigration period of adult anadromous salmonids;
    - Relative abundance, distribution, and emigration period of juvenile anadromous salmonids; and
    - Water quality (i.e., dissolved oxygen, turbidity, specific conductance, pH, nitrogen and phosphorous compounds, herbicides, and pesticides).
- Compare data collected under this proposed project to available pre-MCRP data;
- Develop and maintain a Geographical Information System (GIS) database of all data collected;
- Determine if Murphy Creek hydrologic, physical, chemical, and biological conditions have improved as a result of MCRP actions; and
- Provide recommendations for supplemental Murphy Creek restoration actions.

1.3 Expected Benefits from the MCRP and Justification for Proposed Monitoring

The MCRP restoration actions undertaken and/or ongoing thus far include removal of the Sparrowk Dam, installation of fencing to exclude cattle, and removal of non-native riparian vegetation coupled with replanting of native riparian vegetation. This section describes a conceptual overview of the adverse impacts caused by dams, cattle, and invasive non-native vegetation on stream ecosystems and the expected benefits to be derived from the MCRP actions.

The negative impacts of dams have been well documented (American Rivers et al. 1999). Dams may block the movement of migratory fish species, thereby limiting production of these fish. Alterations in the natural flow regime may facilitate the invasion of non-native fish species, which may out-compete native fish species for food and habitat. Other potential dam-induced impacts include the disruption of a stream's natural hydrologic regime, disruption of the natural transport of sediments and large woody debris (used as cover by many fish and invertebrates), and altered thermal regime. In small streams such as Murphy Creek, dams often create relatively large and shallow impoundments with large surface area and little canopy cover, thereby resulting in elevated water temperatures. The removal of Sparrowk Dam has created access to approximately 0.8 mile of previously inaccessible habitat, a 121% increase in potential spawning and rearing habitat for anadromous salmonids in lower Murphy Creek. This increase in habitat may result in production of anadromous salmonids in Murphy Creek, pending suitability of the newly accessible habitat for spawning and rearing. Improvements in Murphy Creek's hydrologic and thermal regimes and improved conditions for the transport of sediments and large woody debris may also benefit anadromous salmonids and benthic macroinvertebrate (BMI) communities; however, the presence of other similar dams upstream may be limiting the realized extent of these benefits.

Negative impacts to stream ecosystems associated with cattle include the trampling of bank vegetation, associated increases in stream sediment load, and increases in levels of pathogens (i.e., coliform bacteria) and nutrients (e.g., nitrogen compounds) derived from cattle excrement. A secondary effect of bank trampling by cattle may include an increase in the level of fertilizer-derived nutrients, herbicides, and pesticides resulting from runoff where land uses are primarily agricultural. A decrease in water quality, such as those associated with cattle in streams, is often reflected by changes in benthic macroinvertebrate communities. A variety of metrics (e.g., CDFG 2003, Merritt and Cummnins 1996) have been developed for correlating the status of BMI communities (e.g., species richness, diversity) to ambient water quality. Installation of cattle exclusion fencing is expected to result in a decrease in suspended sediment, pathogen, nutrient, herbicide, and pesticide concentrations in the water column.

The lack/loss of native riparian overstory vegetation in streams and corresponding invasion of non-native understory vegetation is often associated with increases in stream temperatures

resulting from increased exposure to the sun. In addition, stream banks that are dominated by understory plant species are typically less stable than banks dominated by large overstory trees. An increase in the density of large overstory trees in the riparian zone of Murphy Creek is expected to improve instream conditions for anadromous salmonids and the benthic macroinvertebrate community by providing shade, which lowers stream temperatures; increasing bank stability, which reduces sediment loads and water column concentrations of nutrients, pathogens, pesticides, and herbicides. Over time, a contribution of wood from riparian trees is expected to increase cover for fish (i.e., large woody debris) and provide an important nutrient source for BMI communities (Merritt and Cummins 1995).

This project proposes to test the following five key null (H_o) and alternative (H_a) hypotheses:

H_o: The amount of spawning and rearing habitat for anadromous salmonids has not been measurably increased in Murphy Creek following removal of Sparrowk Dam;

H_a: The amount of spawning and rearing habitat for anadromous salmonids has been measurably increased in Murphy Creek following removal of Sparrowk Dam;

H_o: The relative proportion of native fish species has not increased measurably in Murphy Creek following removal of Sparrowk Dam;

H_a: The relative proportion of native fish species has increased measurably in Murphy Creek following removal of Sparrowk Dam;

H_o: The relative abundance of anadromous salmonids has not increased measurably in Murphy Creek following removal of Sparrowk Dam;

H_a: The relative abundance of anadromous salmonids has increased measurably in Murphy Creek following removal of Sparrowk Dam;

H_o: Water temperatures have not decreased measurably in Murphy Creek following removal of Sparrowk Dam and replanting of native vegetation;

H_a: Water temperatures have decreased measurably in Murphy Creek following removal of Sparrowk Dam and replanting of native vegetation;

H_o: Murphy Creek water quality has not increased measurably following implementation of MCRP restoration actions (i.e., dam removal, cattle exclusion and replanting of native vegetation);

H_a: Murphy Creek water quality has increased measurably following implementation of MCRP restoration actions (i.e., dam removal, cattle exclusion and replanting of native vegetation).

The proposed MCRP restoration monitoring project will examine Murphy Creek's seasonal water temperature regime, seasonal hydrologic regime, physical habitat, fish community, and benthic macroinvertebrate community over a 3-year period to evaluate whether measurable improvements can be detected following implementation of MCRP actions. A stratified random sampling approach will be implemented, with strata defined as follows (Figure 1):

1. **Reach 1** – Murphy Creek / Mokelumne River confluence to the location of the former Sparrowk Dam;
2. **Reach 2** – Location of Former Sparrowk Dam to Ranchero Dam;
3. **Reach 3** – Ranchero Dam to headwater origin of Murphy Creek.

Because Reach 2 was formerly upstream of the impoundments surveyed in EBMUD's sampling efforts, a key assumption is that the Reach 2 fish community was more similar to that of Reach 3 than to Reach 1 in terms of species present and relative abundance prior to dam removal. Following dam removal, it is expected that over time the fish community of Reach 2 will become more similar to that of Reach 1.

1.4 Previously Funded Monitoring

The MCRP allocated $20,000 for monitoring of its restoration actions. This amount has been allocated for monitoring occurrences of neotropical migratory birds. Other monitoring efforts have been conducted by volunteers, including riparian landowners and the Citizen's Monitoring Group created by the Lodi Lake Docents. The results of these monitoring efforts will be compiled and summarized to the extent possible; however, it is our understanding that these efforts have been conducted primarily in a qualitative manner (e.g., photographs) and may not lend themselves to quantitative analyses.

1.5 Approach and Scope of Work

Task 1: Project Management

Subtask 1a) Project Management

The San Joaquin County Resource Conservation District (SJRCD) shall provide all technical and administrative services associated with performing and completing the work for this project. Technical and administrative tasks shall include: project management, budgeting, scheduling, coordination, crew supervision, report preparation, contract management, invoicing, equipment maintenance and data collection, storage and analysis, subcontract management, and all other tasks that may be necessary to complete the scope of work specified in this agreement.

The work performed in this subtask also includes the preparation and submission of Quarterly Progress Reports (using ERP's Quarterly Report Format) to CALFED's Contract Manager; the planning and conducting of quarterly status meetings with all project investigators to review progress and issues from the previous quarter; the preparation and

submission of the project Final Report; and the preparation and submission of deliverable products as specified.

Subtask 1b) Progress Reporting

Prepare and submit quarterly progress reports to CALFED's Contract Manager electronically using CALFED's progress report format. Each progress reports shall detail work accomplished, discuss any problems encountered, and recommend potential solutions to those problems; detail costs incurred during the subject quarter, and document delivery of any intermediate work products. A brief outline of upcoming work scheduled for the subsequent quarter would also be provided. Progress reports will be submitted by the 10th day of the month following each calendar quarter (April, July, October, January) throughout the duration of the project.

Subtask 1c) Subcontractor Selection

Award subcontracts, as necessary, to qualified consultants or other agencies. The subcontractors shall be selected by a process that complies with all applicable State and Federal regulations. Prepare a legally enforceable agreement between the contractor and the selected subcontractors. The agreement shall describe the scope of work and the products expected from each subcontractor. Document steps taken in soliciting and awarding the subcontract and submit a copy of documentation to CALFED. In the quarterly progress report, document all subcontractor activities, deliverables completed, progress, issues and proposed resolutions.

Task 2: Project Initiation and Data Compilation

Subtask 2a) Coordination with Study Partners

Compile Existing Studies and Data. Available agency (e.g., NOAA Fisheries, CDFG, USFWS) and organization (e.g., EBMUD, UC Davis) records and personal observations by local landowners will be compiled to determine the pre-MCRP physical, chemical, hydrologic, and biological conditions. Compilation of data will be conducted by searching available agency files, requesting data from organizations known to have conducted such surveys in Murphy Creek, and interviewing local landowners. EBMUD, which currently monitors the lower Mokelumne River and has conducted monitoring in Murphy Creek since 1990, will be a primary source of baseline information for the proposed monitoring project.

Field Reconnaissance Survey. Under this subtask, Robertson-Bryan, Inc. and Fisheries Foundation biologists will conduct a one-day field reconnaissance survey to identify sampling reaches/sites and access points for collecting physical, chemical, and biological data identified in Tasks 3 through 6. Information obtained from the reconnaissance survey will be used to determine permanent transect locations for monitoring instream habitat

conditions. Monitoring locations for deploying temperature and hydrologic recording units will also be identified during this field reconnaissance survey.

Task 3: Physical Habitat Assessment

In order to characterize temporal variations in Murphy Creek's physical habitat, the proposed monitoring project will consist of two distinct annual sampling events – one in the wet season (i.e., November through April) and one in the dry season (i.e., June through October) in each of the sampling reaches over the course of the 3-year monitoring period, for a total of six physical habitat sampling events. Physical habitat assessments will be conducted under wet and dry season base flow conditions. This approach will facilitate comparisons of spatial and temporal changes in physical habitat conditions.

Physical habitat conditions will be assessed using a combination of standard stream habitat assessment protocols. Replicate physical habitat sampling stations measuring at least 40 times the bankfull channel width in length will be established in each sampling reach. To characterize temporal and spatial changes in instream habitat composition, field personnel will begin at the downstream end of each station and walk the entire distance of each of the physical habitat stations delineating and measuring all channel habitat units (e.g., riffles, runs, pools) during each sampling event. The habitat type will be visually determined according to standard classification methods using Flossi and Reynolds (1991) methods. Lengths of habitat units and cumulative distance upstream from the downstream end of each station will be measured to the nearest 0.1 ft using a hip chain and/or laser distance measuring unit.

The Murphy Creek instream physical habitat of will be further assessed by collecting quantitative and qualitative data at permanently established transects throughout the system. The number and exact locations of transects will be determined based on site-specific conditions documented during the field reconnaissance survey. At each transect, a measuring tape will be extended across the bankfull channel width where the following variables will be characterized:

1. Stream channel width across the transect;
2. Water depth at multiple equally-spaced intervals across the transect;
3. Water velocity at multiple equally-spaced intervals across the transect;
4. Substrate composition at multiple equally-spaced intervals across the transect;
5. Riparian vegetative cover;
6. Percent overhead canopy cover.

Water depth will be measured to the nearest 0.1 ft using a measuring rod. Water velocity will be measured to the nearest 0.1 fps using a standard flow meter. The substrate category will be measured using a categorized substrate gauge and/or measured with a standard

measuring stick. The percent overhead canopy cover will be measured in the upstream, downstream, left bank, and right bank directions using a standard densiometer. Transects will be photographed during each sampling event to provide a qualitative indication of habitat conditions.

Task 4: Fish Community Assessment

Fish Community Sampling. The Murphy Creek fish community will be sampled using standard multi-pass electrofishing techniques (e.g., Reynolds 1996). When and where conditions are not conducive to electrofishing or sampling is precluded by the presence of special-status fish species, other less obtrusive active fish capture methods (e.g., Hayes et al. 1996), such as seining, will be employed as necessary. Replicate sites will be selected in each of the three reaches and sampled two times per year (i.e., dry season and wet season) over the 3-year monitoring period. All fish captured will be identified to species in the field, enumerated, and released downstream of the sampling site. The length of all salmonids captured will be measured and recorded.

Anadromous Salmonid Carcass / Redd Surveys. Standard carcass and redd surveys will be conducted weekly over a 16-week period following the first storm of each fall during the 3-year study period. Two Fisheries Foundation biologists will walk from the Mokelumne River confluence upstream to the Ranchero Dam looking for anadromous salmonid redds and carcasses. All redds and carcasses will be counted, flagged, and recorded. GPS coordinates will be recorded for each redd and/or carcass observed.

Anadromous Salmonid Juvenile Emigration Surveys. Juvenile anadromous salmonid occurrences in Murphy Creek will be surveyed by placing fyke nets (e.g., Hubert 1996) a short distance upstream of the confluence with the Mokelumne River. Sampling will occur annually during the peak emigration period (i.e., December–April) for juvenile chinook salmon and steelhead in the Mokelumne River system. Nets will be deployed prior to precipitation events and left in place until flows return to normal wet season base flow conditions. Nets will be checked and cleaned daily and all fish captured will be identified to species, enumerated, and released downstream of the nets. The length of all salmonids captured will be measured.

Task 5: Benthic Macroinvertebrate Surveys

Collection of BMIs will be performed following the California Stream Bioassessment Procedure (CSBP) (CDFG 2003), a regional adaptation of the U.S. EPA's Rapid Bioassessment Protocols for use in Streams and Rivers (Barbour et al. 1999). The CSBP is widely recognized as the State standard for conducting rapid bioassessment surveys of BMI communities in wadeable streams. Three replicate sites will be selected for BMI sampling in each of the three reaches. Each site will be sampled two times annually (i.e., dry season and

wet season) over the course of the 3-year monitoring period, thereby sampling each BMI monitoring site six times.

Task 6: Water Quality Monitoring

Water quality parameters associated with cattle excrement (i.e., nitrogen compounds, coliform bacteria) and agriculture (i.e., nutrients, pesticides, and herbicides) will be examined in each sampling reach to evaluate whether improvements in water quality are occurring as a result of MCRP actions, especially the installment of cattle exclusion fencing. One water quality monitoring site will be established in each reach and samples will be collected on a bi-monthly basis to be analyzed by California Laboratory Services (CLS) for water column concentrations of the following parameters:

- coliform bacteria count,
- nitrate,
- ammonia,
- total Kjeldahl nitrogen (TKN),
- phosphate,
- herbicides, and
- pesticides.

In addition, the following water quality parameters will be recorded using a handheld meter at all transects sampled during the physical habitat samples:

- dissolved oxygen concentration (mg/L)c
- specific conductance (µS/cm),
- turbidity (Nephlometric Turbidity Units), and
- pH.

Task 7: Water Temperature Monitoring

Onset Computer Corporation Optic Stowaway® Temperature Loggers will be used to continuously monitor creek water temperatures. Replicate Stowaway® units will be deployed in each of the three reaches at the same location as the water quality monitoring sites. Units will be programmed to record water temperatures on an hourly basis and data will be retrieved from each of the units on a monthly basis.

Task 8: Hydrologic Monitoring

Collection of hydrologic data will be facilitated by the installation of a streamflow gauging station located near the mouth of Murphy Creek. The exact location of the gauging station will be determined in Task 2c. The streamflow gauge will be of the pressure transducer type and record stream stage. A rating-curve, correlating stream stage (water depth) with

discharge (cubic-feet per second flow rate), will be developed for streamflow gauge. Data from the gauge will be collected on a bi-monthly basis. Additional details of this task are provided below.

Subtask 8a) Installation and Maintenance

Monitoring equipment will consist of a water level sensor installed a location specified during the field reconnaissance effort in Task 2c. The equipment will be housed in PVC conduit allowing cables to run up the stream banks to an accessible point. Conduit for this equipment will consist of 2-inch PVC electrical conduit. All conduit and equipment housing will be hidden and secured to the extent possible.

The monitoring equipment will consist of a ***Water Level Logger, WL15, by Global Water Instrumentation.*** The Water Level Logger, WL15, provides a datalogger with a submersible transducer for remote monitoring and recording of water depth measurements and water pressure. This reliable and accurate water logger records 24,000 readings and is programmable from one reading per minute to one reading per day. An internal 9-VDC battery powers the water level meter and level sensor for up to one year. The water level monitor converts the 4-20mA water depth reading to a digital value and stores the measurement in the level-logger's memory.

Subtask 8b) Development of a Stage-Flow Rating Curve

Stream discharge will be measured at the gauging site by measuring depths and velocities across a channel transect that represents the flow being measured at the gauging site. Discharge measurements will be measured with a Marsh-McBirney Flo-Mate Model 2000 or the Sontek FlowTracker current meter. These instruments are direct replacements for United States Geological Survey (USGS) type mechanical meters and are standard equipment for USGS streamflow measurement programs. Flows measurements will be made using accepted USGS velocity or discharge measuring instruments and procedures (USGS 1982).

RBI will utilize the ***Sixth-Tenths Depth Method*** and the ***Two-Point Method*** for measuring velocities at each transect station, depending on the depth of water. For depths greater than 2.5-feet the Two-Points Method will be used and for depths less than 2.5-feet the Sixth-Tenths Depth Method will be used. A description of these methods is provided below.

- ***Sixth-Tenths Depth Method*** – The Six-Tenths Depth Method (0.6 of the total depth below the water surface) uses the observed velocity at this depth as the mean velocity in the vertical column of water being measured. This method provides extremely reliable results whenever the water depth is between 0.3 and 2.5-feet.

- ***Two-Point Method*** **–** The Two-Point Method (0.2 and 0.8 depth below the water surface) averages the velocities observed at these relative depths within a vertical column of water to determine a mean velocity for column of water. This method

generally provides a more consistent and accurate result than any other method. However, this method is not generally used at depths of 2.5-feet or less, because the current meter setting would be too close to the water surface and stream bed for dependable readings.

Ideally, discharge measurements are needed to define the stage-discharge relationship through out the entire range of stage experienced at each monitoring site. A minimum of 10 discharge measurements per year is recommended by the USGS to accurately define the stage-discharge relationship (Rantz, 1982). Stream flow measurements will be made each month during the UAA study period, water conditions permitting.

Subtask 8c) Data Preparation and Reporting

Once the data has been downloaded, stage data will be converted to streamflow discharge values, reported in cubic-feet-per-second, using the developed rating curve. Quarterly data transmittal reports containing the following information:

- Narrative summary of data collected during the previous three-month collection period.
- Data presentation for previous three-month collection period – tabular and graphic.

Task 9: Data Analysis and Reporting

Data Analyses. Physical habitat variables will be summarized and compared according to habitat suitability indices (HSIs) developed for chinook salmon and steelhead. Regionally-developed HSI values will be used if available. In the absence of such data, HSI criteria developed by the U.S. Fish and Wildlife Service for chinook salmon (Raleigh et al. 1986) and steelhead (Raleigh et al. 1984) will be used.

The fish communities of sampling reaches will be analyzed using metrics described by Barbour et al. (1999) to evaluate spatial and temporal changes in fish community structure (e.g., species richness, species diversity). Species-specific population estimates will be determined using MicroFish 3.0 or equivalent software. Fish communities will be compared spatially between sampling reaches and temporally among sampling reaches using indices of similarity based on measures of overlap in species presence/absence (e.g., Sorenson's coefficient) and relative abundance (e.g., Morisita's coefficient). To the extent possible, similarity indices will be used to compare these fish communities to available Mokelumne River fish community data to determine whether Mokelumne River fish species make seasonal use of Murphy Creek.

Total escapement and escapement relative to improved sites will be estimated using the standard Peterson Index (Lincoln Index) as employed by Snider et al. (2000). Employing the

Peterson Estimate under these circumstances has the potential of severe bias (Snider et al. 2000, Law 1994), particularly when fish numbers are low (Ricker 1975).

Identification of BMI samples will be performed by BioAssessment Services, a laboratory belonging to the California Bioassessment Laboratories Network (CAMLnet), per the recommendation of CDFG. A series of biological metrics (e.g., CDFG 2003, Barbour et al. 1999, Merritt and Cummins 1996) will be calculated to characterize the BMI communities, trophic condition, and water quality of Murphy Creek. Water quality grab samples for nutrients, pathogens, pesticides, and herbicides will be analyzed by California Laboratory Services using standard analytical methods.

Development of a GIS Database. GPS coordinates will be recorded at all physical habitat transect locations, fish, BMI, water quality, and temperature sampling locations, and at the upstream and downstream endpoints of physical habitat assessment reaches. These data will be integrated in a comprehensive GIS database to evaluate spatial and temporal trends in physical, biological, and chemical variables.

Data Reporting. Annual reports summarizing the results of the hydrologic, physical, chemical, and biological data collection efforts to date will be prepared and made available following each of the first two years of restoration monitoring. A final report will be prepared following the third year of monitoring. This report will summarize the results from all three years of monitoring, conclusions reached, and provide recommendations for potential supplemental restoration actions and/or monitoring. All annual and final reports will be made available to interested agencies, organizations, and the public.

Task 10: Public Outreach

Public outreach will be coordinated through the Murphy Creek Restoration Project and Lower Mokelumne River Watershed Stewardship Plan efforts, led by the SJRCD and the Lower Mokelumne River Watershed Stewardship Planning Committee.

Information gathered and reported through the Murphy Creek Restoration Monitoring Project will be conveyed to above groups for dissemination to the interested stakeholders and local partners.

1.6 Feasibility

The MCRP and this proposed monitoring project has tremendous support from the adjoining landowners and the local community. In fact, the landowners initiated a watershed stewardship effort that ultimately led to the MCRP and even enlisted the assistance of the University of California, Davis, and the Natural Resource Conservation District to establish baseline data and a need assessment for the Murphy Creek watershed. The riparian landowners have provided written permission for access to their land for implementation of

the MCRP and this proposed monitoring project. RBI and FF currently hold all necessary sampling permits for collection of fish and BMI organisms in California waters.

From a technical/logistical standpoint, the methodologies described above have been successfully implemented by EBMUD, RBI, and FF, the consultants responsible for data collection and analyses. The methodologies described are standard procedures for wadeable streams. There are no foreseen issues regarding the implementation of the proposed project.

1.7 Expected Outcomes and Products

Expected outcomes:

- Annual progress reports (2) – one following each of the first two years
- Final report (1) – following the final year
- MCRP webpage
- Presentations held periodically at SJRCD meetings, public meetings
- Peer-reviewed publication(s)
- Quarterly CALFED progress reports

1.8 Data Handling, Storage, and Dissemination

All data collected will be stored in a comprehensive database developed in Microsoft (MS) Access®. Data will be analyzed using a combination of MS Access, GIS software (e.g., ESRI ArcView), MS Excel, and statistical software (e.g., WinStat). All necessary quality assurance/quality control (QA/QC) measures will be taken with regard to data collection, storage, analysis, and dissemination to ensure the quality of the data. Data that has undergone QA/QC scrutiny will be made available to agencies/organizations coordinating long-term monitoring efforts (e.g., Lower Mokelumne River Watershed Stewardship Plan, Interagency Ecological Program, CVPIA's Comprehensive Assessment and Monitoring Program, Surface Water Ambient Monitoring Program).

1.9 Public Involvement and Outreach

Public outreach and involvement will be conducted throughout this proposed MCRP monitoring project. Riparian landowners granting access to the creek will be contacted in advance of upcoming field visits and will be informed of the project's status and key findings over the course of the project. Riparian landowners may provide a key role in monitoring by informing project staff whenever relevant observations are made, such as observations of adult salmonids in Murphy Creek.

Two public outreach meetings will be held over the course of this proposed project. The first meeting will be held prior to initiation of field work to inform the local residents of the project's purpose, history, and goals/objectives. The second meeting will be held following completion of the project and will inform the local residents of the monitoring results, conclusions, and recommendations. A webpage will be developed to provide additional

information regarding the project purpose and status, and the personnel involved in the project. This website will be updated as new information relevant to the public becomes available.

2 APPLICABILITY TO CALFED BAY-DELTA PROGRAM ERP GOALS, THE ERP DRAFT STAGE 1 IMPLEMENTATION PLAN AND CVPIA PRIORITIES

2.1 ERP and CVPIA Priorities

The Murphy Creek Restoration Project will implement four CALFED ERP Goals:

- **Recovery of at-risk species** through restoration of rearing and/or spawning habitat for Chinook salmon and steelhead and restoring habitat for neotropical migratory birds;
- **Rehabilitation of ecosystem processes** by restoring in-channel flow, gravel recruitment to the Mokelumne River, and restoration of native riparian vegetation;
- **Enhancement of harvestable species** through expansion of habitat for Chinook salmon and steelhead; and
- **Restoration of functioning habitats** through restoration of a free-flowing stream system and restoration of native riparian habitat to support neotropical birds and other special status species.

The Murphy Creek Restoration Monitoring Project will measure the progress of the restoration actions toward meeting the ERP Goals identified in *Draft Stage 1 Implementation Plan, Ecosystem Restoration Program Plan* (CBDA 2001). Also, the Murphy Creek Restoration Project is fully integrated with the following programs that support CALFED goals.

East Bay Municipal Utility District (EBMUD) Lower Mokelumne River Project Water Quality and Resource Management Program-Lower Mokelumne River Joint Settlement Agreement.

The Lower Mokelumne River Project Water Quality and Resource Management Program is being coordinated by EBMUD pursuant to the Federal Energy Commission's (FERC) November 27, 1998, Order Approving Settlement Agreement and Amending License Approved June, 1997, offer of settlement (Agreement). Under the terms of the Agreement, EBMUD, USFWS and CDFG have established a Lower Mokelumne River Partnership with the following objectives:

- Protection and Enhancement of the anadromous fishery;
- Protection and improvement of the Mokelumne River ecosystem;
- Encouragement of stakeholder participation and cooperation; and

- Integration of Mokelumne River strategies with the Bay Delta Accord, CVPIA (Central Valley Project Improvement Act) implementation and similar measures.

The Settlement Agreement specifically directs a commitment to ecosystem protection and enhancement which includes, but is not limited to: spawning gravel improvements; riparian restoration; maintaining a database, and other actions to be determined by a steering committee.

The FERC EIS proposed the *Mokelumne River Spawning Improvement Project* to implement several recommended actions including: riparian restoration, sediment source control, predator control, and livestock management (e.g., fencing, rotational grazing, or compensating ranchers for not grazing riparian pastures). In conjunction with the program, EBMUD is undertaking surveys of both common and special status wildlife species including neotropical migratory birds, reptiles, mammals, fish and amphibians. Also pursuant to the program, EBMUD, CDFG, and the USFWS have established a Partnership Fund which makes funds available to interested stakeholders.

Central Valley Project Improvement Act/Anadromous Fish Restoration Plan: The Central Valley Project Improvement Act (CVPIA) of 1992 [Section 3405(b)(1)] directed the Secretary of the Interior to develop and implement a program which makes all reasonable efforts to double natural production of anadromous fish in Central Valley rivers and streams by 2002. In response, the U.S. Fish and Wildlife Service prepared a draft plan entitled: Anadromous Fish Restoration Program Plan (AFRP). The plan identifies multiple anadromous fish habitat deficiencies in each tributary of the Central Valley of California including the Mokelumne River system where degraded aquatic habitat conditions are documented.

The FERC FEIS and AFRP combined with the CVPIA Restoration Fund affords the opportunity to provide funding for habitat improvement actions. The AFRP effort includes a process to collaborate with other agencies, organizations and the public by augmenting and assisting restoration efforts presently conducted or proposed by local watershed groups, CDFG, and others to increase natural production of anadromous fish in the Central Valley.

Cosumnes and Mokelumne River Flood Plains Integrated Resources Management Plan: The San Joaquin County Resource Conservation District, EBMUD, along with other regional partners[1] have joined together to evaluate potential ecosystem restoration and non-traditional flood damage reduction methods in the Mokelumne River flood plan from Camanche Dam to the confluence of the San Joaquin River and on the Cosumnes River from Rancho Murieta to its confluence with the Mokelumne River. Wildlife restoration measures include restoring

[1] Regional partners include: The Southeast Sacramento County Agricultural Water Authority, Sacramento County Water Agency, Sacramento Area Flood Control Agency, the Nature Conservancy, Reclamation District 800, and the University of California, Davis, Center for Integrated Watershed Management.

habitats through plantings and other natural revegetation efforts. Measures will be designed in cooperation with landowners and other water users to protect private property rights, water rights and the economic viability of land.

Lodi-Woodbridge Winegrape Commission (LWWC): LWWC has produced the Lodi Winegrower's Workbook. This self-assessment guide to integrated farming practices includes a habitat component which recognizes the benefits of wildlife habitats in integrated farming practices. These benefits include control of animal pests (e.g., by raptors and other birds of prey), control of insect pests, reducing erosion, and providing filters to improve water quality. The work also explains how the presence of wildlife and diverse habitats in and around vineyards adds quality to the experience of anyone touring the Lodi region. As the LWWC district matures, wine tourism is bound to become an important aspect of winegrape growing. The workbook includes recommendations for farming practices which can assist farmers in realizing the benefits of managed wildlife resources and avoiding practices that could increase threats to farming practices (e.g., increasing the potential for *Armillaria* root rot on grape vines by removing oaks trees). The workbook also provides information on funding sources which can assist in implementation of wildlife-friendly farming practices [e.g., Wildlife Habitat Incentive Program (WHIP) and the Environmental Quality Incentives Program (EQIP) offered through the Natural Resources Conservation Service (NRCS)].

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

The Murphy Creek Restoration Project and the Murphy Creek Restoration Monitoring Project illustrates the relationship between sustainable agricultural production and natural resource conservation within a watershed. The restoration project specifically emphasizes the relationships between cattle grazing and riparian ecosystems and seeks to restore functionality to the riparian ecosystem while maintaining economically viable livestock production. The primary goal of the restoration project is to restore habitat for at-risk species (Chinook salmon, steelhead, neotropical migratory birds), including harvestable species (Chinook salmon, steelhead) through restoration of functioning habitats.

The subsequent monitoring project evaluates the success of the restoration project for aquatic species, specifically Chinook salmon and steelhead. The monitoring project also evaluates the success of restoring a natural hydrologic regime important for a functional riparian ecosystem and of improving water quality by removing cattle from creek and re-planting native riparian species as a filter between established vineyards and grazing lands.

The findings of the Murphy Creek Restoration Monitoring Project will provide information that can be compared to other restoration project for low elevation foothill streams in the Central Valley. Small streams, tributary to the major Central Valley rivers, offer a great potential for restoring riparian and aquatic ecosystems that under the influence of major water development projects, and therefore offer a more natural hydrologic regime. The

monitoring and evaluation of the Murphy Creek restoration effort will provide valuable information about the success of similar restoration efforts throughout the Central Valley and also offer recommendations for redirecting restoration effort to more fully achieve CALFED and CVPIA restoration objectives.

2.3 Additional Information for Proposals Containing Land Acquisition

Not Applicable.

3 QUALIFICATIONS

San Joaquin County Resource Conservation District

The San Joaquin County Resource Conservation District (SJRCD) will oversee the implementation of the Murphy Creek Restoration Monitoring Project and shall be the fiscal agent responsible for handling funds. The SJRCD has extensive experience administering and implementing grants as detailed below in item c. The SJRCD is a Special District authorized by the State Legislature. The SJRCD has nine board members living throughout San Joaquin County, including both the President and Vice President who reside within the Lower Mokelumne River Watershed.

East Bay Municipal Utility District

Kent Reeves and **Joe Merz** are staff biologists for the East Bay Municipal Utility District and have been conducting biological monitoring surveys within the Lower Mokelumne River for several years. Kent is a wildlife biologist who is also involved in range management and has a strong established rapport with landowners throughout the Lower Mokelumne River Watershed and within the Murphy Creek Watershed. Joe is a fisheries biologist and has been responsible for tracking populations of salmonids within the Lower Mokelumne River and Murphy Creek.

USDA Natural Resource Conservation Service

Dave Simpson is the District Conservationist for the USDA Natural Resource Conservation Service where he has served for more than 25 years. He holds a B.S. from Humboldt State University in Natural Resources Management and has been active in the USDA NRCS=s Wetland Reserve and Wildlife Habitat Incentive Programs.

Tish Espinosa is a Plant Materials Specialist. She holds an M.S. in Agronomy from Cal Poly Pomona and has been with the USDA NRCS for more than 10 years. Operating out of the NRCS Plant Materials Center located along the Lower Mokelumne River, she will provide assistance in selecting appropriate natives, acquiring plant materials and establishing new native plantings within the Murphy Creek Watershed.

John Bishoff is an Agricultural Engineer with a Ph.D. from South Dakota State University. He will provide assistance in evaluating sedimentation associated with dam removal and other engineering support, as necessary.

Murphy Creek Landowners

Bev and Jack Sparrowk have extensive land holdings in the Murphy Creek Watershed near its confluence with the Mokelumne River. They own and operate Sparrowk Livestock and are active in both the California and National Cattleman's Association. The Sparrowks initiated the Murphy Creek Restoration Program approximately 2 years ago and have been the impetus for encouraging neighboring landowners to join in the effort to restore Murphy Creek. They will continue to coordinate landowner participation.

Tom Azevedo has worked with the Sparrowks for 6 years. He is the Controller for Sparrowk Livestock with extensive financial and organization expertise and a degree in Accounting. He has been integrally involved in the Murphy Creek restoration project since its inception. He will continue to provide budgeting and financial administration guidance as well as technical expertise. Other landowners participating in the Murphy Creek restoration include: Cordula and Joseph Atkinson, Carol Atkinson, Jean Cline, Melissa and Steve Holmes, Richard Deller, Nancy Biglow. Additional property owners continue to join the program.

Robertson-Bryan, Inc.

Robertson-Bryan, Inc. (RBI) will provide the technical lead on all aspects of the Murphy Creek Restoration Monitoring Project. RBI is a multi-disciplinary consulting firm of engineers and scientists that provides water and power resource engineering and environmental services to clients. The firm draws on decades of consulting and research experience to provide timely and effective solutions for resolving today's complex water resource issues.

Dr. Michael Bryan is Vice President of Robertson-Bryan, Inc. (RBI). He has a B.S. in Fisheries Biology from the University of Wisconsin-Stevens Point, a M.S. degree in Fisheries Biology from Iowa State University, and a Ph.D. in Fisheries Biology and Toxicology from Iowa State University. He has over 18 years experience in consulting and research in the fields of fisheries biology, water quality, and aquatic toxicology. His work focuses on addressing how physical, chemical, and biological characteristics of aquatic habitats affect fish and other aquatic life. Dr. Bryan also has extensive expertise in preparing CEQA/NEPA documentation, developing study designs and fisheries management plans, analyzing and interpreting field data, and regulatory permitting. Dr. Bryan is experienced in assessing water quality and habitat related effects on fish and other aquatic life at various levels of biological organization, including biochemical, cellular, individual, population, and community levels.

David Thomas is a Fisheries Biologist/Water Quality Specialist with RBI. has over six years of experience researching relationships between fish assemblages, macroinvertebrate

communities, and instream habitat. Mr. Thomas earned a B.S. in Fisheries & Wildlife and a M.S. in Fisheries & Wildlife with an emphasis in Aquatic Toxicology from Michigan State University. His Master's thesis examined and compared fish communities, physical habitat, and benthic macroinvertebrate communities of low-ordered tributaries to that of their terminal drainage in the context of the River Continuum Concept. He is experienced in assessing potential impacts to aquatic resources, designing restoration and monitoring plans, assessing benthic macroinvertebrate communities, assessing fish passage of physical structures, and geospatial analyses using Geographic Information Systems (GIS). Mr. Thomas is also experienced in design and implementation of water quality sampling programs for municipal dischargers and he has additional expertise in the areas of aquatic toxicity and rapid bioassessment.

Fisheries Foundation of California

The Fishery Foundation of California was established in 1985 to develop and implement innovative fishery restoration programs. Since 1992, the Foundation has successfully completed numerous contracts with state and federal agencies including DFG, DWR, USFWS, and the Wildlife Conservation Board. The Foundation is currently conducting monitoring programs for the CVPIA and CALFED on the American River, Cosumnes River, and Stanislaus River. The Foundation conducted fishery surveys in the Cosumnes River floodplain and lower river and built a fish ladder at Granlee Dam. The Foundation is presently conducting a downstream migrant screw trap for DFG in the lower Cosumnes River.

4 LITERATURE CITED

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5 NON-PROFIT VERIFICATION

Tasks And Deliverables

Murphy Creek restoration monitoring project

Task ID	Task Name	Start Month	End Month	Deliverables
1	Project Management	1	36	Semiannual and final reports. Periodic invoices
2	Project Initiation and Data Compilation	1	5	Technical Memorandum: Reporting of Existing Data and Field Reconnaissance and Mapping
3	Physical Habitat Assessment	2	34	Technical Memorandum: Year 1 Reporting of Physical Habitat Assessment, Technical Memorandum: Year 2 Reporting of Physical Habitat Assessment, Technical Memorandum: Year 3 Reporting of Physical Habitat Assessment
4	Fish Community Assessment	2	34	Technical Memorandum: Year 1 Reporting of Fish Community Assessments, Technical Memorandum: Year 2 Reporting of Fish Community Assessments, Technical Memorandum: Year 3 Reporting of Fish Community Assessments
5	Benthic Macroinvertebrate Surveys	2	34	Technical Memorandum: Year 1 Reporting of Benthic Macroinvertebrate Surveys, Technical Memorandum: Year 2 Reporting of Benthic Macroinvertebrate Surveys, Technical Memorandum: Year 3 Reporting of Benthic Macroinvertebrate Surveys

6	Water Quality Monitoring	2	34	Technical Memorandum: Year 1 Reporting of Water Quality Monitoring, Technical Memorandum: Year 2 Reporting of Water Quality Monitoring, Technical Memorandum: Year 3 Reporting of Water Quality Monitoring
7	Water Temperature Monitoring	2	34	Technical Memorandum: Year 1 Reporting of Water Temperature Monitoring, Technical Memorandum: Year 2 Reporting of Water Temperature Monitoring, Technical Memorandum: Year 3 Reporting of Water Temperature Monitoring
8	Hydrologic Monitoring	2	34	Technical Memorandum: Year 1 Reporting of Hydrologic Monitoring, Technical Memorandum: Year 2 Reporting of Hydrologic Monitoring, Technical Memorandum: Year 3 Reporting of Hydrologic Monitoring
9	Data Analysis and Reporting	8	36	Murphy Creek Restoration Monitoring Project – Year 1 Annual Report, Murphy Creek Restoration Monitoring Project – Year 2 Annual Report, Murphy Creek Restoration Monitoring Project – Final Report
10	Public Outreach	8	36	Murphy Creek Restoration Monitoring Information Sheet

Comments

If you have comments about budget justification that do not fit elsewhere, enter them here.

Budget Summary

Project Totals

Labor	Benefits	Travel	Supplies And Expendables	Services And Consultants	Equipment	Lands And Rights Of Way	Other Direct Costs	Direct Total	Indirect Costs	Total
$23,400	$0	$0	$0	$504,610	$2,600	$0	$48,934	$579,544	$3,510	$583,054

Do you have cost share partners already identified?
No.

If yes, list partners and amount contributed by each:

Do you have potential cost share partners?
No.

If yes, list partners and amount contributed by each:

Are you specifically seeking non−federal cost share funds through this solicitation?
No.

Murphy Creek restoration monitoring project

Murphy Creek restoration monitoring project

Year 1 (Months 1 To 12)

Task	Labor	Benefits	Travel	Supplies And Expendables	Services And Consultants	Equipment	Lands And Rights Of Way	Other Direct Costs	Direct Total	Indirect Costs	Total

1: project management (12 months)	**7800**	**0**	**0**	**0**	**24340**	**0**	**0**	**120**	$32,260	**1170**	$33,430
2: Project Initiation and Data Compilation (5 months)	**0**	**0**	**0**	**0**	**26688**	**0**	**0**	**257**	$26,945	**0**	$26,945
3: Physical Habitat Assessment (11 months)	**0**	**0**	**0**	**0**	**8102**	**0**	**0**	**220**	$8,322	**0**	$8,322
4: Fish Community Assessment (11 months)	**0**	**0**	**0**	**0**	**57440**	**0**	**0**	**9517**	$66,957	**0**	$66,957
5: Benthic Macroinvertebrate Surveys (11 months)	**0**	**0**	**0**	**0**	**4565**	**0**	**0**	**3731**	$8,296	**0**	$8,296
6: Water Quality Monitoring (11 months)	**0**	**0**	**0**	**0**	**4080**	**0**	**0**	**1680**	$5,760	**0**	$5,760
7: Water Temperature Monitoring (11 months)	**0**	**0**	**0**	**0**	**7840**	**1400**	**0**	**220**	$9,460	**0**	$9,460
8: Hydrologic Monitoring (11 months)	**0**	**0**	**0**	**0**	**18780**	**1200**	**0**	**620**	$20,600	**0**	$20,600
9: Data Analysis and Reporting (5 months)	**0**	**0**	**0**	**0**	**49420**	**0**	**0**	**244**	$49,664	**0**	$49,664
10: Public Outreach (5 months)	**0**	**0**	**0**	**0**	**3840**	**0**	**0**	**40**	$3,880	**0**	$3,880

Totals	$7,800	$0	$0	$0	$205,095	$2,600	$0	$16,649	$232,144	$1,170	$233,314

Year 2 (Months 13 To 24)

Task	Labor	Benefits	Travel	Supplies And Expendables	Services And Consultants	Equipment	Lands And Rights Of Way	Other Direct Costs	Direct Total	Indirect Costs	Total
1: project management (12 months)	7800	0	0	0	23061	0	0	113	$30,974	1170	$32,144
3: Physical Habitat Assessment (12 months)	0	0	0	0	6823	0	0	216	$7,039	0	$7,039
4: Fish Community Assessment (12 months)	0	0	0	0	59040	0	0	9510	$68,550	0	$68,550
5: Benthic Macroinvertebrate Surveys (12 months)	0	0	0	0	5713	0	0	3731	$9,444	0	$9,444
6: Water Quality Monitoring (12 months)	0	0	0	0	4280	0	0	1680	$5,960	0	$5,960
7: Water Temperature Monitoring (12 months)	0	0	0	0	3500	0	0	160	$3,660	0	$3,660
8: Hydrologic Monitoring (12 months)	0	0	0	0	8457	0	0	540	$8,997	0	$8,997

9: Data Analysis and Reporting (12 months)	0	0	0	0	25200	0	0	124	$25,324	0	$25,324
10: Public Outreach (12 months)	0	0	0	0	2000	0	0	40	$2,040	0	$2,040
Totals	**$7,800**	**$0**	**$0**	**$0**	**$138,074**	**$0**	**$0**	**$16,114**	**$161,988**	**$1,170**	**$163,158**

Year 3 (Months 25 To 36)

Task	Labor	Benefits	Travel	Supplies And Expendables	Services And Consultants	Equipment	Lands And Rights Of Way	Other Direct Costs	Direct Total	Indirect Costs	Total
1: project management (12 months)	7800	0	0	0	23982	0	0	119	$31,901	1170	$33,071
3: Physical Habitat Assessment (10 months)	0	0	0	0	7895	0	0	217	$8,112	0	$8,112
4: Fish Community Assessment (10 months)	0	0	0	0	62580	0	0	9512	$72,092	0	$72,092
5: Benthic Macroinvertebrate Surveys (10 months)	0	0	0	0	5981	0	0	3731	$9,712	0	$9,712
6: Water Quality Monitoring (10 months)	0	0	0	0	5541	0	0	1680	$7,221	0	$7,221
7: Water Temperature	0	0	0	0	3680	0	0	160	$3,840	0	$3,840

Monitoring (10 months)											
8: Hydrologic Monitoring (10 months)	**0**	**0**	**0**	**0**	**8860**	**0**	**0**	**540**	$9,400	**0**	$9,400
9: Data Analysis and Reporting (12 months)	**0**	**0**	**0**	**0**	**40842**	**0**	**0**	**202**	$41,044	**0**	$41,044
10: Public Outreach (12 months)	**0**	**0**	**0**	**0**	**2080**	**0**	**0**	**10**	$2,090	**0**	$2,090
Totals	**$7,800**	**$0**	**$0**	**$0**	**$161,441**	**$0**	**$0**	**$16,171**	**$185,412**	**$1,170**	**$186,582**

Budget Justification

Murphy Creek restoration monitoring project

Labor

Task 1 Project Management 10 hours per month billed at $65.00/hour

Benefits

Benefits rate of 25% included in hourly rate

Travel

No travel anticipated for task 1

Supplies And Expendables

Supplies and expendables for task 1 are included in 15% overhead rate

Services And Consultants

The Murphy Creek Restoration Monitoring Project will be completed almost entirely by the following consultants:

Robertson−Bryan, Inc. − RBI will provide the lead management and data analysis and reporting role for this project. Larry Rodriguez will serve as the Project Manager and technical lead on all hydrologic assessments. Dave Thomas, M.S., will service as the technical lead on all fisheries and macroinvertebrate related assessments. Variuos support staff will provide assistance in during all tasks of this project. Dr. Michael Bryan will service as the Lead Investigator.

The Fisheries Foundation of Calfornia − The FFC will provide the lead in field work associated with this project. All FFC efforts will be led by Trevor Kennedy. Variuos support staff

will provide assistance in all tasks of this project.

Task 1: Project Management Robertson−Bryan, Inc. −

Equipment

Global Water WL15 Level Logger &Field Housing: $1,000 Onset Computer Corp. Optic Stowaway Temperature Loggers (8 @ $129): $1,032

Lands And Rights Of Way

None

Other Direct Costs

Other Direct cost items are specified in the Budget and cover mileage expenses and cost of laboratory services.

Indirect Costs/Overhead

Th3e indirect rate is applied only to labor costs billed to the San Joaquin County Resoruce Conservation District through task 1. These indirect costs include general office requirements such as rent, phones, fax machines, furniture, internet access, web site maintenance, liability and other insurance for the district, general office supplies and expendables including postage, copies, paper, pens, etc., and the time of individual members of the baord of directors to oversee the project and finances, review the bills and overall progress of the project.

Comments

Environmental Compliance

Murphy Creek restoration monitoring project

CEQA Compliance

Which type of CEQA documentation do you anticipate?
X none
− negative declaration or mitigated negative declaration
− EIR
− categorical exemption

If you are using a categorical exemption, choose all of the applicable classes below.
− Class 1. Operation, repair, maintenance, permitting, leasing, licensing, or minor alteration of existing public or private structures, facilities, mechanical equipment, or topographical features, involving negligible or no expansion of use beyond that existing at the time of the lead agency's determination. The types of "existing facilities" itemized above are not intended to be all−inclusive of the types of projects which might fall within Class 1. The key consideration is whether the project involves negligible or no expansion of an existing use.
− Class 2. Replacement or reconstruction of existing structures and facilities where the new structure will be located on the same site as the structure replaced and will have substantially the same purpose and capacity as the structure replaced.
− Class 3. Construction and location of limited numbers of new, small facilities or structures; installation of small new equipment and facilities in small structures; and the conversion of existing small structures from one use to another where only minor modifications are made in the exterior of the structure. The numbers of structures described in this section are the maximum allowable on any legal parcel, except where the project may impact on an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies.
− Class 4. Minor public or private alterations in the condition of land, water, and/or vegetation which do not involve removal of healthy, mature, scenic trees except for forestry or agricultural purposes, except where the project may impact on an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies.
− Class 6. Basic data collection, research, experimental management, and resource evaluation activities which do not result in a serious or major disturbance to an environmental resource, except where the project may impact on an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies. These may be strictly for information gathering purposes, or as part of a study leading to an action which a public agency has not

yet approved, adopted, or funded.
− Class 11. Construction, or placement of minor structures accessory to (appurtenant to) existing commercial, industrial, or institutional facilities, except where the project may impact on an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies.

Identify the lead agency.

Is the CEQA environmental impact assessment complete?

If the CEQA environmental impact assessment process is complete, provide the following information about the resulting document.

Document Name
State Clearinghouse Number

If the CEQA environmental impact assessment process is not complete, describe the plan for completing draft and/or final CEQA documents.

NEPA Compliance

Which type of NEPA documentation do you anticipate?
X none
− environmental assessment/FONSI
− EIS
− categorical exclusion

Identify the lead agency or agencies.

If the NEPA environmental impact assessment process is complete, provide the name of the resulting document.

If the NEPA environmental impact assessment process is not complete, describe the plan for completing draft and/or final NEPA documents.

Successful applicants must tier their project's permitting from the CALFED Record of

Decision and attachments providing programmatic guidance on complying with the state and federal endangered species acts, the Coastal Zone Management Act, and sections 404 and 401 of the Clean Water Act.

Please indicate what permits or other approvals may be required for the activities contained in your proposal and also which have already been obtained. Please check all that apply. If a permit is *not* required, leave both Required? and Obtained? check boxes blank.

Local Permits And Approvals	Required?	Obtained?	Permit Number (If Applicable)
conditional Use Permit	–	–	
variance	–	–	
Subdivision Map Act	–	–	
grading Permit	–	–	
general Plan Amendment	–	–	
specific Plan Approval	–	–	
rezone	–	–	
Williamson Act Contract Cancellation	–	–	
other	–	–	

State Permits And Approvals	Required?	Obtained?	Permit Number (If Applicable)
scientific Collecting Permit	–	–	
CESA Compliance: 2081	–	–	
CESA Complance: NCCP	–	–	
1602	–	–	
CWA 401 Certification	–	–	
Bay Conservation And Development Commission Permit	–	–	
reclamation Board Approval	–	–	
Delta Protection Commission Notification	–	–	
state Lands Commission Lease Or Permit	–	–	
action Specific Implementation Plan	–	–	

other	–	–	

Federal Permits And Approvals	Required?	Obtained?	Permit Number (If Applicable)
ESA Compliance Section 7 Consultation	–	–	
ESA Compliance Section 10 Permit	–	–	
Rivers And Harbors Act	–	–	
CWA 404	–	–	
other	–	–	

Permission To Access Property	Required?	Obtained?	Permit Number (If Applicable)
permission To Access City, County Or Other Local Agency Land Agency Name	–	–	
permission To Access State Land Agency Name	–	–	
permission To Access Federal Land Agency Name	–	–	
permission To Access Private Land Landowner Name **Jack Sparrowk, Steve Holmes, Russ Bigelow, East Bay Municipal Utility District**	–	X	

If you have comments about any of these questions, enter them here.

This project does not involve any construction are land alterations that will require permits. Permits for previous work done to complete the Murphy Creek Restoration Project were obtained by East Bay Municipal Utility District and the San Joaquin County Resoruce Conservation District. All land in the study area is privately held. All landowners cooperated in

the Murphy Creek Restoration Project and are cooperating for this study.

Land Use

Murphy Creek restoration monitoring project

Does the project involve land acquisition, either in fee or through easements, to secure sites for monitoring?
X No.
– Yes.

How many acres will be acquired by fee?

How many acres will be acquired by easement?

Describe the entity or organization that will manage the property and provide operations and maintenance services.

Is there an existing plan describing how the land and water will be managed?
– No.
– Yes.

Will the applicant require access across public or private property that the applicant does not own to accomplish the activities in the proposal?
– No.
X Yes.

Describe briefly the provisions made to secure this access.

Letters of permission to conduct study along the Murphy Creek project site were secured prior to beginning work under previous grant. These letters are in the process of being renewed for this proposed project.

Do the actions in the proposal involve physical changes in the current land use?
X No.
– Yes.

Describe the current zoning, including the zoning designation and the principal permitted uses permitted in the zone.

Describe the general plan land use element designation, including the purpose and uses allowed in the designation.

Describe relevant provisions in other general plan elements affecting the site, if any.

Is the land mapped as Prime Farmland, Farmland of Statewide Importance, Unique Farmland, or Farmland of Local Importance under the California Department of Conservation's Farmland Mapping and Monitoring Program?
X No.
– Yes.

Land Designation	Acres	Currently In Production?
Prime Farmland		–
Farmland Of Statewide Importance		–
Unique Farmland		–
Farmland Of Local Importance		–

Is the land affected by the project currently in an agricultural preserve established under the Williamson Act?
– No.
X Yes.

Is the land affected by the project currently under a Williamson Act contract?
– No.
X Yes.

Why is the land use proposed consistent with the contract's terms?

Some of the land in the Murphy Creek Project is currently under Williamson ACt Coverage. However, this project proposes no change in land use as it will be studying the effects of changes made to Murphy Creek under a previous project.

Describe any additional comments you have about the projects land use.