Summary Information

Fishery Foundation of California

Cosumnes River Passage Improvement Monitoring Program

Amount sought: $251,647

Duration: 36 months

Lead investigator: Mr. Trevor Kennedy, Fishery Foundation of Califorinia

Short Description

This project will continue to monitor a previously funded CALFED/Anadromous Fish Restoration Program (AFRP) project; The Cosumnes River Salmonid Barrier Improvement Project (Barriers Project). The project involved two CALFED/AFRP grants to improve passage at a low flow crossing near tidewater, four summer dams operated by the local water districts, and two fish ladders at Granlees Dam in Rancho Murieta. In total, improvements were made to six structures from River mile (RM) 6.75 through RM 34.5. The FFC proposes to continue monitoring the effectiveness of the individual barrier improvements and the response of the salmon population in terms of migration, escapement, and juvenile production to the restoration project as a whole. Total escapement will be estimated using the Peterson Index or modified Peterson Index.

Executive Summary

COSUMNES RIVER PASSAGE IMPROVEMENT MONITORING PROGRAM

FISHERY FOUNDATION OF CA

The Fishery Foundation of California (FFC) proposes to continue monitoring a previously funded CALFED/Anadromous Fish Restoration Program (AFRP) project; The Cosumnes River Salmonid Barrier Improvement Project (Barriers Project). The goal of the Barriers Project was to improve low flow passage in the lower Cosumnes River to spawning grounds near Rancho Murieta in eastern Sacramento County. With improved passage at lower flows, early spawning distribution would shift upward to the historic, higher quality habitat above the barriers. Improved run timing would lead to a higher coefficient of condition at the time of spawning and, thus, greater spawning success. By providing access to the higher quality spawning habitat above the barriers, egg survival and subsequent production would increase

relative to total escapement. Overall, the project would lead to greater, more consistent run strength in the long term. The project involved two CALFED/AFRP grants to improve passage at a low flow crossing near tidewater, four summer dams operated by the local water districts, and two fish ladders at Granlees Dam in Rancho Murieta. In total, improvements were made to six structures from River mile (RM) 6.75 through RM 34.5.

The FFC proposes to continue monitoring the effectiveness of the individual barrier improvements and the response of the salmon population in terms of migration, escapement, and juvenile production to the restoration project as a whole. Total escapement will be estimated using the Peterson Index or modified Peterson Index. The distribution of spawners and redds in relation to improved sites as well as success of the run reaching optimal spawning habitat in the upper river will be another performance measure for project success. Outmigration will be documented with a 5 foot rotary screw trap placed at RM 6.75. The screw trap will be operated in a manner consistent with the standardized protocol developed for CAMP. Specific performance measures will be juvenile abundance relative to total escapement and outmigration timing. As proposed, the work is consistent with and supports the objectives of the Comprehensive Assessment and Monitoring Program (CAMP) established by Section 3406(b)(16) of the CVPIA (CAMP, 2004). Expected outcomes are annual estimates of escapement, spawning distribution, and juvenile outmigration rates presented in quarterly and annual reports.

1. ERP, SCIENCE PROGRAM, AND CVPIA PRIORITIES

The proposed project will directly benefit one CALFED primary, first tier species: Chinook salmon. By providing passage, the proposed project will lead to improved run of Chinook salmon in the watershed. The projected benefit of the project will be long−term contribution to increased escapement of salmon. Overall, this proposal parallels the CALFED mission to restore ecological health while protecting existing beneficial uses including water supply and flood control in the Cosumnes River watershed. The proposed improvements to fish passage are consistent with the high priority ranking given to fish passage facilities and flow improvements of the CALFED Bay−Delta program. The proposed project is consistent with both CALFED priorities and objectives and with actions designed to promote recovery and protection of Chinook salmon populations in the Central Valley and the Cosumnes River.

Several CALFED ERPP objectives are met by this project: 1) by enhancing the connectivity of instream aquatic habitats the project will result in greater access to upstream spawning grounds and rearing habitat. The specific ERPP target addressed by the project is improving passage (ERPP section: Dams, Weirs, Reservoirs, and Other Structures, pages: 278 280, volume I). 2) By improving fish passage conditions, the project will help to ensure the restoration of Cosumnes River Chinook salmon.

The specific targets met by the project are restoring passage required by Chinook salmon (ERPP section: Chinook Salmon, pages 153 154, volume I).

The proposed project addresses the goal of the AFRP as stated in Section 3406(b)(1) of the CVPIA by meeting the following objectives: 1) improving the opportunity for adult fish to reach their spawning habitats in a timely manner, and 2) involving multiple partners in the implementation and evaluation of restoration actions.

A. Project Description: Project Goals and Scope of Work.

1. PROBLEM, GOALS, AND OBJECTIVES

The Fishery Foundation of California (FFC) proposes to continue monitoring a previously funded CALFED/Anadromous Fish Restoration Program(AFRP) project; The *Cosumnes River Salmonid Barrier Improvement Project (Barriers Project).* The goal of the Barriers Project was to improve salmon passage in the lower Cosumnes River to spawning grounds near Rancho Murieta in eastern Sacramento County. The project involved two CALFED/AFRP grants to improve passage at one culvert, two fish ladders at Granlees Dam in Rancho Murieta, and four summer dams operated by the local water districts. FFC proposes to continue monitoring the effectiveness of the individual barrier improvements and the response of the salmon population in terms of migration, escapement, and smolt production.

The Cosumnes River Barrier Improvement project, funded in 1998, was a collaborative effort by the FFC, Department of Fish and Game (DFG), The Nature Conservancy (TNC), AFRP, CALFED, Rancho Murieta Community Services District (RMCSD), Omochumnes/Hartnell Water district (OHWD), and a private landowner adjacent to the lower Cosumnes River. The objectives of the project as originally proposed were to improve passage conditions at four low-flow barriers; two summer dams and a low flow crossing in the lower river beneath the historic spawning reach and a diversion dam in the middle of the spawning reach. During post project monitoring activities two additional potential barriers were discovered and included in the objectives. In total, improvements were made to six structures from River mile(RM) 6.75 through RM 34.5 (Figure 1). Following is a brief description of the restoration actions.

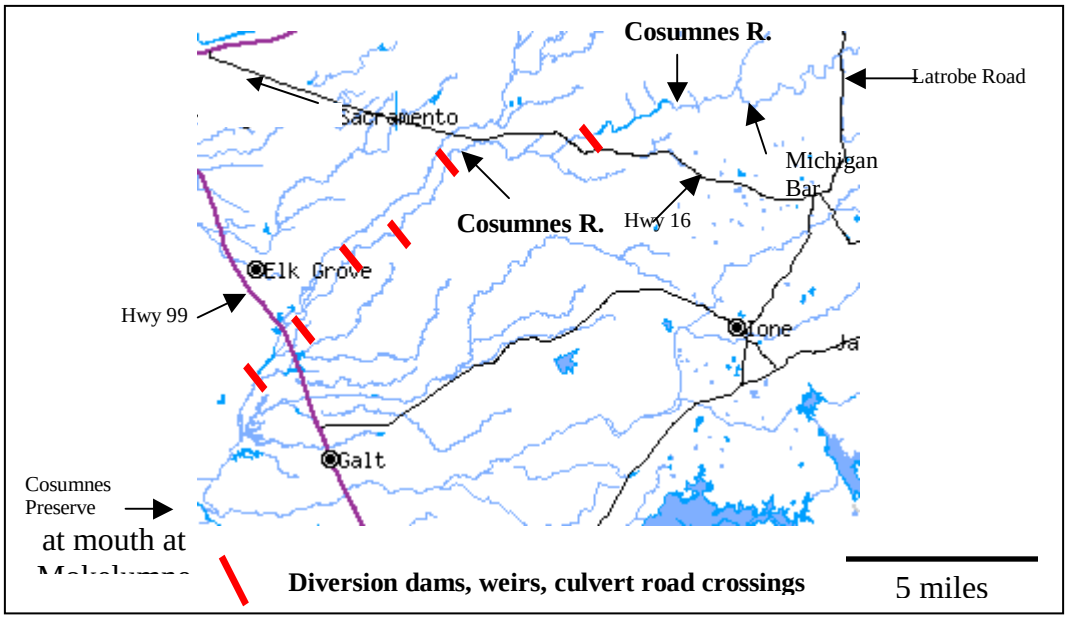


Figure 1. Anadromous fish zone of the lower Cosumnes River from mouth to Latrobe Falls.

Low Flow Crossing (Culvert RM (6.75):
The low flow crossing prior to FFC improvements was a low elevation concrete slab which spanned the entire width of the Cosumnes River. Downstream scour had created a three foot drop from the upstream water surface elevation (WSE) to the downstream WSE. This created severe hardships for upstream migrating salmon at flows under 100cfs. A 4 foot by 6 foot single box culvert as recommended by George Heise DFG engineer was installed in the middle of the road to facilitate passage under 100cfs(Figure 2).

The culvert performed as planned over an even greater range of flows than for which it was designed. Depths of greater than 6 inches were present in the culvert at flows as low as 5 cfs. At higher flows100-200 cfs velocities were well within the tolerances for adult Chinook salmon swimming abilities. Velocities of 4 to 8 feet per second were measured in the culvert during flows of 100-120 cfs. Velocities of 9-13 feet per second were measured when the culvert was at capacity (200cfs). At flows above 200 cfs a backwater effect was observed and velocities within the culvert were observed to decrease until conditions made it unsafe to measure.

Figure 2. Culvert constructed in summer 2001.

Summer Dams:
Two summer dams were originally slated for restoration on the Cosumnes River. However, four were improved by the FFC over the course of the contract period using AFRP and private funds:

<u>Mahone Ranch Dam (RM12.4):</u>
Mahone Ranch Dam is a small flashboard dam with a low angle rock approach leading up to the concrete footing that supports the flashboards. Although this structure was not originally identified as a barrier, improvements were made in the summer of 2003 to improve passage at flows below 60cfs (Figure 3). The improvements were made in response to a low flow stranding event discovered during 2002 monitoring activities. The approach involved installing concrete curbs on the downstream edge of the weir footing and forming pools in the low angle rock approach. The concrete curbs were 6" tall and spanned the entire width of the footing with two 10 foot gaps near the banks. The curbs functioned to back up water over the concrete footing to a depth of 6 inches and also focused the low flows into the two channels rather than allowing it to spill evenly over the rip rap as shallow sheet flow. Evaluations during the fall of 2003 found that the modifications worked as planned. Salmon were observed passing the structure at flows

as low as 30 cfs (Cosumnes River Chinook Salmon Passage Improvement Draft Report. 2004).

Hop Ranch Dam: (RM 16.25)

Hop Ranch Dam is a small flashboard dam with a low angle rock approach leading up to the concrete footing that supports the flashboards. The dam was modified in exactly the same way as Mahone Dam with similar results in improving low flow passage (Figure 3).

Figure 3. Hop Ranch (left) and Mahone Ranch (right) following improvements made in 2002 and 2003 respectively. Note the low angle rock approach on both structures.

Blodgett Dam (RM 22.5):

Modifications to the dam were a joint effort between the FFC and the OHWD using FEMA funds secured when the 1997 flood damaged the structure. The total project cost was near $800,000 of which approximately $100,000 went to the actual fish passage structure (Boulder Weir). Conditions at this site were unique in that there was no rock approach to work with but rather a vertical four to five foot drop which severely hindered passage at flows below 250-300cfs. A 6-teired boulder weir was installed per the suggestion of DFG passage engineer George Heise. The weir was built with 2-6 foot diameter boulders placed into a series of 20 by 40 foot step pools. These pools in sequence created a low gradient riffle up to the structure with no greater than a 1 foot jump at any point in the sequence. Additionally, a concrete curb, similar to those installed in the other weirs, was installed on the concrete weir footing to increase the depth over the structure and focus the low flows into the center of the uppermost weir. Post project monitoring suggests that these modifications have improved passage down to 20 cfs (Figure 4).

Figure 4. Blodgett Dam prior to (left) and following improvements(right). The photo on the left was taken during the stranding event. Note the salmon jumping in the center of the photo.

Rooney Brothers Dam (RM 25):

Rooney Dam is a small flashboard dam with a very steep rock approach leading up to the concrete footing that supports the flashboards. Routine maintenance activities by the OHWD in 2002 created a serious low flow barrier. The nature of the rock placement and the size of the material have created a significant low-flow barrier to upstream migration based on observed schools of milling salmon and abundant spawning below the dam in marginal habitat. A significant stranding event (approx. 75 individuals) was observed at this site during 2002 monitoring activities (Cosumnes River Chinook Salmon Passage Improvement Draft Report, 2004). Modifications to the approaches to Rooney Dam including rock and sandbag placement at the weir during the fall of 2002 appeared to improve passage at flows greater than 70 cfs but were ineffective at lower flows. Permanent improvements to these dams including concrete flow-focusing curbs and the creation of step pools in the rock approaches were designed and implemented by the FFC prior to the fall 2003 season using water district funds (Figure 5). These improvements were successful in three other dams in significantly reducing the minimum flow requirements for upstream passage. However, Rooney Bro.'s Dam remains a problem to this day due to the steep rock approach and the relatively large material used in its modification. Per the suggestion of George Heise, DFG fish passage engineer, the FFC will install a four tiered boulder weir in the summer of 2005 using AFRP funds. This approach was highly successful Blodgett Dam (Figure 4).

Figure 5 Rooney Dam following improvements made in the 2003. Note the concrete curb on the weir footing and the focused flows in the modified rip rap channel. The steep rock approach still remains problematic to upstream migrating salmon during flows less than 70 cfs.

Granlees Dam *Fish Ladders*:

Granlees Dam RM (34.5) is operated by RMCSD to supply water to the surrounding community. The dam had two fish ladders, which were in excess of 70 years old and in a state of disrepair, possessing broken sections and significant filling of coarse sediment. An informal inspection by George Heise of DFG in June of 1998 found the following deficiencies: 1) Excessive jump heights in all pools; 2) Inadequate volume in resting pools; 3) Substandard entrance pool for wide range of flows; 4) High risk of salmon spilling back into the basin upon exiting the ladders due to poorly placed spillway; 5) Inadequate wall height increasing the risk of larger fish jumping out of resting pools; and, 6) Misleading attraction flows on opposite side of basin and near ladder outlet (Figure 6).

With a grant from CALFED, the FFC completely rebuilt the South ladder and significantly modified the North ladder so that both would meet current DFG criteria for fish passage. Design of the V-weir pool and chute South ladder was provided by Northwest Hydraulic Consultants with input from George Heise. In the new South ladder, jump heights were reduced to a maximum of 1 foot and the pool volumes were doubled. The ladder outlet was placed 45 feet downstream of the old ladder away from the false attraction flow at the dam face (Figure 7).

As major reconstruction efforts were logistically prohibitive, due to the proximity of the RMCSD diversion headworks, modifications to the North ladder were completed within the footprint of the existing ladder. Surveys were conducted to determine existing weir

elevations so that they could be cut down or elevated to bring them into DFG criteria. Changes were made to four of the eight weirs and jump heights were reduced to a maximum of 1.25' at each pool. During project monitoring, salmon were observed to pass readily through the North and South ladders at Granlees Dam, some in less than 10 seconds. No significant delays were observed at either ladder.

Figure 6. Granlees Dam fish ladder pre project. Photo on left shows short walls and turbulent flow in pools caused by inadequate volume. Photo on right shows the outlet of ladder adjacent to mis-directing attraction flow at dam face.

Figure 7. New ladder on South Granlees Dam. Photo on left shows upper section of new ladder with higher walls and reduced jump heights. Photo on right shows new outlet location away from false attraction flow.

The Barriers Project was completed in the fall of 2004. The draft final report will be submitted to CALFED/AFRP in December 2004. Passage has been greatly improved at all sites originally identified in the project scope as well as at two sites not included in the scope. All of the project objectives have been met with the exception of Rooney Brothers Dam which is the sole remaining low flow barrier. The FFC has secured AFRP funding to improve passage at this site in the summer of 2005. The project objective for Rooney Brothers Dam is to facilitate passage at flows greater than or equal to 30 cfs with the ultimate goal of eliminating the last remaining low flow barrier in the Cosumnes River.

The proposed monitoring activities are paramount in determining the success of the individual structure improvements and in determining whether the goals and objectives of the passage project as a whole have been met. Specifically, the proposed monitoring activities will determine response in the salmon population to the Barriers Project in terms of total adult escapement and smolt production. In addition, specific variables such as run timing and spawning and carcass distribution relative to project sites will lead to a better understanding of the effectiveness of the Barriers Project.

The Problem

The Cosumnes River, the last un-dammed river running from the eastern slopes of the Sierra Nevada into the Sacramento/San Joaquin Delta supports a rich aquatic ecosystem. Of all of the Delta tributaries, it alone has escaped major water development and therefore has retained a relatively natural flow pattern and accompanying sediment and nutrient transport process.

The flow regime in the Cosumnes River is a significant limiting factor to the river's salmon population (Calhoun, F. and R. Reiner, 1999). The Cosumnes River watershed is rain dominated receiving most runoff in the form of rainfall, the majority of which falls from November through April. Average annual rainfall at the Highway 49 Bridge is 28 inches, with a high annual variability (Whitener, K. and T. Kennedy, 1998). With little snowmelt to augment fall flows, the river between Highway 16 and Twin Cities Road often dries up or has flows unsuitable for upstream migration. The Cosumnes River historically supported thousands of fall-run Chinook salmon. When the Barriers Project was initiated in 1998 the spawning run (adult escapement) had diminished to only a few hundred spawning individuals because of habitat degradation, a lack of fall attraction flows, and barriers to migration during periods of low flow.

The Cosumnes River had six potential migration barriers within or below the suitable spawning area that hindered salmon upstream passage to varying degrees. Five concrete summer dams/low flow crossings occur in the lower river, well below the spawning area. These crossings were low flow barriers to upstream migration and acted as a migration bottleneck in normal to low-flow years sometimes resulting in no salmon reaching the spawning ground in the river near Rancho Murieta. The Cosumnes River often connects following the first significant rain event or when flows reach 100 cfs at the Michigan Bar Bridge. If the initial connection flow is less than 400 cfs and is followed by an extended dry period, as is often the case, the river tends to disconnect or has flows too low to facilitate passage over the barriers within three to five days. A significant stranding occurred below the lowermost diversion dam (Mahone) in the fall of 1998. Field investigators estimate that approximately 200 fall-run salmon were stranded below the structure. Flows at the time were recorded at 70 cfs and it was concluded that flows in excess of 150 cfs were required for this structure to effectively pass fish. A similar stranding event was observed at Rooney Brothers Dam during 2002 monitoring activities. A sharp reduction in flow following the initial fall connection rendered Rooney dam impassable. We estimate from carcass distribution surveys that 25% of the entire salmon

run either died without reaching the historic spawning reach or spawned in poor quality habitat below Rooney Dam. As the available substrate in this reach is composed primarily of sand, production was likely very low (Cosumnes River Chinook Salmon Passage Improvement Draft Report, 2004).

RMCSD operates a small diversion dam on the Cosumnes River. The dam had two fish ladders, which were functional within a narrow range of flows. However, the ladders were both in excess of 70 years old and in a state of disrepair, possessing broken sections and significant filling of coarse sediment. An informal inspection by George Heise of DFG in June of 1998 suggested the following deficiencies: 1) Excessive jump heights in all pools; 2) Inadequate dimensions in resting pools; 3) Substandard entrance pool for wide range of flows; 4) High risk of salmon spilling back into the basin upon exiting the ladders due to poorly placed spillway; 5) Inadequate wall height increasing the risk of larger fish jumping out of resting pools; and, 6) Misleading attraction flows on opposite side of basin. The old ladder configuration was passable at flows between 60 and 150cfs. Granlees Dam is in the middle of the historic spawning reach and much of the highest quality spawning habitat resides upstream of the dam.

Goals and Objectives

Goals:

The goal of the project as originally proposed was to improve low flow passage at four structures within and below the spawning reach so that delays and stranding would be minimized or eliminated. Two additional low flow barriers were discovered during post project monitoring activities and have since been added to the project overall project goal. With improved passage at lower flows, early spawning distribution would shift upward to the historic, higher quality habitat above the barriers. Improved run timing would lead to a higher coefficient of condition at the time of spawning and, thus, greater spawning success. By providing access to the higher quality spawning habitat above the barriers, egg survival and subsequent production would increase relative to total escapement. Overall, the project would lead to greater, more consistent run strength in the long term.

Objectives: Site specific objectives are as follows:

Granlees Dam; Extend the range of flows over which both ladders are functional so that delays in migration to the higher quality spawning habitat are minimized or eliminated.

Summer Dams/Low Flow Crossing; Improve low flow passage at each of the dams so that migrating salmon aren't delayed or stranded during low fall flows. Passage should be possible at flows greater or equal to 30 cfs.

Rooney Brothers Dam; Improve low flow passage at Rooney Brothers Dam in the Summer of 2005 so that migrating salmon aren't delayed or stranded during low fall flows. Passage should be possible at flows greater or equal to 30 cfs.

2. JUSTIFICATION (INCLUDING CONCEPTUAL MODEL, HYPOTHESES AND SELECTION OF PROJECT TYPE)

Conceptual Model for Fall-Run Chinook Salmon

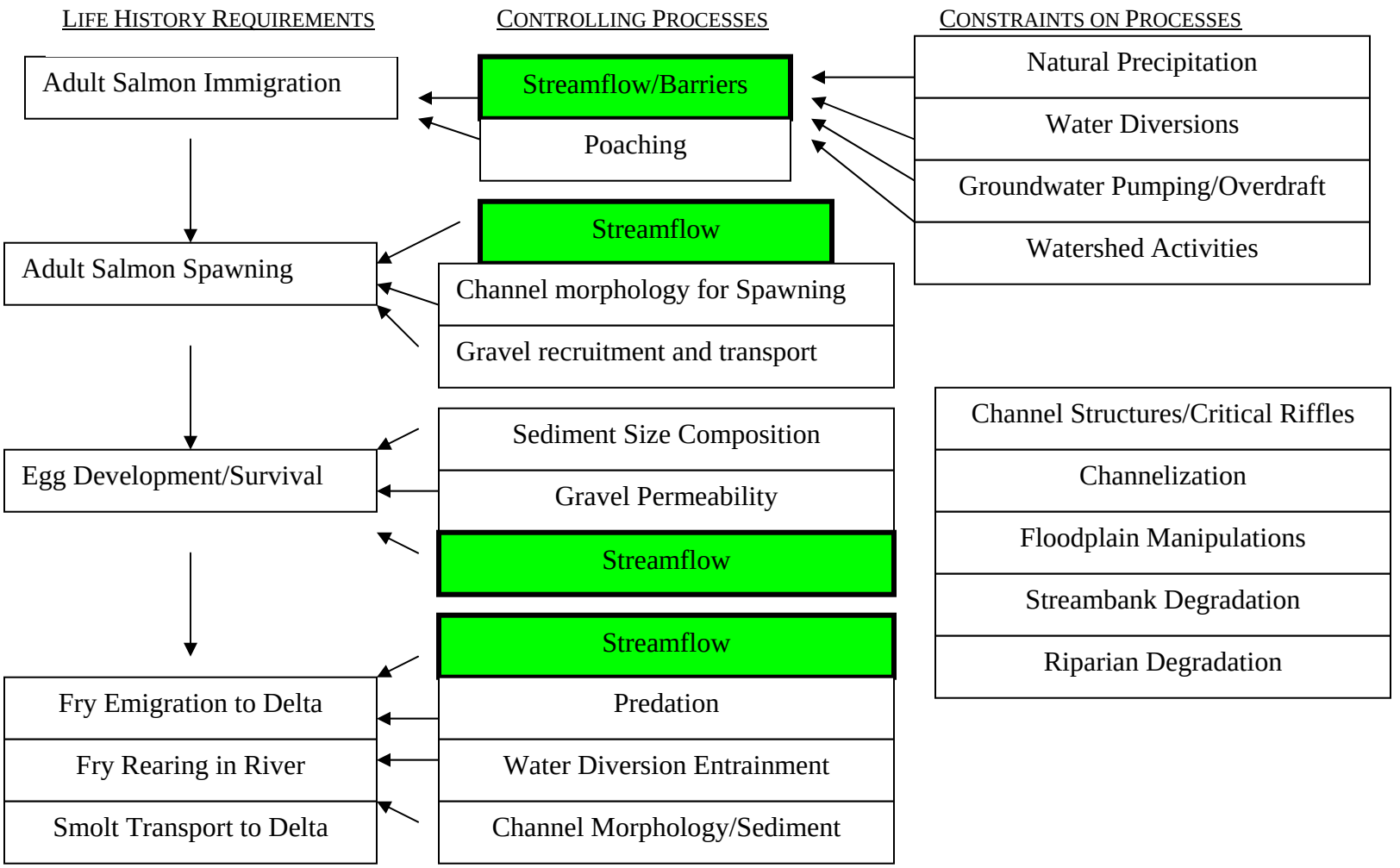
The conceptual model for fall-run Chinook salmon in the Cosumnes River is summarized in Table 1. The critical role of streamflow and instream barriers can be seen at each life stage. Fall-run Chinook salmon need fall flows of sufficient intensity and duration in the lower river to provide passage upstream from tidewater for adults to spawning grounds 16 miles above tidewater. If the initial connection flow is less than 200cfs, adequate flow often lasts less than a week and upstream migrating salmon are subject to significant delays or stranding below any of five summer dams which reside downstream of the historic spawning reach. If it is followed by an extended dry period those salmon either perish prior to spawning or spawn in poor quality habitat below the summer dams. During the four-day connection period in early November 2002, over a thousand adult salmon were able to migrate upstream to spawning grounds from tidewater during flows up to 100 cfs. (Cosumnes River Chinook Salmon Passage Improvement Draft Report, 2004). Conversely, in 2001, initial connection flows lasted only for one day and were followed by a two week dry period. Less than 100 salmon were able to ascend the lower river to reach the spawning grounds. It is estimated that 200-300 adult Chinook salmon perished in the lower river after the flows receded. Preliminary evaluations over the past ten years (1993-2002) indicate that 100 cfs average flow at Michigan Bar for ten days during October or early November would provide minimum reasonable passage conditions for the salmon[1]. Four to six days was the maximum connection period during the 10 years (1998, 2000, and 2002) during the fall spawning run. If salmon can reach the spawning reaches above Hwy 16, flows at Michigan Bar appear sufficient to support a spawning run of several thousand salmon. Flows in the spawning reach generally increase over the winter with winter rainfall even in dry years.

Natural flows at Michigan Bar are adequate to sustain eggs and fry through emergence and then through the rearing period into spring. Improved low flow passage will allow a greater proportion of salmon to reach the spawning reaches and will, therefore increase production relative to total escapement. After hatching in winter, young salmon require sufficient flows for rearing or out-migration. Some fry will remain in the river, while others will migrate to the estuary. Some flow would be necessary in the lower river to provide fry and fingerling passage to tidewater. Under present conditions, some fry would migrate to the lower river and possibly become stranded before reaching tidewater because of low flows. Again, 20 cfs of flow in the lower river at the peak fry emergence period may facilitate fry emigration to tidewater. Such flow in the lower river occurs for extended periods of the winter in most years. Higher flows would increase survival by decreasing emigration time and by reducing the vulnerability of fry to bird and fish predation

[1] The four days in 2002 were inadequate as many salmon were stranded in the lower river near tidewater at the end of the fourth day of connection. We speculate that 10 days would provide a reasonable period.

By spring when smolt sized salmon descend the river for tidewater, having sufficient flow for outmigration may be problematic. In some years the lower river disconnects due to lack of watershed inflow and because flashboards are placed in diversion dams in the lower river to hold back outflow and increase groundwater recharge. Water diversions also increase in the spring. Improved run timing resulting from passage improvements at Granlees Dam and the summer dams would lead to earlier spawning and subsequent emergence and perhaps accelerated emigration to the delta. This would minimize flow and temperature related mortality for outmigrating juveniles spawned later in the year.

Table 1. Conceptual Model of Limiting Factors of Salmon Production in the Cosumnes River



Objectives and Hypotheses

Objective #1
Granlees Dam; Extend the range of flows over which both ladders are functional so that delays in migration to the higher quality spawning habitat are minimized or eliminated.

Objective #2
Summer Dams/Low Flow Crossing; Improve low flow passage at each of the dams so that migrating salmon aren't delayed or stranded during low fall flows. Passage should be possible at flows greater or equal to 30 cfs.

Objective #3
Rooney Brothers Dam; Improve low flow passage at Rooney Brothers Dam in the summer of 2005. Passage should be possible at flows greater or equal to 30 cfs.

The following hypotheses will be tested to address objective #1:

Hypothesis 1-1: By improving passage at Granlees Dam, delays and stranding at the site will be reduced or eliminated.

Hypothesis 1-2: With improved passage at Granlees Dam, a higher proportion of the total run will spawn in the higher quality habitat upstream of the dam earlier in the year.

Hypothesis 1-3: With improved run timing and a higher proportion of the total run reaching the higher quality spawning habitat production relative to total escapement will increase and emigration will occur earlier in the year.

The following hypotheses will be tested to address Objective #2:

Hypothesis 2-1: By improving passage conditions at Blodgett Dam, Hop Ranch Dam, Mahone Ranch Dam, and the Onetto Low Flow Crossing delays and stranding below the sites will be reduced or eliminated at flows greater than 30 cfs.

Hypothesis 2-2: With improved passage at the summer dams, spawning distribution will shift upward to the historic spawning habitat earlier in the year or after the initial connection flow.

Hypothesis 2-3: With improved run timing and a higher proportion of the total run reaching the higher quality spawning habitat production relative to total escapement will increase and emigration will occur earlier in the year.

The following hypotheses will be tested to address Objective #3:

Hypothesis 3-1: Rooney Brothers Dam is still a low-flow barrier and will delay and/or strand upstream migrating salmon at flows below 70 cfs.

Hypothesis 3-2: Following improvements to low flow passage to be completed in the Summer of 2005, delays and stranding below the site will be reduced or eliminated at flows greater than 30 cfs.

3. PREVIOUSLY FUNDED MONITORING

Mean fall-run escapement from 1953 to 1966 was 2,500 (USFWS 2003). From 1967 to 1991 the river supported a mean run size of 1600 salmon with a maximum of 8,000, while over the past decade escapement has been less than 500 (USFWS 2003). By the end of the 1987-1992 drought the run size was down to 100 fish or less. Stocking by California Department of Fish and Game of salmon fry from the American River Hatchery has helped to sustain the salmon run (Harris 1996; Snider and Reavis 2000). Historically, the river also may have had a run of steelhead (Harris 1996). Although steelhead observations in recent years have been sporadic, it would not be surprising to see stray steelhead from the American or Mokelumne Rivers. Surveys conducted by the FFC and DFG from 98-2003 estimated total escapement from <100-1350 (Grand Tab-DFG, 2003; Cosumnes River Chinook Salmon Passage Improvement Draft Report, 2004)

4. APPROACH AND SCOPE OF WORK

The proposed approach involves three tasks:

Task 1 - Project Management

Project management encompasses all QAQC activities, database management, quarterly and annual reporting, and all necessary costs directly associated with specific project oversight. It also allows for in the field for inspection of work in progress and training purposes.

Task 2 - Escapement

Visual observations at selected weirs and at the Granlees Dam fish ladders will be made to observe specific behavior of salmon when ascending weirs under different flows. Visual observation periods are 60 minutes with stage (flow) recorded and the number of adult salmon attempting passage and success rate recorded. Milling and holding behavior below weirs will also be recorded, as they are symptomatic of weirs being obstacles to migration at given flows. Concentrations of spawning salmon below weirs in marginal habitat as noted in 2002 will be noted, and is another indicator that weirs hinder or delay passage to more optimal spawning habitat upstream. Ultimately, the distribution of spawners and redds in the river in relation to improved sites among and within years and their relationship to flow will be another indicator of delay or hindrance, as well as success of the run reaching optimal spawning habitat in the upper river.

Total escapement and escapement relative to improved sites will be estimated using the standard Peterson Index (Lincoln Index) as employed by Snider and Reavis (2000):

$N=MC/R$

Where,

N = estimated spawning population,
M = number of carcasses marked during the survey,
C = total number of carcasses examined during the survey, and
R = number of marked carcasses recovered during the survey.

The Petersen estimator is a consistent estimator of the population size under the following conditions:
1. Either or both of the samples is a simple random sample, i.e. all fish in the population have the same probability of being tagged or all fish have the same probability of being captured in the second sample; or tagged fish mix uniformly with untagged fish.
2. The population is closed.
3. There is no tag loss.
4. The tagging status of each fish is determined without error.
5. Tagging has no effect on the subsequent behavior of the fish.

Employing the Peterson Estimate under these circumstances has the potential of severe bias (Snider and Reavis 2000, Law 1994); particularly when fish numbers are low (Ricker 1975). If observations at the weirs suggest that the run size on a given year will be low, Bailey's (1951) modification may be employed as an alternative.

Bailey's Modification, N=M(C+1)/(R+1) allows for multiple recaptures of marked fish.

Escapement will also be estimated by expanding total redd counts by a factor of 2.5.

Task 3 - Outmigration

Good downstream migrating conditions often occur in the winter and spring on the lower Cosumnes River because it is basically an unregulated river. For example in the winter and spring of 2003 the Cosumnes had flows much higher than the Mokelumne and Calaveras, and even the American at times. Even in drier years, Cosumnes winter flows are often adequate for winter-spring rearing and emigration.
Downstream migrating salmon data are very limited on the Cosumnes River. Screw trap sampling in prior years collected few juvenile salmon. Screw trapping during the winter and spring of 2003 has provided further information on juvenile emigration. A screw trap operated daily at RM 6.7 a few miles above tidewater provided numbers and size of salmon. Snorkel surveys during the winter and spring 2003 in the spawning and rearing areas provide information on the distribution and relative abundance of juvenile salmon and how long and in what numbers they remain upstream before emigrating to tidewater.

The problem with these data is that they were collected during a wet year for the Cosumnes under high flows. Downstream passage has not been a problem in 2003.

Recent survey information collected by the Fisheries Foundation and The Nature Conservancy, including life history and screw traps and snorkel surveys (Keith Whitener, TNC; Trevor Kennedy, FFC, personal communications), will be used to determine whether flows in 2001, 2002, and 2003 were conducive to acceptable fry and smolt

emigration. Densities and total production of fry, fingerling, and smolts will be compared under different flow regimes. This information will be used to recommend additional studies and further evaluation on flow requirements for juvenile passage. A conceptual model will be developed of the flow-emigration relationship from the spawning and rearing areas of the Cosumnes River below Latrobe Falls. Of primary concern is the potential effect of the six weirs and at least one small diversion dam hindering flow cues for emigration. Based on preliminary screw trap and snorkel survey data collected in the winter and spring of 2003, it appears that juvenile salmon migrate in a steady stream over several months, as fry soon after spawning and also as smolts after rearing in the river. Cues that initiate emigration of fry and smolts will be determined from the available data. Further survey data will be collected as needed in the winter and spring of the proposed sample period to verify observations in 2003.

The FFC will continue to operate a screw trap at river mile 6.7 to estimate outmigration timing and production relative to total escapement. As juvenile salmon migrate downstream, they will be intercepted at five foot rotary screw trap. The number of juvenile outmigrants will be estimated by using a trap efficiency method of releasing marked fish upstream of the trap. Fish will be marked with Bismark Brown dye prior to being released 1 mile upstream of the trap. Trap efficiency tests will be conducted when numbers captured merit the effort (>100). Trap efficiency will be estimated using a modification to the Petersen estimate from the equation $e = (R+1)/(M+1)$, where e is the estimated trap efficiency, M is the number of marked fish released upstream of the trap, and R is the number of marked fish recaptured. Murphy et al. (1996) listed the standard assumptions of the Petersen method. The same assumptions apply in trap-efficiency experiments: (1) the population is closed; (2) all fish have the same probability of capture in the first sample; (3) marking does not affect catchability; (4) the second sample is either a simple random sample, or if the second sample is systematic, marked and unmarked fish mix randomly; (5) fish do not lose their marks; and (6) all recaptured marks are recognized. Specific performance measures will be juvenile abundance relative to total escapement and outmigration timing.

As proposed, the above work is consistent with and supports the objectives of the Comprehensive Assessment and Monitoring Program (CAMP) established by Section 3406(b)(16) of the CVPIA (CAMP, 2004).

5. FEASIBILITY

The Fishery Foundation has been working for 10 years to help restore the Cosumnes River. They have extensive contacts with local stakeholders and landowners, as well as regional fishery management and regulatory agencies. The FFC has significant experience performing the proposed monitoring activities on the Cosumnes River and has been the lead on said activities for three years. The project can be completed in the time allotted because many of the necessary parties are already active in the watershed and wholly cooperative toward finding solutions that would for the completion of the proposed monitoring activities. The FFC has a long standing relationship with many landowners and both of the local water agencies adjacent to the Cosumnes River. Access was granted during the construction of the passage improvement structures and for post project monitoring. All involved parties have been contacted in 2004 and have enthusiastically agreed to grant access for future monitoring activities.

6. EXPECTED PRODUCTS AND OUTCOMES

Project products will include white papers, memos, notes, and quarterly reports. A draft and final report will be developed upon completion of the study.

7. DATA HANDLING AND STORAGE

Electronic data will be stored in an appropriate database or similar format, and the FFC will retain all data in the Elk Grove office. The FFC shall retain copies of all project files, including data, metadata, maps, and other information for a period of five years upon completion of the work. Where field data collection is necessary, the Project Team will use standard quality assurance and control (QA/QC) methods in designing sampling protocols and in obtaining, recording, and analyzing data. All field data will be recorded on standard rite in the rain data sheets and in field books. Field crews will review current data and notes collected at the end of each day for completeness and clarity, and will photocopy all data upon return to the central office. The original field books and data sheets as well as one set of photocopies will be stored in a fireproof safe at the Elk Grove office.

8. PUBLIC INVOLVEMENT AND OUTREACH

Public and stakeholder support and participation are a key component of this project and are crucial for the adaptive management process and in developing implementable restoration actions. The FFC is working closely with the AFRP, DFG, RMCSD, TNC, and the local Resource Conservation District and has coordinated with the Omochumnes Hartnell Water District. The FFC will continue to coordinate with all stakeholder groups throughout the monitoring process. Letters of support can be found in Appendix A .

9. WORK SCHEDULE

The proposed project will require 36 months to complete (Table 2).

Table 2. Work schedule by 12 month period. Milestones such as quarterly and annual reports are denoted with an X.

Task													
Month 1-12		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
1	Project management			X			X			X			
2	Escapement												
3	Outmigration												
Month 13-24													
1	Project management			X			X			X			
2	Escapement												
3	Outmigration												
Month 25-36													
1	Project management			X			X			X			X
2	Escapement												
3	Outmigration												

B. Applicability to CALFED ERP and Science Program Goals and Implementation Plan and CVPIA Priorities

1. ERP, SCIENCE PROGRAM, AND CVPIA PRIORITIES

The proposed project will directly benefit one CALFED primary, first tier species: Chinook salmon. By providing passage, the proposed project will lead to improved run of Chinook salmon in the watershed. The projected benefit of the project will be long-term contribution to increased escapement of salmon. Overall, this proposal parallels the CALFED mission to restore ecological health while protecting existing beneficial uses including water supply and flood control in the Cosumnes River watershed. The proposed improvements to fish passage are consistent with the high priority ranking given to fish passage facilities and flow improvements of the CALFED Bay-Delta program. The proposed project is consistent with both CALFED priorities and objectives and with actions designed to promote recovery and protection of Chinook salmon populations in the Central Valley and the Cosumnes River.

Several CALFED ERPP objectives are met by this project: 1) by enhancing the connectivity of instream aquatic habitats the project will result in greater access to upstream spawning grounds and rearing habitat. The specific ERPP target addressed by the project is improving passage (ERPP section: Dams, Weirs, Reservoirs, and Other Structures, pages: 278-280, volume I). 2) By improving fish passage conditions, the project will help to ensure the restoration of Cosumnes River Chinook salmon.

The specific targets met by the project are restoring passage required by Chinook salmon (ERPP section: Chinook Salmon, pages 153-154, volume I).

The proposed project addresses the goal of the AFRP as stated in Section 3406(b)(1) of the CVPIA by meeting the following objectives: 1) improving the opportunity for adult fish to reach their spawning habitats in a timely manner, and 2) involving multiple partners in the implementation and evaluation of restoration actions.

RECOMMENDED RECOVERY ACTIONS

Various actions have been recommended by CALFED, AFRP, and the Cosumnes River Task Force.

AFRP RECOMMENDATIONS

- Protect and restore native habitats
- Stabilize and improve populations of native species
- Focus initially on federally listed, proposed or candidate species, other non-listed State and Federal species of special concern including resident fish

AFRP ACTIONS

The following actions are presented as high priority in the FINAL RESTORATION PLAN FOR THE ANADROMOUS FISH RESTORATION PROGRAM (January 2001).

- Acquire water from willing sellers consistent with applicable guidelines or negotiate agreements to reduce water diversions or augment instream flows during critical periods for salmonids.
- Pursue opportunities to purchase existing water rights from willing sellers consistent with applicable guidelines to ensure adequate flows for all life stages of salmonids.
- Determine and evaluate instream flow requirements that ensure adequate flows for all life stages of all salmonids.
- Evaluate the feasibility of restoring and increasing available spawning and rearing habitat for salmonids.

CALFED RECOMMENDATIONS

- Improve streamflow
- Improve channel and floodplain morphology
- Improve salmon spawning and rearing habitat
- Improve fish passage at small dams

The proposed restoration program is also consistent with the CALFED Visions and Proposed ERP Actions for the Cosumnes River:

CALFED Vision for the Cosumnes River: *Recovery of native species, rehabilitating natural processes and restoring functional habitat types are all goals of the ERP. These goals converge in floodplains, which were once a dominant functional type of habitat in the system. Because the Cosumnes River is the last free-flowing river on the western slope of the Sierra Nevada, it was designated as a high priority area for restoration and study of functional floodplain. The Cosumnes River provides unique opportunities for research and restoration.*

CALFED ERP Actions for Cosumnes River: *The fall-run Chinook salmon population can be sustained through improvements in streamflow, channel and floodplain morphology, spawning and rearing habitat, fish passage at diversion dams, and reducing losses to unscreened diversions. Also important to restoration will be removing existing levees and constructing set back levees, implementing improved land management and livestock grazing practices along stream/riparian zones, fish passage improvements at small dams, screening water diversions, and improving gravel recruitment and riparian habitats.*

2. RELATIONSHIP TO OTHER ECOSYSTEM RESTORATION PROJECTS

The proposed project is an essential element of the overall program to restore anadromous fish to Central Valley rivers including the specific program to restore salmon and steelhead populations in the Cosumnes River outlined in CALFED's ERP, Strategic Plan, and Stage 1 Implementation Plan, as well as the AFRP recommended program for Cosumnes River.

In addition, the proposed project complements ongoing studies funded by CALFED and AFRP on the salmon life histories and flow requirements in the Cosumnes River. As stated earlier, the proposed project is an essential adaptive management element of the

overall restoration program for the Cosumnes River based on results of research and monitoring studies over the past two years.

SYSTEM-WIDE ECOSYSTEM BENEFITS

One possible system-wide benefit to restoration efforts on the Cosumnes River would be restoration of fall-run Chinook salmon to one tributary of the Sacramento-San Joaquin River Delta. Fall-run salmon have been observed in the Cosumnes River for the past several decades.

C. Qualifications

OVERVIEW OF TEAM

The Fishery Foundation of CA will be the project lead and will oversee all management and data collection activities.

QUALIFICATIONS OF THE FISHERY FOUNDATION

The Fishery Foundation of California is a non profit 501(c)(3) corporation (Appendix B) 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, Calaveras River, Cosumnes River, Stanislaus River and West Delta. The Foundation assisted DFG in conducting escapement and outmigration surveys in the Cosumnes River from 1997 to 2001 and was the lead investigator from 2002 to the present. Given the Foundations extensive experience with the proposed sampling techniques and vast knowledge of the river, they are highly qualified to perform the proposed monitoring activities.

RESPONSIBILITIES OF PERSONNEL

The Fishery Foundation will administer the project. Trevor Kennedy will serve as Project Coordinator and will be responsible for overseeing all aspects of the project. Kevin Melanephy of FFC will serve as Project Manager and will oversee field operations and data collection. The remaining FFC personnel have worked in the Cosumnes River in various capacities for three to five years. The project team will work with AFRP, DFG, TNC, the Cosumnes River Task Force, and the local water districts to coordinate efforts on a watershed level.

Trevor Kennedy is an aquatic ecologist/fishery Biologist. He has participated in and managed fishery restoration and research projects in the Central Valley for 10 years and has managed restoration and monitoring programs on the Cosumnes River for seven years. He has extensive experience relevant to the proposed project. He developed and implemented measures to improve fish passage on the Cosumnes River via the Cosumnes River Salmonid Passage Improvement Project and on the Calaveras River via the Belotta Weir Fish Passage Project. He is presently managing an AFRP funded pilot study to determine minimum flow requirements for juvenile and adult chinook on the Cosumnes

River with the ultimate goal of securing fall flows for upstream migration. He has contributed to the present understanding of how juvenile fish utilize floodplain habitats within the Cosumnes River and has developed methodologies to determine spatial and temporal densities and distribution of juvenile chinook salmon and steelhead within the Stanislaus, American, and Sacramento Rivers by direct observation. Mr. Kennedy's work has involved extensive coordination with state and local agencies and local landowners. Mr. Kennedy is also experienced in project planning and management and has participated in restoration plans for several California streams and rivers.

D. Costs

1. BUDGET

The project requests $251,647 in grant funds from CALFED to fund the three project tasks:
Task 1. (Project Management) Project management including periodical and annual reporting, quality control, and contract management.
Task 2. (Escapement) Estimate annual escapement and determine temporal and spatial spawning distribution relative to improved sites.
Task 3. (Outmigration) Estimate annual outmigration timing and production relative to past years.

Tasks two and three could be funded separately. It is highly recommended that all three tasks be funded to provide the maximum contribution to our understanding of the relative success of the previously funded restoration actions. Failure to fund either task would require the adjustment of the total budget for task 1

2. COST-SHARING

The AFRP program has provided approximately $120,000 for monitoring studies relating to anadromous fish on the Lower Cosumnes River from 1999-2003 and has funded additional passage improvements and monitoring in the amount of $50,000 for the fall of 2004-spring of 2005 (Agreement#113320J019). Additionally, AFRP has funded a $99,000 pilot study to determine the flow needs for upstream migrating salmon relative to human made structures and critical riffles (Agreement#113323J008).

3. LONG-TERM FUNDING STRATEGY

The FFC plans to continue to implement actions to fully restore the Salmonid populations of the Cosumnes River. Potential future projects including fall flow augmentation, gravel additions or improvements, channel reconfiguration, and cattle exclusion. All the above projects will require a monitoring component and, if funded, will extend monitoring activities into the future.

E. Compliance with standard terms and conditions

The Fishery Foundation of California is willing to comply with all of the standard ERP grand agreements as described in the PSP attachments.

G. Literature Cited

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USFWS. 2003. AFRP Cosumnes River Watershed Data (http://www.delta.dfg.ca.gov/afrp/ws_stats.asp?code=COSUR).

US Fish and Wildlife Service. 2001. FINAL RESTORATION PLAN FOR THE ANADROMOUS FISH RESTORATION PROGRAM. A Plan to increase Natural Production of Anadromous Fish in the Central Valley of California. Prepared for the Secretary of the Interior by the United States Fish and Wildlife Service with assistance from the Anadromous Fish Restoration Program Core Group under authority of the Central Valley Project Improvement Act. Released as a Revised Draft on May 30, 1997 and Adopted as Final on January 9, 2001

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The Nature Conservancy®
Saving the Last Great Places

Cosumnes River Preserve & Delta Project
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info@cosumnes.org
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Worldwide Office
Arlington, Virginia

November 18, 2004

Trevor Kennedy
The Fisheries Foundation
9632 Adams
Elk Grove, CA 95624

Dear Mr. Kennedy,

I am writing on behalf of The Nature Conservancy's Cosumnes River Preserve to express our support for The Fisheries Foundation's proposal titled The Cosumnes River Passage Improvement Monitoring Program. This program to continue The Fisheries Foundation's stewardship and monitoring of the Cosumnes River fall-run Chinook salmon is critical given the endangered nature of the Cosumnes salmon population.

Recent escapement estimates of the Cosumnes salmon have ranged from less than 100 to a high of 1200 emphasizing the endangered nature of the run and the continuing need for oversight of passage, spawning and out-migration conditions. The annual low flow conditions of the Cosumnes River make monitoring the upstream passage essential. There have been several instances over the last several years where Fisheries Foundation personal have identified and or responded to critical blockages in passage. Had the Fisheries Foundation not been in place to respond and remedy these passage emergencies the escapements could have been significantly reduced. Additionally, Fisheries Foundation personal conduct carcass counts resulting in annual escapement estimates and provide important out-migration data both of which are crucial to monitoring the success of past and future restoration actions.

Starting in 1984, The Nature Conservancy began a focused plan along the Cosumnes River to protect endangered ecosystems while accommodating appropriate growth and sustainable economic development within the region. Today, the Cosumnes River Preserve encompasses approximately 50,000 acres including critical habitats needed by the Cosumnes salmon for passage and rearing. The Nature Conservancy welcomes the opportunity to continue working with you and your organization on an ongoing basis to improve conditions for Chinook salmon on the Cosumnes River.

Sincerely,

Keith Whitener
Project Manager
The Nature Conservancy

Appendix B

FISHERY FOUNDATION OF CALIFORNIA
P.O. Box 16277
San Francisco, Ca 94112
415.665.3474 fax 415.564.1069

Reviewers/CALFED,
I hereby declare that the Fishery Foundation of California is a non-profit corporation formed pursuant to the Nonprofit Public Benefit Corporation Law (Division 2 (commencing with Section 5000) of Title 1 of the Corporations Code) and are qualified under Section 501(c)(3) of the United States Internal Revenue Code. Our Tax Identification number is 94-2987019. Attached are our Articles of Incorporation.

Sincerely,

Craig Hanson
Executive Director
Fishery Foundation of California

A420518

UNITED ANGLERS OF CALIFORNIA RESEARCH INSTITUTE

2530 San Pablo Avenue, Suite D / Berkeley, CA 94702-2013 / (510) 845-3533

CERTIFICATE OF AMENDMENT OF ARTICLES OF INCORPORATION

ENDORSED
FILED
In the office of the Secretary of State
of the State of California

JUL 8 1992

MARCH FONG EU, Secretary of State

Robert Hayden and Richard Majourau certify that:

1. They are the president and the secretary/treasurer, respectively, of UNITED ANGLERS OF CALIFORNIA RESEARCH INSTITUTE, a California Corporation, Corporation #1277825.

2. Article One of the Articles of Incorporation of this corporation is amended to read as follows:

   The name of this corporation is FISHERY FOUNDATION OF CALIFORNIA.

3. The corporation has no members.

4. This amendment was unanimously approved by the Board of Directors at their April 29, 1992 meeting.

We further declare under penalty of perjury under the laws of the State of California that the matters set forth in this certificate are true and correct of our own knowledge.

DATE: July 7, 1992

Robert P. Hayden

Robert Hayden, President

Richard Majourau

Richard Majourau, Secretary/Treasurer

c:\wp\uacri\amend.inc
7/1/92

Tasks And Deliverables

Cosumnes River Passage Improvement Monitoring Program

Task ID	Task Name	Start Month	End Month	Deliverables
1	Project Management	1	36	Semiannual and final reports. Periodic invoices
2	Escapement	1	36	Annual estimates of spawning timing and distribution relative to barrier improvement sites. Total escapement using Peterson Index.
3	Outmigration	1	36	Annual estimates of juvenile production and outmigration via screwtrap in lower river.

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
$155,929	$54,575	$11,892	$6,123	$0	$0	$0	$0	$228,519	$23,128	$251,647

Do you have cost share partners already identified?
Yes.

If yes, list partners and amount contributed by each:

DFG (screw trap) $15,000 AFRP (Monitoring) $20,000 FFC (In kind services) $5,000

Do you have potential cost share partners?
Yes.

If yes, list partners and amount contributed by each:

Sacramento County: $50,000/year for 3 years. Negotiations are in progress.

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

Cosumnes River Passage Improvement Monitoring Program

Cosumnes River Passage Improvement Monitoring Program

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)	**18000**	**6300**	**374**	**300**	**0**	**0**	**0**	**0**	$24,974	**2497**	$27,471
2: Escapement (12 months)	**16160**	**5656**	**979**	**550**	**0**	**0**	**0**	**0**	$23,345	**2365**	$25,710
3: Outmigration (12 months)	**16848**	**5897**	**2611**	**1000**	**0**	**0**	**0**	**0**	$26,356	**2677**	$29,033
Totals	**$51,008**	**$17,853**	**$3,964**	**$1,850**	**$0**	**$0**	**$0**	**$0**	**$74,675**	**$7,539**	**$82,214**

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)	**18000**	**6300**	**374**	**330**	**0**	**0**	**0**	**0**	$25,004	**2502**	$27,506
2: Escapement (12 months)	**16604**	**5811**	**979**	**605**	**0**	**0**	**0**	**0**	$23,999	**2437**	$26,436
3: Outmigration (12 months)	**17360**	**6076**	**2611**	**1100**	**0**	**0**	**0**	**0**	$27,147	**2773**	$29,920
Totals	**$51,964**	**$18,187**	**$3,964**	**$2,035**	**$0**	**$0**	**$0**	**$0**	**$76,150**	**$7,712**	**$83,862**

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)	**18000**	**6300**	**374**	**363**	**0**	**0**	**0**	**0**	$25,037	**2507**	$27,544
2: Escapement (12 months)	**17060**	**5971**	**979**	**665**	**0**	**0**	**0**	**0**	$24,675	**2507**	$27,182
3: Outmigration (12 months)	**17897**	**6264**	**2611**	**1210**	**0**	**0**	**0**	**0**	$27,982	**2863**	$30,845
Totals	**$52,957**	**$18,535**	**$3,964**	**$2,238**	**$0**	**$0**	**$0**	**$0**	**$77,694**	**$7,877**	**$85,571**

Budget Justification

Cosumnes River Passage Improvement Monitoring Program

Labor

The following outlines annual task by task summaries of estimated hours and associated rates for each task. Annual efforts for each task are the same for each year. Rates for permanent employees with the exception of the project manager are increased by 5% annually. Temporary field tech rates remain the same for all years. Task 1 (project management) encompasses all QAQC activities, database management, and quarterly and annual reporting. It also allows for the project manager to spend 8 hours per week for 28 weeks in the field for QAQC and training puropses.

Task 2 (escapement) will run from mid−October through mid−January of each year for a total of 12 weeks per year. The senior biologist, biologist, and both techs will work 10 hours per day, two days per week to survey the river from Latrobe falls to the Low flow crossing. The project manager will participate in the escapement surveys one day per week for QAQC and training purposes and will charge his time to project management.

Task 3 (outmigration) will run from February through May of each year for a total of 16 weeks per year. The Senior biologist will work 8 hours per day for four days per week during the 16 week period (64 days). The Field tech#1 will work 3 days per week during the 16 week period (48 days). The project manager will replace the Tech 1 on the fourth work day each week for QAQC and training purposes and will charge his time to project management.

Year 1

Task 1(project management) Project manager 50hr for 360hours

Task 2(escapement)

Statistician 50/hr−40 hours Senior Biologist 20/hr−240 hours Biologist 17/hr−240 hours Field Tech 1 12/hr−240 hours Field Tech 2 10/hr−240 hours

Task 3(outmigration)

Statistician 50/hr−40 hours Senior Biologist 20/hr−512 hours Field Tech 1 12/hr−384 hours

Year 2

Task 1(project management)

Project manager 50/hr−360 hours

Task 2(escapement) Statistician 50/hr−40 hours Senior Biologist 21/hr−240 hours Biologist 17.85/hr−240hours Field Tech 1 12/hr−240 hours Field Tech 2 10/hr−240 hours

Task 3(outmigration) Statistician 50/hr−40hours Senior Biologist 21/hr−512hours Field Tech 1 12/hr−384hours

Year 3

Task 1(project management) Project manager 50/hr−360hours

Task 2(escapement) Statistician 50/hr−40 hours Senior Biologist 22.05/hr−240 hours Biologist 18.7/hr−240 hours Field Tech 1 12/hr−240 hours Field Tech 2 10/hr−240 hours

Task 3(outmigration) Statistician 50/hr−40 hours Senior Biologist 22.05/hr−512 hour Field Tech 1 12/hr−384 hour

Benefits

Employee benefits are charged at 35% and cover Workers Compensation, Unemployment, Social Security, and disability insurance.

Travel

FFC field techs and biologists will travel to the project sites from either Stockton, CA or Sacramento, CA. Distances required for this project have been established for all employees and were used in estimating total mileage by task. The current rate of $0.34/mile was used in calculating reimbursement totals.

Year 1

Task 1(project management) 1100 miles @$0.34/mile– $374

Task 2(escapement) 2879 miles @$0.34/mile– $979

Task 3(outmigration) 7680 miles @$0.34/mile– $2611

Year 2

Task 1(project management) 1100 miles @$0.34/mile– $374

Task 2(escapement) 2879 miles @$0.34/mile– $979

Task 3(outmigration) 7680 miles @$0.34/mile– $2611

Year 3

Task 1(project management) 1100 miles @$0.34/mile– $374

Task 2(escapement) 2879 miles @$0.34/mile– $979

Task 3(outmigration) 7680 miles @$0.34/mile– $2611

Supplies And Expendables

Supplies and expendables include office supplies, document generation, and general field supplies such as field notebooks, rite in the rain paper, thermometers, scale envelopes, measuring tapes, machettes, gaffs, water quality meter maintenance, waders, etc. Boat and screw trap maintenance is also included in this category. The amounts are

based on expenses accrued during similar past monitoring activities. Rates are adjusted upward annually by 10% assuming an increase in costs.

Year 1

Task 1(project management) Office supplies, document production−$300

Task 2(escapement) General field supplies−$550

Task 3(outmigration) General field supplies−$550 Boat and screw trap mainenance−$450

Year 2

Task 1(project management) Office supplies, document production−$330

Task 2(escapement) General field supplies−$605

Task 3(outmigration) General field supplies−$600 Boat and screw trap mainenance−$500

Year 3

Task 1(project management) Office supplies, document production−$363

Task 2(escapement) General field supplies−$665

Task 3(outmigration) General field supplies−$660 Boat and screw trap mainenance−$550

Services And Consultants

None

Equipment

None

Lands And Rights Of Way

None

Other Direct Costs

None

Indirect Costs/Overhead

The Indrect cost rate is 10% and includes costs associated with general office requirements such as rent, phones, computors, furniture, and office staff.

Comments

Environmental Compliance

Cosumnes River Passage Improvement Monitoring Program

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	–	X	801102-02
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 **Omochumnes Hartnell Water District, Rancho Murieta Community Service District**	**–**	**X**	
permission To Access State Land Agency Name	**–**	**–**	
permission To Access Federal Land Agency Name	**–**	**–**	
permission To Access Private Land Landowner Name **Ken Onetto, Bob Mahon, Dick Becker, Kurt Kautz, Van Vleck Ranch, Dan Ruman.**	**–**	**X**	

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

All of the above landowners and local agencies have a good working relationship with the FFC and will continue to grant access to their land for monitoring purposes.

Land Use

Cosumnes River Passage Improvement Monitoring Program

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?
X 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.

The FFC has a long standing relationship with many landowners and both of the local water agencies adjacent to the Cosumnes River. Access was granted during the construction of the passage improvement structures and for post project monitoring. All involved parties have been contacted in 2004 and have enthusiastically agreed to grant access for future monitoring activities.

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?
X 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.