Summary Information

Tri−Dam Project

Stanislaus River chinook salmon and steelhead escapement evaluation

Amount sought: $551,914

Duration: 36 months

Lead investigator: Mr. Doug Demko, S.P. Cramer &Associates, Inc.

Short Description

This project will measure restoration success in the Central Valley with regard to Chinook salmon in the collection of escapement estimates, primarily obtained through carcass surveys. The Stanislaus River Weir is the only method capable of enumerating upstream migrating steelhead, which don't die after spawning and are not counted in traditional carcass surveys. Due to challenges encountered during the first two years of operation, steelhead enumeration was not possible and Chinook salmon enumeration was incomplete. Modifications to the monitoring system are anticipated to provide complete estimates of both steelhead and salmon abundance and run timing. Additional weir monitoring will also provide data to evaluate the influence of environmental conditions on fall−run Chinook run timing. Of particular interest is the potential for low dissolved oxygen concentrations in the Deep Water Ship Channel (DWSC) of the San Joaquin River to delay Chinook migration.

Executive Summary

Monitoring programs serve as a measure of restoration success and progress towards meeting established recovery goals to assist in the identification, design, and prioritization of future actions. One of the longest running and widely relied upon monitoring efforts to measure restoration success in the Central Valley with regard to Chinook salmon is the collection of escapement estimates, primarily obtained through carcass surveys. However, carcass−based abundance estimates require a series of underlying assumptions to be met. These assumptions are largely untested but can substantially affect the accuracy of abundance estimates (Ricker 1975, Seber 1982, Cavallo 2000). Accurate estimates of adult salmon escapement are key to valid assessments of stock status and effective protection or recovery efforts. Biased estimates of abundance can result in significant errors in fishery management and faulty assessments of the needs for water management, habitat restoration, or other measures (Walters and Ludwig 1981, Rivard 1989, Hilborn and Walters 1992, Hinrichsen 2001).

Portable resistance board weirs (a.k.a., Alaskan weirs) are an alternative to carcass surveys that can provide direct counts of salmonids for comparison and validation with carcass survey estimates.

The Stanislaus River Weir project was initiated in 2002 with a grant awarded by the United States Fish and Wildlife Service (USFWS) through the Central Valley Project Improvement Act’s (CVPIA) Anadromous Fish Restoration Program (AFRP). Operation of the Stanislaus River Weir offers the unique opportunity to collect detailed information about adult migration characteristics of Central Valley fall−run Chinook salmon and Central Valley steelhead. This information is particularly valuable for steelhead, since little is known about their abundance or life−history characteristics in the San Joaquin Basin. The weir is the only method capable of enumerating upstream migrating steelhead, which don’t die after spawning and are not counted in traditional carcass surveys. Due to challenges encountered during the first two years of weir operation, steelhead enumeration was not possible and Chinook salmon enumeration was incomplete. Now, modifications to the monitoring system are anticipated to provide complete estimates of both steelhead and salmon abundance and run timing.

Additional weir monitoring will also provide data to evaluate the influence of environmental conditions on fall−run Chinook run timing. Of particular interest is the potential for low dissolved oxygen concentrations in the Deep Water Ship Channel (DWSC) of the San Joaquin River to delay Chinook migration. Migration delays can result in reduced reproductive success. The causes and consequences of low dissolved oxygen in the DWSC have been the source of considerable study, including a 4 year monitoring effort funded by CALFED. Unlike carcass surveys, the weir is able to provide detailed migration timing information upon which correlations to environmental conditions can be based.

This proposal seeks funding to continue monitoring of the Stanislaus River Weir during 2006, 2007, and 2008. The goals of continued weir monitoring are to (1) estimate the total Chinook salmon and steelhead escapement in the Stanislaus River through direct counts, (2) evaluate the effects of environmental conditions on migration timing of fall−run Chinook salmon, and (3) serve as a validation measure for traditional carcass survey estimates.

Stanislaus River Chinook Salmon and Steelhead Escapement Evaluation

A. PROJECT DESCRIPTION: PROJECT GOALS AND SCOPE OF WORK

1. PROBLEM, GOALS, AND OBJECTIVES

There are two previous restoration projects that the Weir Monitoring Project will address (1) Stanislaus River Weir Project, and (2) Lover's Leap Restoration Project.

The Stanislaus River Weir project was initiated in 2002 with a grant awarded by the United States Fish and Wildlife Service (USFWS), through the Central Valley Project Improvement Act's (CVPIA) Anadromous Fish Restoration Program (AFRP). Operation of the Stanislaus River Weir offers the unique opportunity to collect detailed information about adult migration characteristics of Central Valley fall-run Chinook salmon and Central Valley steelhead that can not be ascertained through traditional carcass survey estimates. This information is particularly valuable for steelhead, since little is known about their abundance or life-history characteristics in the San Joaquin Basin.

Carcass-based abundance estimates require a series of underlying assumptions to be met. These assumptions are largely untested but can substantially affect the accuracy of abundance estimates (Ricker 1975, Seber 1982, Cavallo 2000). Accurate estimates of adult salmon escapement are key to valid assessments of stock status and effective protection or recovery efforts. Biased estimates of abundance can result in significant errors in fishery management and faulty assessments of the needs for water management, habitat restoration, or other measures (Walters and Ludwig 1981, Rivard 1989, Hilborn and Walters 1992, Hinrichsen 2001). Portable resistance board weirs (a.k.a., Alaskan weirs) are an alternative to carcass surveys that can provide direct counts of salmonids for comparison and validation with carcass survey estimates.

The Lovers' Leap Restoration Project was initially part of a larger proposed effort entitled "Spawning Habitat and Floodplain Restoration in the Stanislaus River" that was submitted to the ERP in 2001. Funded by the United States Fish and Wildlife Service (USFWS), through the Central Valley Project Improvement Act's (CVPIA) Anadromous Fish Restoration Program (AFRP), the Lovers' Leap Restoration Project is in progress and gravel augmentation will occur in the summer of 2005. This project seeks to increase the quantity and quality of salmon spawning and rearing habitat in the lower Stanislaus River downstream from Goodwin Dam by restoring riverbed topography that was damaged by past instream gravel mining, increasing gravel supplies, and increasing the amount of functional floodplain habitat. The ultimate goal of the project is to increase the abundance of Chinook salmon and Central Valley steelhead.

The need for recent gravel augmentation efforts was identified by the observed relationships of annual escapement to corresponding juvenile production the following winter/spring. These relationships indicated that gravel supply and spawning habitat are limiting salmon production when escapement exceeds approximately 1,000 to 3,000 spawners (SRFG 2004). This is well below the CVPIA adult production (i.e., escapement + harvest) goal of approximately 20,000 fall-run Chinook which requires approximately 10,000 or more spawners escaping to the Stanislaus River, assuming that harvest is 50% or less of total adult production. One of the measures of success for this, as well as previous, gravel augmentation projects in the Stanislaus River is an increase in adult escapement. In the past, carcass surveys were used to determine adult escapement estimates. However, the estimates can also be made through direct counts at the weir which can then be compared and validated with carcass survey estimates.

2. JUSTIFICATION

This project seeks to continue operation of the Stanislaus River Weir, an effort initiated in 2002 with a grant awarded by the United States Fish and Wildlife Service (USFWS), through the Central Valley Project Improvement Act's (CVPIA) Anadromous Fish Restoration Program (AFRP). The conceptual model from the original grant proposal is presented in Table 1. The project also seeks to directly monitor the success of gravel augmentation efforts in the Stanislaus River by providing direct counts of adult Chinook salmon and steelhead, and indirectly through the validation of carcass survey estimates. The conceptual model used for the Lovers' Leap Restoration Project is one that was developed and presented in the proposed "Spawning Habitat and Floodplain Restoration in the Stanislaus River" project (Table 2).

The weir is the only method capable of enumerating upstream migrating steelhead, which don't die after spawning and are not counted in traditional carcass surveys. In addition, unlike carcass surveys, the weir is also able to provide detailed migration timing information upon which correlations to environmental conditions can be based. Due to challenges encountered during the first two years of weir operation, steelhead enumeration was not possible and Chinook salmon enumeration was incomplete. Now, modifications to the monitoring system are anticipated to provide complete estimates of both steelhead and salmon abundance and run timing.

Additional weir monitoring will also provide data that can be used to evaluate environmental influences on migration timing and evaluate the influence of restoration actions on Chinook salmon production. Several environmental factors have the potential to adversely affect migration and spawning success of salmonids including high water temperatures and low dissolved oxygen concentrations. Of particular interest is the potential for low dissolved oxygen concentrations in the Deep Water Ship Channel (DWSC) of the San Joaquin River to delay Chinook migration. The causes and consequences of low dissolved oxygen in the DWSC have been the source of considerable study, including a 4 year monitoring effort funded by CALFED.

Several gravel restoration projects have been completed in the Stanislaus River since 1994 and another, the Lovers' Leap Restoration Project, is scheduled for completion in 2005. One of the measures of success for these gravel augmentation projects is an increase in adult escapement. Direct counts at the weir can provide adult escapement estimates which can then be compared and validated with carcass survey estimates.

3. PREVIOUSLY FUNDED MONITORING

Stanislaus River Weir monitoring was initiated in 2002 with a grant awarded by the United States Fish and Wildlife Service (USFWS), through the Central Valley Project Improvement Act's (CVPIA) Anadromous Fish Restoration Program (AFRP). Previously funded monitoring of the effects of DWSC conditions on fall-run Chinook migration timing is limited to weir monitoring in 2003-2004 and 2004-2005 in progress.

Monitoring efforts previously funded that have been used to evaluate cumulative restoration success with regard to Stanislaus River fall-run Chinook include the Stanislaus River Weir Project, carcass surveys (1953-ongoing), and juvenile outmigration monitoring at Oakdale and Caswell (1993-ongoing).

Table 1. Working hypotheses presented for the Stanislaus River Weir Project in the original grant proposal entitled "Test and Demonstrate a Portable Alaskan Weir to Count and Characterize Runs of Anadromous Salmonids in the Stanislaus River".

1	Alaskan weirs can be installed and fished seasonally with limited manpower and maintenance to provide full counts of adult salmon and steelhead migrating to spawning areas.
2	Run sizes determined at the weir can be used to evaluate biases in traditional carcass surveys, and to estimate correction factors that can be applied to historic and future carcass surveys.
3	Assumptions required to estimate run size from carcass surveys, such as representative sampling of the population either at tagging or tag recovery, equal visibility of tagged and untagged carcasses, tag retention, and opportunity to complete sampling throughout the spawning season, are often violated and affect the accuracy of abundance estimates.
4	Traditional carcass survey techniques provide inaccurate data on run-timing of chinook in some years, and provide no data on the abundance or timing of steelhead in the river.
5	Sampling of lengths, scales, and entry timing of steelhead at the weir will provide conclusive information on the timing, number, and rearing life-history of steelhead migrating into the Stanislaus River. Although snorkel surveys are able to identify large rainbow trout adults, they cannot conclusively determine life-history of the fish observed.
6	Sampling of lengths and scales from chinook salmon at the weir will provide conclusive information on the timing, and number of fish at each age and from each brood year that enters the river. On the other hand, scale samples from carcasses provide a biased estimate of size and age distribution, because larger carcasses have a higher probability of recovery.
7	Accurate adult chinook salmon counts, combined with accurate juvenile outmigration estimates already available, will allow us to quantify density dependent survival for adult-to-outmigrant and outmigrant-to-adult life segments, and to detect the effect of flow, temperature or other environmental factors on survival during these life segments.
8	Operation of an Alaskan Weir near the mouth of the Stanislaus River will allow managers to accurately evaluate the effects of fall attraction flows on river entry of fall chinook, thus providing information which will aid future resource management.

Table 2. Conceptual model for Spawning Habitat and Floodplain Restoration in the Stanislaus River which includes the Lovers' Leap Restoration Project.

Conceptual model of natural conditions and why it was important to ecosystem constituents:
• River adjusts its dimensions to transport coarse sediment at rate nearly equal to that supplied by the upstream watershed.
• Lots of gravel in the unconfined alluvial reaches (say downstream of Knights Ferry), less so in the upstream canyon, but gravel is still stored there.
• Floodplains allowed shear stress during high flows to be moderated, so that coarse sediment is transported, but not in a catastrophic manner.
• Lots of coarse sediment storage (of diverse particle size created by meandering/migrating channel) provided large quantity of high quality spawning and rearing habitat for variety of salmonids.
• Channel avulsed and migrated during larger flows, creating floodplains
• Functional floodplains and snowmelt hydrograph was conducive to natural riparian regeneration on floodplains surfaces
• Functional floodplains and snowmelt hydrograph was conducive to high quality fry and juvenile salmonid rearing habitat on floodplains, increasing water temperature, food supply, and juvenile salmonid growth rates.
• Functional floodplains and snowmelt hydrograph caused fry and juvenile salmonid to rear on floodplains, causing some stranding, but the higher growth rates more than compensated for stranding losses by increasing overall juvenile salmonid survival (Sommer, 2000).
• Frequent mobilization (and subsequent replacement) of gravel deposits lowered fine sediment storage in spawning deposits, maintaining high salmonid egg-to-emergence success.
How natural conditions have changed and impacts to key ecosystem constituents:
• Dams reduced the magnitude, duration, and frequency of high flows. The virtual loss of flows capable of frequently scouring riparian vegetation allowed it to encroach along the low flow channel, fossilizing gravel bars and encouraging riparian berms to form that confine the river (Pelzman, 1973; McBain and Trush, 1997).
• Dams blocked coarse sediment supply to downstream reaches. Even though the high flow regime was reduced, there were periods when flood control releases transported coarse sediments. The combination of riparian fossilization of gravel bars, confinement from riparian berms and dikes, instream gravel mining, and loss of upstream coarse sediment supply reduced the volume of coarse sediment storage in the channel and armored the bed surface (Dietrich, et al., 1989). Cumulatively, this process greatly reduced the quantity of coarse sediment storage in the river, thus spawning habitat quantity was greatly reduced to the point where only approximately 2,000 spawners can be supported by available habitat.
• Riparian encroachment, dikes constructed to isolate "off-channel" mining pits from the river, gold dredging, and "off-channel" gravel mining have virtually eliminated functional floodplains along the lower Stanislaus River. These physical impacts, combined with the regulated flow regime, has also virtually eliminated natural regeneration of cottonwoods and several willow species.
• Loss of floodplains and access to them by juvenile salmonids has reduced growth potential, thereby reducing production potential.
• Reduction of high flows and gravel bar mobilization frequency, combined with increased land disturbance in sandy loam soils downstream of Goodwin Dam, has increased fine sediment storage in spawning gravel deposits, decreasing salmonid egg-to-emergence success.
Conceptual model of the restoration will provide anticipated benefits to key ecosystem constituents:
• Greatly increase gravel storage and supply by introducing 27,080 yd^3 at five reaches a short distance downstream of Goodwin Dam. This will potentially increase the amount of spawning habitat by about 50 percent; in addition, adding this clean gravel will greatly improve spawning gravel quality, thereby increasing salmonid egg-to-emergence success.
• Recreating floodplains by removing confining dredger tailings as part of the gravel introduction efforts. Some pilot efforts to breach riparian berms to improve floodplain inundation will also increase floodplain habitat, riparian regeneration, and potential salmonid production.
• Repairing gullies that deliver large volumes of sandy loam to the river will increase the longevity of high quality spawning gravels and increase long-term salmonid production.

4. APPROACH AND SCOPE OF WORK

This project is a three year study to monitor adult salmonid escapement using a portable resistance board weir to (1) determine the total Chinook salmon and steelhead escapement in the Stanislaus River through direct counts, (2) to evaluate the effects of downstream conditions on migration timing of fall-run Chinook salmon, and (3) to validate traditional carcass survey estimates. The following objectives will be performed:

Objective 1. Manage project to ensure that all objectives and reporting requirements are met on time and within budget.

Task 1.1 Project management.

Tri-dam will be responsible for overall project management and administrative activities. Project management will consist of managing the contract, submitting progress reports, budget tracking and invoicing. The work products will consist of semi-annual fiscal and programmatic reports.

Activity 1.1.1 Execute contract with funding agency and sub-contractors.

Tri-dam will sign and execute the contract with the funding agency and submit additional information, if required. Tri-dam will also execute a contract with the sub-contractor, S.P. Cramer & Associates (SPC), and submit a copy to the funding agency within ninety (90) days of execution.

Activity 1.1.2 Provide technical oversight to ensure that all project objectives are met, tasks are carried out in the manner described, and deliverables are completed on schedule.

SPC will oversee the coordination of all field activities to ensure that the project objectives are met and that all deliverables are completed on schedule. This includes adaptively managing the project to respond to unforeseen challenges in the field and to modify sampling elements if needed.

Activity 1.1.3 Manage project funds.

Tri-dam will prepare and submit invoices inclusive of subcontractor services to the funding agency on a monthly basis. Three copies of the invoice will be provided to the funding agency, including one signed invoice and two duplicate copies. Activity reports will accompany each monthly invoice and will describe the work conducted during the month.

Activity 1.1.4 Prepare and submit semi-annual fiscal and programmatic reports to funding agency.

Fiscal and programmatic reports will be submitted to the funding agency on a semi-annual basis. The semi-annual reports will describe the fiscal and programmatic status during each six month period. These reports will include (1) the total amount of money awarded to the project, (2) the amount invoiced to the granting agency and cost-sharing partners, (3) description of activities performed during the six month period and the percentage of each task completed, (4) deliverables produced during the six month period, (5) problems encountered that may delay the progress of the project, and (6) description of amendments or modifications to the grant agreement.

Task 1.2 Prepare and distribute bi-weekly sampling summaries.

SPC will distribute bi-weekly summaries of all field activities during the sampling season to the agencies, managers, and other interested parties. Bi-weekly summaries will include a written description of activities, as well as relevant tables and graphs. As in the past, SPC will also post these summaries on our Internet site so that the project is accessible to a wide audience.

Task 1.3 Submit electronic and hardcopy of data collected annually

Data will be collected by field personnel, entered into a Microsoft Access database, and error checked before being submitting to the funding agency at the end of each of the three project years. SPC will provide to the funding agency an electronic and hard copy of the data collected along with a written description of field procedures, summary tables and graphs, and an account of database management procedures.

Task 1.4 Prepare and distribute annual data reports.

SPC has found that many are interested in the data generated by monitoring efforts for comparison to similar or related projects. Annual study reports typically do not provide all of the detailed monitoring data collected during the study. To improve the efficiency of sharing frequently requested information with interested parties SPC began distributing annual data reports. These reports include data tables and graphs only with no interpretation of the results. SPC will continue to provide these reports annually.

Task 1.5 Compile research findings into comprehensive annual reports of study findings.

Each year SPC will prepare a comprehensive written report describing events and study findings to date. All reports will be distributed to managers involved with work in the Stanislaus River and San Joaquin Basin for review and comment. The final report will include comparisons to past years data from the Stanislaus River, and to similar and complementary studies conducted elsewhere. Of particular interest will be comparison of data collected at the weir to data collected during carcass surveys.

Task 1.6 Participate at workshops, seminars, and conferences.

SPC will prepare and deliver at least one PowerPoint presentation of study findings and project status to a scientific or resource group (e.g., CALFED, American Fisheries Society, etc.). SPC has regularly attended the CALFED Science Conference and AFS annual meetings and delivered several presentations at each forum. Presentations will likely include comparisons to past years data from the Stanislaus River, as well as data collected elsewhere along the west coast.

Objective 2. Determine the abundance, biological characteristics, and migration timing of adult Chinook salmon and steelhead in the Stanislaus River.

We understand that there are serious management issues which need to be addressed when working with naturally-produced Chinook salmon and ESA protected steelhead. Therefore, we have worked with State and Federal agencies to develop fish handling and data collection procedures during the time the weir is in operation.

Task 2.1 Install and operate a portable resistance board weir downstream of Jacob Meyer's Park near the town of Riverbank.

The weir will be installed in the Stanislaus River downstream of Jacob Meyer's Park near the town of Riverbank in early September of each project year (e.g., 2006, 2007, and 2008). Prior to installation some components of the weir structure such as pickets, stringers, and cables will need to be repaired or replaced due to wear from the first several years of monitoring. Although made to withstand UV exposure, the lifespan of the plastic used for the stringers is only 3-4 years. Replacing worn components before installation in 2006 will ensure optimum and safe operation of the weir.

Installation of the weir components will require approximately three days for completion. The rigid weir, bulkheads, and substrate rail will remain in place throughout the summer months, which will reduce time spent on installation. Monitoring will begin upon completion of installation and will continue through April of each project year (e.g., 2007, 2008, and 2009).

During operation of the weir SPC will document environmental conditions at the weir site daily including turbidity, water temperature, dissolved oxygen, and weather conditions. An hourly recording thermograph was deployed at the weir site in 2002 and SPC will continue to download this data at 2 month intervals.

Task 2.2 *Determine the number and biological characteristics of upstream migrating Chinook salmon and steelhead.*

Adult salmonids migrating past the weir will be enumerated by a combination of trapping and the use of a Vaki RiverWatcher infrared fish counting system. As each fish passes through the Vaki RiverWatcher a silhouette and digital photograph will be created and will be used to identify fish to species and to determine biological characteristics including length, sex, and presence/absence of adipose fin.

Scale samples will be collected from captured Chinook and provided to CDFG for age determination. CDFG also collects scales for age determination during carcass surveys. However, questions still remain about whether scales collected from fish trapped at the weir may be of better quality (i.e., less resorption) for age determination that scales collected from carcasses. This question may be answered before the proposed project period and if the scale sets from the weir and the carcass surveys are found to be of similar quality, collection of scales at the weir will cease.

Two sets of scale samples will be collected from captured steelhead. One set of samples will be cleaned and mounted to determine age and lifehistory. A second set will be collected for genetic analysis. Thus, genetic samples will be obtained from the same set of fish used to determine age and life-history composition. All samples will be provided to CDFG for use in their studies. SPC provided samples collected at the weir to CDFG during 2003 and 2004 for their archives and studies including the ERP funded study entitled "Distribution and Relationship of Resident and Anadromous Central Valley Rainbow Trout".

Task 2.3 *Determine migration timing of adult fall-run Chinook salmon and steelhead.*

Timing of river entry will be established by counting fish passing upstream daily throughout the runs of Chinook and steelhead. The weir will be installed below salmonid spawning habitat, so that time of passage approximates the time of river entry. Since the weir will be operating near the mouth of the river, we will be able to monitor the response of salmonids to fall attraction flows and other environmental variables.

Objective 3. Evaluate the effects of Stanislaus and San Joaquin River environmental conditions on migration timing of fall-run Chinook salmon.

Task 3.1 *Compile environmental data from the Stanislaus and San Joaquin Rivers.*

SPC will obtain environmental data from the California Data Exchange Center (CDEC) from monitoring stations along the fall-run Chinook migration route within the Stanislaus and San Joaquin Rivers. Currently, there are three stations (i.e. Rough 'n Ready Island, Mossdale and Vernalis) located in the San Joaquin River downstream of the confluence with the Stanislaus River and one near the mouth of the Stanislaus River (Ripon) that record environmental conditions such as flow, temperature and dissolved oxygen (DO). Additionally, SPC will obtain release data from Goodwin Dam on the Stanislaus River and export data from the Central Valley Project (CVP) and State Water Project (SWP) punps.

Task 3.2 Evaluate the influence of environmental conditions on Stanislaus River fall-run Chinook salmon migration timing.

SPC will evaluate the influence of environmental conditions on fall-run Chinook migration timing into the Stanislaus River using data obtained under Objective 2 and in Task 3.1. The Stanislaus Weir is located at river mile 31.4 and is near the lower extent of the Stanislaus River spawning habitat; therefore, time of spawning reach entry can be inferred from the time fall-run Chinook pass the Stanislaus Weir. Studies conducted prior to the 1970's concluded that low DO concentrations could potentially inhibit upstream migration of fall-run Chinook salmon through the Deep Water Ship Channel (DWSC) near the city of Stockton (Hallock and others 1970). This is the only known study of the effects of low DO on Chinook migration. There is need for further studies to understand the concentrations at which DO may delay the migration of Chinook salmon. Run timing data collected at the Stanislaus Weir will be compared to environmental data recorded downstream of the weir at Ripon as well as in the San Joaquin River to determine the influence of environmental conditions on timing of spawning reach entry.

A specific volume of water is allocated annually from New Melones Reservoir for CDFG to use at their discretion for fisheries purposes. Each year CDFG uses a portion of this volume to supplement Stanislaus River fall flows to attract adult Chinook salmon. However, carcass survey data is inadequate to determine the effects of the attraction flows. Data collected at the weir during the demonstration phase suggests the response of the attraction flows varies with magnitude and duration of the pulse as well as the proportion of the run that passed the weir prior to the attraction flows. SPC will continue to evaluate the influence of attraction flows.

Objective 4. Compare effectiveness of weir operation to carcass surveys for estimating abundance and biological characteristics of adult Chinook salmon in the Stanislaus River.

Task 4.1 Compare the accuracy of estimates for population size.

We will compare the estimates of population size, run timing and life-history composition obtained from sampling with the weir to that from sampling spawner carcasses. Since the weir will allow boats and debris to pass, but will block the entire river to upstream migrating salmon, our sampling rate should be nearly 100%, and will serve as a total count of adult salmon entering the Stanislaus River. By operating the weir over different environmental conditions, we may be able to determine what environmental factors are responsible for the difference in actual count and estimates abundance from carcass surveys. This may enable us to develop a calibration factor for future carcass estimates and possibly to validate past escapement estimates.

Task 4.2 Compare the accuracy of information regarding biological characteristics.

SPC will test the hypothesis that direct weir counts provide more accurate information regarding biological characteristics than carcass surveys. This hypothesis is based on the premise that direct counts will increase accuracy by sampling a larger proportion of the population and eliminating bias. Characteristics compared will include the frequency distribution of fish length, proportion coded-wire-tagged, and sex ratios.

5. FEASIBILITY

Operation of the Stanislaus River Weir near the town of Riverbank since 2002 has demonstrated that continued operation to meet the proposed objectives is feasible.

Tasks under objective 2 require CDFG scientific collecting permits; CESA compliance; 1603 Streambed Alteration Notification; USACE Rivers and Harbors Act Section 10 Permit; and Federal ESA consultation. A real estate agreement with the USACE is required for use of the project site and access to the site requires a landowner agreement. All permits and agreements are in place for the present monitoring effort and will only require extensions for continued monitoring. SPC will seek extension of existing permits in early 2005 in anticipation of future funding.

6. EXPECTED OUTCOMES AND PRODUCTS

This project will provide information on the abundance and run timing of salmon and steelhead in the San Joaquin Basin, specifically in the Stanislaus River. The weir is the only method capable of enumerating upstream migrating steelhead, which don't die after spawning and are not counted in traditional carcass surveys. Continued weir monitoring will also provide migration timing data that is not available from carcass surveys to evaluate the influence of environmental conditions on fall-run Chinook run timing. Finally, direct counts of fall-run Chinook salmon at the weir will serve as a measure of accuracy of the carcass survey abundance estimates for validation.

Biweekly summaries will be written and distributed throughout the field sampling period (see Task 1.2). At the end of each sampling period (i.e., May) electronic and hardcopies of data will be provided to the funding agency and a data report will be distributed (see Task 1.4). Comprehensive annual reports will be completed in July 2007, 2008, and 2009 (see Task 1.5).

Monthly activity summaries will also accompany each invoice (see Activity 1.1.3) and semi-annual status reports will also be provided to the funding agency every six months for the course of the three-year project (Activity 1.1.4).

7. DATA HANDLING, STORAGE AND DISSEMINATION

Data will be collected by an onsite computer (Vaki RiverWatcher) and downloaded daily field personnel, uploaded into Winari database, summarized into Excel spreadsheets and error checked before being released to interested parties. Data will be backed up on a separate hard drive on a weekly basis and all data sheets will be archived for future reference. Data will be made accessible on a near real-time basis to agency personnel, watershed management groups, and the public via a web site that currently exists (www.stanislausriver.com). Consistent data file formats will be applied among years to provide for accurate and efficient analysis.

An Excel spreadsheet indicating daily passage totals, the numbers of Chinook counted above and below the weir during boat surveys, and other relevant information will be distributed to CDFG, NOAA Fisheries, and the USFWS on Mondays, Wednesdays, and Fridays. This file will be in a format similar to the spreadsheet distributed in previous years.

Electronic and hardcopies of data will be provided to the funding agency annually. An annual Data Report will be distributed to the funding agency, CDFG, NOAA Fisheries, and the USFWS within 60 days of the last day of sampling. Data contained in the report will be available in electronic spreadsheet files upon request.

8. PUBLIC INVOLVEMENT AND OUTREACH

The public will be involved in multiple ways during weir operation. Those who use the river for recreational purposes will be provided information via fliers and posted signs identifying how to pass the weir properly when boating or rafting. Fieldtrips for Columbia College students will be supported as they have been in previous years. Tours of the Stanislaus River weir will be conducted annually; they are usually attended by the media and agency personnel. A website containing current information regarding the operation and data collection will be maintained on a regular basis as well as email updates distributed to any interested parties who request to be added to the distribution list.

9. WORK SCHEDULE

SPC will operate the Stanislaus River Weir from September through April during 2006-2007, 2007-2008, and 2008-2009.

Bi-weekly summaries will be written and distributed throughout the field sampling period (see Task 1.2). At the end of each sampling period (i.e., May) electronic and hardcopies of data will be provided to the funding agency and a data report will be distributed (see Task 1.4). Comprehensive annual reports will be completed in July 2007, 2008, and 2009 (see Task 1.5).

Monthly activity summaries will also accompany each invoice (see Activity 1.1.3) and semi-annual status reports will also be provided to the funding agency every six months for the course of the three-year project (Activity 1.1.4).

B. APPLICABILITY TO CALFED ERP AND SCIENCE PROGRAM GOALS AND IMPLEMENTATION PLAN AND CVPIA PRIORITIES

1. ERP AND CVPIA PRIORITIES

The installation and operation of a structure like the Stanislaus weir is a major action that will provide the means for the collection of data that will more accurately reflect the status of Stanislaus River Chinook and steelhead populations. The collection of life-history and population data is recognized by the Ecosystem Restoration Program (ERP), the Science Program, and the Central Valley Project Improvement Act (CVPIA) as an important tool in the planning and evaluation of restoration efforts.

Evaluation of restoration efforts based on accurate data is key to the successful implementation of adaptive management programs.

ERP Goals

At the heart of the ERP are six Strategic Goals. Each of the goals address a different aspect of the restoration of the Bay-Delta Watershed. Two of these, Strategic Goal 1 and Strategic Goal 3 would be contributed to by the successful implementation of the Stanislaus Weir project. Goal 1 refers specifically to the recovery of at-risk species that rely on the Delta as a critical component of their life-histories. Goal 3 provides for the maintenance and/or enhancement of populations of certain harvestable species, including Chinook salmon and steelhead trout.

Implement actions to improve understanding of at-risk species in the region. SPC believes that the Stanislaus Weir will serve as an effective, efficient, and replicable means of enumerating Chinook salmon returns to this part of the San Joaquin Watershed. Successful implementation of this pilot project will serve to provide a foundation for a new standard for the monitoring of anadromous salmonid returns.

In addition, the biological and environmental data collected at the weir will aid in the identification of Central Valley salmonid life-history and environmental requirements. Key to this aspect of the project is the collection of steelhead abundance and life-history data. As in the majority of Central Valley rivers and streams, accurate data from which the current status and needs of Stanislaus River steelhead can be inferred is in direct need of collection, as management decisions are currently made using incomplete information about the population.

Science Program Goals

As stated in the August 2001 ERP Draft Stage 1 Implementation Plan, the CALFED Science Program's long-term goal is to build, over time, "a body of knowledge that will continually improve the effectiveness of restoration actions, allow the CALFED Program to track restoration progress and allow ever-increasing understanding of the implications of interrelated CALFED Program actions." A set of short-term goals have been established by the Science Program to aid in the realization of this ultimate goal. Many of these are met, wholly or in part, by the Stanislaus Weir project.

Build population models for at-risk species. The most important ingredient in the building of reliable population models of any species is accurate data. Through the use of the weir proposed here, we will be able to collect the most accurate biological data that has been collected from live, adult Chinook and steelhead in the Stanislaus River. In addition, important life-history information will be gained as a result of accurate run timing assessment and the drawing of correlations between fish migratory behaviors and environmental conditions such as flow and water temperature and turbidity. All of this data will be on hand and available for the future development of Chinook and steelhead population models.

Advance the scientific basis of regulatory activities. At issue on the Stanislaus River, as with all of the major rivers of the Sacramento-San Joaquin Delta watershed, are practices that take advantage of the hydrological and biological resources within each watershed. The impoundment of water and subsequent regulation of flow have effects that are very meaningful to ecological processes in and around waterways and so must be managed in such a way to allow for the effective continuation of these processes. The same is true for angling. Over-harvest or the take of certain species such as Chinook during critical life stages can devastate populations that already exist in a fragile balance between proper and improper water management. From mid-October through December all angling is prohibited on the Stanislaus River to help allow for the successful upstream migration of Chinook salmon. In addition, river flows are increased periodically for the purpose of attraction. Management activities such as changing dam releases and enforcing special angling regulations require agency and utility resources. In order for management practices such as these to be most effective, the most up-to-date and comprehensive information about target species is necessary. The Stanislaus Weir project will be a source of such information.

Coordinate and extend existing monitoring. The Stanislaus Chinook population is currently estimated using carcass mark-recapture surveys. The population census that would take place at the Stanislaus Weir will be used to validate carcass-based abundance estimates and provide additional information regarding fall-run Chinook migration timing and steelhead abundance and migration timing that is not available from carcass surveys.

At the same time, existing monitoring of Chinook will be extended greatly through the operation of the Stanislaus weir. Now, only rough population estimates and DNA collection are possible on the river using current methods. Through this project monitoring will be further developed to include accurate information obtained from live adult fish, including sex and length frequencies, the relative number of jacks in the run, and general physical condition. In addition, a program will be in place that will be able to accomplish the only active steelhead monitoring activities on the Stanislaus.

Take advantage of existing data. Extended time series of adult and juvenile sample data are available from the Stanislaus River. Continuous adult data is available since 1940. Juvenile trap data is available since 1993. Direct abundance estimates and other information that could be obtained with a weir would significantly increase our ability to interpret and apply information from these historic data sets.

<u>CVPIA Goals</u>

The Central Valley Project Improvement Act (CVPIA) states as one of its goals that it is meant to "protect, restore, and enhance fish, wildlife, and associated habitats in the Central Valley...of California". Part of this goal is achieved through authorization of the Anadromous Fish Restoration Program (AFRP). The goal of the AFRP is to develop and implement a program that attempts to ensure that the natural production of anadromous fish in the Central Valley will be double that of average levels reached between 1967 and 1991 and that the new production levels will be sustainable over the long term. One objective set forth by the AFRP is the collection of fish population, health, and habitat data. Without this reference data, specific target levels of production and general population condition would not be able to be developed in a manner that would accurately reflect the levels historically attained in a specific watershed.

Accurate and complete reference data takes much of the guesswork out of management decisions based on evaluations of restoration actions. The success of restoration activities can only be judged through the monitoring of population trends that are based on the most complete data available. This is especially crucial in the management of at-risk species because these populations are more sensitive to change than are more stable groups. Monitoring of at-risk salmonids at the Stanislaus Weir will provide solid information that will help in the evaluation of Stanislaus River restoration activities, such as the various gravel replenishment projects of the past few years.

2. RELATIONSHIP TO OTHER ERP ACTIONS, MONITORING PROGRAMS, OR SYSTEM-WIDE ECOSYSTEM BENEFITS

In order for the CALFED Program to be successful in its attempts to set the Bay-Delta Region on a path to ecological recovery, it is necessary that a research and monitoring program be complimentary to some of the other restoration efforts that have been funded or may be funded in the future. Due to the broad dataset and body of knowledge that will be obtained concerning salmon and steelhead, the project promises to compliment nearly any other project that focuses on gaining information on these species or on restoration of salmonid populations. On the Stanislaus specifically, various gravel restoration projects have been funded. Accurate adult escapement data collected at the weir will help aid future efforts to evaluate the success of adding spawning gravel to the river, as increases in adult returns as a result of the projects would likely be seen during the 3-year sampling effort. CDFG schedules an attraction flow release from Goodwin Dam in the fall to get Chinook to migrate up the Stanislaus River. The Stanislaus River weir compliments this effort by the enumeration of Chinook response to the attraction flows.

One of the most powerful benefits of direct counts is the ability to quantify production in terms of recruits per spawner and smolt-to-adult survival rates. These rates (like hatchery CWT groups) enable us to determine what conditions are correlated to good and bad survival, and thus help identify beneficial and detrimental management practices, which is a key aspect of adaptive ecosystem management across the Bay-Delta Region. Direct counts would also improve our understanding of juvenile Chinook behavior and life history characteristics, which is especially important since the majority of tributaries supporting anadromous salmonids now have screw traps to collect juvenile outmigration data during most of the spring. Adult escapement is also the basis for determining ocean harvest rates. This information is difficult to come by for wild stocks, and if successful, the Stanislaus Chinook population could be used as a valuable wild stock indicator population.

The Stanislaus River Weir Project has and will continue to serve as a source of samples for CDFG studies of steelhead genetics and lifehistory.

3. ADDITIONAL INFORMATION FOR PROPOSALS CONTAINING LAND ACQUISTION

Not applicable.

C. QUALIFICATIONS

Tri-Dam Project

The Tri-Dam Project (Tri-Dam) is a partnership between two public agencies: the Oakdale Irrigation District and the South San Joaquin Irrigation District. Both irrigation districts were formed in 1909 to provide reliable irrigation. Since the early 1990's, Tri-Dam has taken an active role in fisheries monitoring, protection, and enhancement on the lower Stanislaus River through the funding of several fisheries monitoring programs. Tri-Dam has retained S.P. Cramer & Associates (SPC) since 1993 to provide fisheries consulting services related to the above activities. Tri-Dam has funded annual rotary screw trap monitoring since 1993, radio tracking in 1998-99, studies involving outmigrant responses to pulse-flows, and annual advisory funding for SPC to attend meetings in order to keep them up-to-date on all fisheries issues. Tri-Dam will extend its existing contract with SPC to conduct the proposed project activities.

Steve Felte, **General Manager of Tri-Dam.** Steve will serve as contract manager and will be responsible for quality assurance and control throughout the project. As general manager of Tri-Dam, Steve oversees all of Tri-Dam's daily operational activities and has experience in administering large projects.

S.P. Cramer & Associates

S.P. Cramer & Associates, Inc. (SPC) was established in 1987 to provide innovative solutions for issues relating to salmon and trout on the Pacific Coast. SPC is reputed for investigative work in determining why fish populations have or may change in response to specific actions. SPC has been conducting salmonid research on the Stanislaus River for Tri-Dam, the Comprehensive Assessment and Monitoring Program, and the USFWS's Anadromous Fish Restoration Program since 1993; therefore, SPC is very familiar with basin issues, key watershed participants, and the actions necessary to conduct the proposed project. SPC has also conducted numerous fisheries investigations and assessments in other tributaries within the Sacramento-San Joaquin basin. Previous and ongoing fisheries research includes, but is not limited to, annual juvenile salmonid outmigration monitoring, adult migrant trapping, radio-tracking, and electrofishing studies.

Doug Demko, Senior Consultant. Doug manages and coordinates project activities both within SPC and between cooperating agencies. He also supervises data analyses, interpretation, and report preparation activities. Doug received a Bachelor's degree in Biology in 1992, a Juris Doctor degree in 2002, and has worked in the San Joaquin Basin since 1993. He has led a variety of field sampling projects and has gained the respect of state and federal fisheries biologists as an expert in migrant fish sampling. His experience in the San Joaquin Basin is more extensive than many researchers, and includes project management of studies such as juvenile salmonid outmigration, smolt survival, radio-tracking, predator surveys, resident trout population estimates, habitat surveys, and limiting factors analyses.

Andrea Fuller, Fish Biologist. Andrea joined SPC as a fisheries technician in 1995 and was promoted to Fish Biologist in 2000 while attending Stanislaus State University, Stanislaus. She coordinates and oversees field personnel and data collection activities and assists in data analyses and report preparation. Since joining SPC, she has assisted Doug Demko in the coordination of field research activities on major tributaries to the San Joaquin River. As a field research coordinator, she conducts considerable networking and coordination with state, federal, and local government agency representatives; private consultants; landowners; and recreational groups.

Michele Simpson, Fish Biologist. Michele joined SPC in 2002 after working as a fisheries biologist for both the U.S. Bureau of Reclamation and NOAA Fisheries. She received her Master's degree in Biology in 1997. She specializes in Endangered Species Act issues regarding salmonid populations in California including effects analyses of projects potentially effecting listed salmonids including reservoir management, unscreened diversions, fish passage barriers/impediments, and habitat restoration. She also conducts data analyses and report preparation and review of SPC monitoring projects within the Central Valley. In addition, she collaborates extensively with state, federal, and local government agency representatives; landowners, and other interested groups regarding fisheries management issues.

D. COST

1. Budget

The total cost of the program is $581,914 of which we are requesting $551,914 from the CALFED ERP.

2. Cost Sharing

In-kind services will be provided by Tri-Dam at a total estimated cost of $30,000 for project management.

3. Long-term Funding Strategy

The need for this project beyond the proposed time frame is dependent upon the findings during the initial 3 years of monitoring to be completed during 2005-2006 and the 3 additional years of monitoring proposed herein.

E. COMPLIANCE WITH STANDARD TERMS AND CONDITIONS

The proposed project has been developed in compliance with all of CALFED's standard terms and conditions presented in Attachment 3 of the September 2004 PSP. The applicant has reviewed and will comply with the State of California standard contracting terms and conditions. We also agree to the prevailing law shall be the State of California and the venue for settling any disputes, if any, shall be Sacramento, California. The applicant also understands that the contract terms will apply to any sub-contracts that may be entered into to complete the proposed work. There are no conflicts of interest in performing this work.

F. LITERATURE CITED

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G. NONPROFIT VERIFICATION

Not applicable.

Tasks And Deliverables

Stanislaus River chinook salmon and steelhead escapement evaluation

Task ID	Task Name	Start Month	End Month	Deliverables
1.1	Project Management	1	36	Semiannual fiscal and programmatic reports. Monthly invoices
1.2	Prepare and distribute bi-weekly sampling summaries.	1	36	Bi-weekly sampling summaries
1.3	Submit electronic and hardcopy of data collected annually.	1	36	Electronic and hardcopies of data collected
1.4	Prepare and distribute annual data reports.	1	36	Annual data reports
1.5	Compile research findings into comprehensive annual reports of study findings.	1	36	Comprehensive annual reports
1.6	Participate at workshops, seminars, and conferences.	1	36	At least one PowerPoint presentation prepared and delivered to a scientific or resource group
2.1	Install and operate a portable resistance board weir downstream of Jacob Meyer’s Park near the town of Riverbank.	1	36	Bi-weekly sampling summaries Electronic and hardcopies of data collected Annual data reports

				Comprehensive annual reports
2.2	Determine the number and biological characteristics of upstream migrating Chinook salmon and steelhead.	1	36	Bi-weekly sampling summaries Electronic and hardcopies of data collected Annual data reports Comprehensive annual reports
2.3	Determine migration timing of adult fall-run Chinook salmon and steelhead.	1	36	Bi-weekly sampling summaries Electronic and hardcopies of data collected Annual data reports Comprehensive annual reports
3.1	Compile environmental data from the Stanislaus and San Joaquin Rivers.	1	36	Bi-weekly sampling summaries Electronic and hardcopies of data collected Annual data reports Comprehensive annual reports
3.2	Evaluate the influence of environmental conditions on Stanislaus River fall-run Chinook salmon migration timing.	1	36	Comprehensive annual reports
4.1	Compare the accuracy of estimates for population size.	1	36	Comprehensive annual reports

4.2	Compare the accuracy of information regarding biological characteristics.	1	36	Comprehensive annual reports

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
$0	$0	$0	$0	$551,914	$0	$0	$0	$551,914	$0	$551,914

Do you have cost share partners already identified?
Yes.

If yes, list partners and amount contributed by each:

Tri−dam Project will contribute in−kind services by providing administrative services for the project management task (1.1). The total estimated cost−share from Tri−dam is $30,000.

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.

Stanislaus River chinook salmon and steelhead escapement evaluation

Stanislaus River chinook salmon and steelhead escapement evaluation

Year 1 (Months 1 To 12)

Task	Labor	Benefits	Travel	Supplies And	Services And	Equipment	Lands	Other	Direct	Indirect	Total

				Expendables	Consultants		And Rights Of Way	Direct Costs	Total	Costs	
1.1: project management (12 months)	0	0	0	0	8380	0	0	0	$8,380	0	$8,380
1.2: Prepare and distribute bi−weekly sampling summaries. (12 months)	0	0	0	0	4416	0	0	0	$4,416	0	$4,416
1.3: Submit electronic and hardcopy of data collected annually. (12 months)	0	0	0	0	464	0	0	0	$464	0	$464
1.4: Prepare and distribute annual data reports. (12 months)	0	0	0	0	3349	0	0	0	$3,349	0	$3,349
1.5: Compile research findings into comprehensive annual reports of study findings. (12 months)	0	0	0	0	15402	0	0	0	$15,402	0	$15,402
1.6: Participate at workshops, seminars, and conferences. (12 months)	0	0	0	0	7664	0	0	0	$7,664	0	$7,664
2.1: Install and operate a portable resistance board weir downstream of Jacob Meyer’s Park near the town of Riverbank.	0	0	0	0	64731	0	0	0	$64,731	0	$64,731

(12 months)											
2.2: Determine the number and biological characteristics of upstream migrating Chinook salmon and steelhead. (12 months)	0	0	0	0	70788	0	0	0	$70,788	0	$70,788
2.3: Determine migration timing of adult fall−run Chinook salmon and steelhead. (12 months)	0	0	0	0	13502	0	0	0	$13,502	0	$13,502
3.1: Compile environmental data from the Stanislaus and San Joaquin Rivers. (12 months)	0	0	0	0	2371	0	0	0	$2,371	0	$2,371
3.2: Evaluate the influence of environmental conditions on Stanislaus River fall−run Chinook salmon migration timing. (12 months)	0	0	0	0	2711	0	0	0	$2,711	0	$2,711
4.1: Compare the accuracy of estimates for population size. (12 months)	0	0	0	0	3068	0	0	0	$3,068	0	$3,068
4.2: Compare the accuracy of information regarding biological characteristics. (12 months)	0	0	0	0	3068	0	0	0	$3,068	0	$3,068

Totals	$0	$0	$0	$0	$199,914	$0	$0	$0	$199,914	$0	$199,914

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
1.1: project management (12 months)	0	0	0	0	8464	0	0	0	$8,464	0	$8,464
1.2: Prepare and distribute bi−weekly sampling summaries. (12 months)	0	0	0	0	4477	0	0	0	$4,477	0	$4,477
1.3: Submit electronic and hardcopy of data collected annually. (12 months)	0	0	0	0	474	0	0	0	$474	0	$474
1.4: Prepare and distribute annual data reports. (12 months)	0	0	0	0	3414	0	0	0	$3,414	0	$3,414
1.5: Compile research findings into comprehensive annual reports of study findings. (12 months)	0	0	0	0	15568	0	0	0	$15,568	0	$15,568
1.6: Participate at workshops, seminars, and conferences. (12 months)	0	0	0	0	7738	0	0	0	$7,738	0	$7,738
	0	0	0	0	37236	0	0	0	$37,236	0	$37,236

2.1: Install and operate a portable resistance board weir downstream of Jacob Meyer's Park near the town of Riverbank. (12 months)											
2.2: Determine the number and biological characteristics of upstream migrating Chinook salmon and steelhead. (12 months)	0	0	0	0	72353	0	0	0	$72,353	0	$72,353
2.3: Determine migration timing of adult fall−run Chinook salmon and steelhead. (12 months)	0	0	0	0	13727	0	0	0	$13,727	0	$13,727
3.1: Compile environmental data from the Stanislaus and San Joaquin Rivers. (12 months)	0	0	0	0	2421	0	0	0	$2,421	0	$2,421
3.2: Evaluate the influence of environmental conditions on Stanislaus River fall−run Chinook salmon migration timing. (12 months)	0	0	0	0	2736	0	0	0	$2,736	0	$2,736
4.1: Compare the accuracy of estimates for population size.	0	0	0	0	3097	0	0	0	$3,097	0	$3,097

(12 months)											
4.2: Compare the accuracy of information regarding biological characteristics. (12 months)	0	0	0	0	3097	0	0	0	$3,097	0	$3,097
Totals	**$0**	**$0**	**$0**	**$0**	**$174,802**	**$0**	**$0**	**$0**	**$174,802**	**$0**	**$174,802**

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
1.1: project management (12 months)	0	0	0	0	8506	0	0	0	$8,506	0	$8,506
1.2: Prepare and distribute bi−weekly sampling summaries. (12 months)	0	0	0	0	4538	0	0	0	$4,538	0	$4,538
1.3: Submit electronic and hardcopy of data collected annually. (12 months)	0	0	0	0	483	0	0	0	$483	0	$483
1.4: Prepare and distribute annual data reports. (12 months)	0	0	0	0	3477	0	0	0	$3,477	0	$3,477
1.5: Compile research findings into comprehensive annual reports of study findings. (12 months)	0	0	0	0	15682	0	0	0	$15,682	0	$15,682

1.6: Participate at workshops, seminars, and conferences. (12 months)	0	0	0	0	7790	0	0	0	$7,790	0	$7,790
2.1: Install and operate a portable resistance board weir downstream of Jacob Meyer’s Park near the town of Riverbank. (12 months)	0	0	0	0	37446	0	0	0	$37,446	0	$37,446
2.2: Determine the number and biological characteristics of upstream migrating Chinook salmon and steelhead. (12 months)	0	0	0	0	73875	0	0	0	$73,875	0	$73,875
2.3: Determine migration timing of adult fall−run Chinook salmon and steelhead. (12 months)	0	0	0	0	13941	0	0	0	$13,941	0	$13,941
3.1: Compile environmental data from the Stanislaus and San Joaquin Rivers. (12 months)	0	0	0	0	2467	0	0	0	$2,467	0	$2,467
3.2: Evaluate the influence of environmental conditions on Stanislaus River fall−run Chinook salmon migration timing.	0	0	0	0	2757	0	0	0	$2,757	0	$2,757

(12 months)											
4.1: Compare the accuracy of estimates for population size. (12 months)	**0**	**0**	**0**	**0**	**3118**	**0**	**0**	**0**	$3,118	**0**	$3,118
4.2: Compare the accuracy of information regarding biological characteristics. (12 months)	**0**	**0**	**0**	**0**	**3118**	**0**	**0**	**0**	$3,118	**0**	$3,118
Totals	**$0**	**$0**	**$0**	**$0**	**$177,198**	**$0**	**$0**	**$0**	**$177,198**	**$0**	**$177,198**

Budget Justification

Stanislaus River chinook salmon and steelhead escapement evaluation

Labor

Tri−dam will provide labor as in−kind service to the project. See Services and Consultants for description of labor for project.

Benefits

Tri−dam will provide benefits as in−kind service to the project. See Services and Consultants for description of benefits for project.

Travel

No travel expenses will be incurred by the applicant. See Services and Consultants for travel expenses related to the project.

Supplies And Expendables

No supplies or expendables will be purchased by the applicant. See Services and Consultants for supplies and expendables related to the project.

Services And Consultants

Labor:

S.P. Cramer &Associates (SPC) will we used to perform all field activities and synthesis of the data collected. SPC will be used to perform portions of Task 1.1 (Project Management) to provide technical insight and oversee that objectives and tasks are being met and deliverables produced. This task will require 40 hours of senior consultant and 40 hours of Biologist II time for each year of the project. Task 1.2 will

require 40 hours of Biologist I time, 12 hours of Biologist III time and 6 hours of senior consultant time for each year of the project. Task 1.3 will require 8 hours technician time and 1 hour Biologist I time for each year of the project. Task 1.4 will require 40 hours technician time, 20 hours Biologist I time, and 2 hours Biologist II time for each year of the project. Task 1.5 will require 20 hours Biologist I time, 50 hours Biologist II time, 40 hours Biologist III time and 48 hours senior consultant time for each year of the project for draft and final comprehensive reports. Task 1.6 will require 10 hours Biologist I time, 20 hours Biologist II time, and 40 hours of Senior Consultant time to participate in workshops, seminars and conferences each year of the project. A large portion of this task includes preparing Power Point presentations of the study findings, which will be delivered by the Senior Consultant to interested forums.

Task 2.1 will require 450 hours technician time the first year and 120 hours each additional year to monitor the weir, download the data and manage the database for 8 months each year project year. The increase in labor for the first year includes approximately 330 hours to fabricate parts and make major repairs to the weir (replace PVS pickets and plastic stringers), all of which are extremely time consuming to do. This includes monitoring the weir a minimum of once a day plus additional monitoring during times of high abundance and increase flows when more labor is required. Task 2.1 will also require 20 hours Biologist I time, 40 hours Biologist II and 60 hours Senior Consultant time to coordinate activities and provide guidance to personnel for each year of the project. Task 2.2 will require 1,350 hours technician time to determine number of salmonids and biological characteristics of each for each month period each year. Task 2.2 also includes 80 hours Biologist I time, 40 hours Biologist II time, 10 hours Biologist III time and 10 hours Senior Consultant time to coordinate activities, supervise database, analyze results and provide guidance to personnel for each year of the project. Task 2.3 will require 120 hours technician time, 40 hours Biologist I time, 10 hours Biologist II time, 20 hours Biologist III time and 24 hours Senior Consultant time to determine migration timing of salmonids.

Task 3.1 will require 40 hours of technician time, 4 hours of Biologist I time, and 4 hours Biologist II time to compile environmental data for each year of the project. Task 3.2 will require 4 hours Biologist I time, and 4 hours Biologist II time, 8 hours Biologist III time and 8 hours senior consultant time to evaluate influence of environmental conditions on the data collected from the weir for each year of the project.

The compensation rate with burden for each of the categories mentioned above are $54.67/hr for Senior Consultant, $48.60 for Biologist III, $42.73 for Biologist II, $30.51 for Biologist I and $23.26 for technicians for the first year. Year 2 and 3 will be a 5% increase over these rates to reflect cost of living increase and inflation. Compensation with burden includes taxes, workman's compensation and estimated bonuses.

Benefits: The calculated benefit rate per hour worked includes vacation and holiday pay, medical/dental/life insurance and pension.

The benefit rate per hour for the first year for a senior consultant is $14.54, for Bio III $11.78, for Bio II $10.63, for Bio I $6.98, and for technicians $6.14. Year 2 and 3 will have a 5% increase for cost of living and inflation.

Indirect Costs/Overhead: The indirect cost consists of overhead plus 10% profit of the billing rate for each of the employee categories listed above under labor and benefits. Overhead varies depending on employee position, but is approximately 17%. Overhead for Senior Consultant is $46.15/hr, for Biologist III is $40.50/hr, for Biologist II is $35.71/hr, for Biologist I is $19.15/hr and for technicians is $15.38/hr. The overhead includes items such as administrative personnel (invoicing, payroll, etc.), depreciation on equipment, liability insurance, building maintenance, rent, utilities, furniture, legal expenses, accounting, phones, etc.

The billing rates are $115.39 for senior consultant, $100.63 for Bio III, $89.11 for Bio II, $56.65 for Bio I and $44.69 for technicians for the first year of the project. Years 2 and

3 will have a 5% increase for cost of living and inflation for the billing rates.

The billing rate in each task of the project will be increased by 5% for years 2 and 3 to account for inflation, cost of living and merit increases. This should also be applied to the compensation and benefit rates above.

Travel: A total of $15,700 per year is included to cover cost of traveling to and from project sites, and to attend workshops, seminars and conferences. Travel includes mileage to travel to and from the site twice per day for 8 months. The project site is approximately 30 miles from the SPC field office, which would equal 60 miles round trip. The project site may be visited more than one time per day on most occasions, and may even include 3–4 visits during heavy debris loads and high fish abundance. A small amount has also been included for travel and lodging needed by the Senior Consultant during annual weir installation.

Supplies and Expendables:

The total amount budgeted for supplies and expendables each year is $8,000 for the first year and $5,000 for years 2 and 3. The extra money included in the first year account for miscellaneous supplies required to replace major components of the weir that have deteriorated during the demonstration phase. It is expected the life expectancy of the plastic components of the weir is 3 to 4 years. Expenses for Objective 2 (Task 2.1, 2.2, 2.3) include maintenance and replacement of field equipment such as buckets, waterproof paper, nets, waders, thermometers, trap cleaning supplies, warning signs, locks, digital cameras, batteries, etc. It also includes miscellaneous supplies for weir repairs. Office supplies for the project are expected to cost approximately $500 per year and will include materials for report creation and distribution, data sheet organization and storage, copies, toner, etc. Communication costs associated with long–distance calls (including conference calls) and cellular phone usage are expected to cost approximately $150 per month ($1,800 per year). Task 1.2 includes the cost of a website domain name and

yearly charges. The cost of the website is split with other on-going projects on the Stanislaus River, therefore there will be a cost saving for this expense.

Equipment:

$10,000 has been budget for the first year of the project to replace major components of the weir, specifically plastic components that over time have deteriorated. This includes costs of 20’ PVC pickets and several sheets of high-density UHMW plastic, which can run approximately $450 per 4’ x 8’ sheet.

Equipment

No equipment expenses will be incurred for the project.

Lands And Rights Of Way

Not applicable.

Other Direct Costs

None.

Indirect Costs/Overhead

Indirect and overhead costs for administration services will be provided by the applicant as a cost-share. See Services and Consultants for indirect costs and overhead for sub-contractor.

Comments

Tri-Dam will provide in-kind administrative services at a cost of approximately $10,000 per year to administer the contract and funds.

Environmental Compliance

Stanislaus River chinook salmon and steelhead escapement evaluation

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.
CA Department of Fish and Game

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?
− none
X environmental assessment/FONSI
− EIS
− categorical exclusion

Identify the lead agency or agencies.

US Fish and Wildlife Service

If the NEPA environmental impact assessment process is complete, provide the name of the resulting document.
Finding of No Significant Impact

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

The EA/FONSI was completed in 2002 and the resulting document was a "Finding of No Significant Impact." However, the period of the project listed ends in the Spring of 2005; therefore, we will have to request an extension to cover the proposed project or resubmit the EA/FONSI to start the process over for the new period.

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	X	X	
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 Stream Alteration Agreement	X	–	

Federal Permits And Approvals	Required?	Obtained?	Permit Number (If Applicable)
ESA Compliance Section 7 Consultation	–	–	
ESA Compliance Section 10 Permit	X	–	
Rivers And Harbors Act	–	–	
CWA 404	–	–	
other Nationwide Permit 4	X	–	

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 Army Corps Of Engineers	X	–	
permission To Access Private Land Landowner Name	X	–	

Rodney Beard			

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

All permits and land access permission have been previously obtained and will require extensions to cover the period of the proposed project. Extensions mostly consist of writing letters requesting the extension.

A Stream Alteration Agreement was obtained for the original project from CDFG. The Streambed Alteration did not determine the project needed to be reviewed by CEQA. We need to prepare a letter requesting extension of this agreement and do not anticipate any changes to be made.

Land Use

Stanislaus River chinook salmon and steelhead escapement evaluation

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.

We have already obtained levy road access from private landowner and currently have a license/real estate agreement with the Army Corps of Engineers to use the land on the north bank of the river. We will be extending this agreement in 2005 for an additional 5 years. Although we do not access the property to on the south bank, we do have land owner permission.

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?
X No.
− Yes.

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

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

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