

PSP Cover Sheet

Proposal Title:

Improving the Upstream Ladder and Barrier Weir at Coleman National Fish Hatchery to Facilitate Fisheries Restoration in Battle Creek

Applicant Name: U.S. Fish & Wildlife Service
10950 Tyler Road, Red Bluff, CA 96080
(530) 527-3043, Fax (530) 529-0292
Tricia_Parker@fws.gov

Amount of funding requested: \$1,663,400 for 3 years

Indicate the Topic for which you are applying Fish Passage/Fish Screens

Does the proposal address a specified Focused Action? Yes

What county or counties is the project located in? Shasta and Tehama

Indicate the geographic area of your proposal Sacramento Tributary

Indicate the primary species which the proposal addresses (check all that apply):

- X Winter-run chinook salmon
- X Spring-run chinook salmon
- X Late-fall run chinook salmon
- X Fall-run chinook salmon
- X Steelhead trout
- X All chinook
- X All anadromous salmonids

Specify the ERP strategic objective and target (s) that the project addresses. Include page numbers from January 1999 version of ERP Volume I and II:

Species and Species Groups Strategic Objectives, Volume I: pp 177-178:

Priority Group One: Sacramento winter-run chinook salmon p220,
Sacramento spring-run chinook salmon p220,
Sacramento late-fall-run chinook salmon p221,
fall-run chinook salmon p222,
steelhead trout p229.

Vision for Reducing or eliminating stressors:

Artificial Fish Propagation: Volume I: page 522

Population Targets, volume II:

Sacramento winter-run chinook salmon p25,
Sacramento spring-run chinook salmon p26,
Sacramento late-fall-run chinook salmon p27,
fall-run chinook salmon p28,
steelhead trout p29.

Stage 1 action:

Improve the fish passage facilities at the Coleman National Fish Hatchery. p218

Indicate the type of applicant:

Federal agency

Indicate the type of project:

Implementation

By signing below, the applicant declares the following:

- 1.) The truthfulness of all representations in their proposal;
- 2.) The individual signing the form is entitled to submit the application on behalf of the applicant (if the applicant is an entity or organization); and
- 3.) The person submitting the application has read and understood the conflict of interest and confidentiality discussion in the PSP (Section 2.4) and waives any and all rights to privacy and confidentiality of the proposal on behalf of the applicant, to the extent as provided in the Section.

Northern Central Valley FWO
Printed name of applicant

Dale A. Pears for Jim Smith
Signature of applicant

**Improving the Upstream Ladder & Barrier Weir at
Coleman National Fish Hatchery
To Facilitate Fisheries Restoration in Battle Creek**

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PROJECT PARTICIPANTS AND COLLABORATORS

The Battle Creek Working Group is made up of stakeholders and the state and federal agencies responsible for fisheries restoration in Battle Creek. This project proposal has been developed by a technical subcommittee of the Battle Creek Working Group which includes several member agencies:

U.S. Fish and Wildlife Service
National Marine Fisheries Service
California Department of Water Resources
U.S. Bureau of Reclamation
California Department of Fish and Game
Battle Creek Watershed Conservancy

April 13, 1999

EXECUTIVE SUMMARY

A technical subcommittee of the Battle Creek Working Group (BCWG) identified two improvements to correct the deficiencies in the existing Coleman National Fish Hatchery (CNFH) barrier weir -- the need to improve the barrier weir's capability of **effectively blocking hatchery-origin fall chinook** from swimming-over the weir and the need for an **improved fish ladder**. We need to manage passage above the barrier weir to prevent hybridization of spring and fall run chinook, avoid possible redd superimposition and overutilization of rearing habitat (Figure 1).

Blocking fish passage is not usually the first action undertaken by biologists working on a fishery restoration program, yet since Battle Creek is home to the major mitigation feature for Shasta Dam -- the hatchery, blocking or managing passage of salmonids is of primary importance. In the case of Battle Creek, large numbers of returning, hatchery-origin, fall chinook salmon often exceed the broodstock needs at the hatchery. We know that some fall chinook are accessing the upper watershed (USFWS 1998a) and our concern is that some of these fall run chinook salmon (i.e. migrating July through December) could be hybridizing with spring run chinook (i.e. migrating mid February through July, but holding over to spawn in August through October (CDFG 1998a)). Other concerns include the possibility of redd superimposition or exceeding the biological carrying capacity of the habitat available in Battle Creek -- if large numbers of excess fall run, hatchery-origin chinook are able to access habitat upstream of the hatchery (Figure 2).

Although the weir is integral to broodstock collection at CNFH (located at stream mile 6.0), it is the first in a series of 7 passage impediments that affect all fish returning to over 40 miles of prime salmonid spawning and rearing habitat. The recent "agreement in principle" with PG&E, resource agencies and stakeholders to alter the hydropower system (i.e. dismantling dams, improving passage, increasing flows) is paving the way for additional restoration actions to insure that all 40+ miles of habitat in Battle Creek are accessible to salmon and steelhead. Therefore, it is critical that operational capabilities be designed into CNFH's barrier weir so that fisheries managers can facilitate restoration of naturally-produced salmonid populations -- while integrating the mitigation responsibilities of CNFH (USFWS 1998b, CDFG 1998b).

Of the two fish ladders located at the barrier weir, one leads into the hatchery for broodstock collection and the other leads upstream. The Battle Creek Work Group's attention is

focused on the need to improve the upstream ladder to ease any impediments to salmon and steelhead migrating upstream. To provide optimal passage, the attraction flow at a fish ladder needs to provide 10% of the available creek flow 80% of the time. As the existing upstream fish ladder was designed to pass about 40 cfs of water, 10% attraction flow is only available 30% of the time during the time period when spring chinook salmon adult migration is occurring. **Since we want to insure that adult migration of spring run chinook is facilitated, the attraction flow at the upstream ladder needs to be improved.** Objective A in this proposal encompasses the survey, design, and construction of a new fish ladder (or modification of the existing ladder) to meet the professionally recognized standards for fish ladder design (Rainey 1991).

The second objective is to improve the barrier itself. Our recommended solution is a seasonal, drop-in finger weir to more adequately prevent fish from migrating upstream during the critical time period of July through November. Throughout the design process of developing this option, the technical experts will utilize the practice of adaptive management to insure that the "fix" prevents passage, is easily maintained, and minimizes fish injury (Figure 3).

The barrier is currently designed and operated to accomplish three purposes: broodstock collection for the hatchery, restricting access to the upper watershed to prevent hybridization of spring and fall chinook and restricting the upstream area from access by fall and late-fall chinook from the hatchery's water supply to limit disease transmission. The second and third purposes are not being met as undesired fish passage over the barrier weir has been documented. Therefore, the barrier weir is not functioning as a true barrier.

The work described in this proposal has the involvement and support of many agencies and individuals. The list of people who are familiar with and support this proposal includes those involved in the Battle Creek Working Group (BCWG) and the Battle Creek Watershed Conservancy (BCWC). Respectively, these groups represent the agencies/technical advisors on Battle Creek restoration issues and the local watershed workgroup for Battle Creek. Together, these people and agencies will work together to resolve the concerns with this weir that relate to fish population management (CDFG 1993, 1996; Bernard et al. 1996; USFRHAC 1989; USFWS 1995, 1997).

PROJECT DESCRIPTION

SCOPE OF WORK

Objective A – Improving the fish ladder at the CNFH barrier weir.

The existing fish ladder was designed to pass about 40 cfs of water. To provide optimal passage, the fish ladder at the barrier weir needs to be improved to a capacity of about 85 cfs. This can be accomplished in a variety of ways. **Objective A encompasses the survey, design, and construction of a new fish ladder (or modification of the existing ladder) to meet the professionally recognized standards for fish ladder design (Rainey 1991).**

The tasks encompassed by this objective consist of three phases:

Phase I includes collecting the necessary field data, evaluating alternatives, preparing and completing preliminary designs (Tasks A1, A2, A3);

Phase II is the construction of an improved fish ladder and environmental compliance documentation (Tasks A4, A5, A6, A7);

Phase III monitoring, environmental education and project management (Tasks A8, A9, A10).

[Note: Tasks included in any one of the "phases" are considered inseparable.]

Task A1 - Topographic survey and map. A topographic map of the immediate upstream and downstream project area will be produced. The contour interval will be one foot.

Task A2 - Geologic and environmental inspection. Complete geologic exploration and environmental inspection in the vicinity of the project site. Gather information on streamflow, hatchery operations and from previous construction projects at or around the site. Analyze data and develop documentation.

Task A3 - Preliminary designs. A preliminary engineering technical report will be produced. The report will follow standard format including: an introduction; location map; site layout map; fish ladder technical background; technical background on the monitoring facility (e.g. video chamber and trap); design and construction summaries; preliminary design drawings showing major component dimensions and locations; explanation of alternatives considered; discussion of how the improved fish ladder will complement existing and proposed facilities at CNFH and proposed sorting facilities; construction cost estimates; a summary of environmental review; and appendices containing collected field data.

Task A4- Final designs. A final engineering technical report will be produced. The report will follow standard format including an introduction, location map, site layout map, fish ladder technical background, design and construction summary, final design drawings showing major component dimensions and locations, and final construction cost estimates.

Task A5- Environmental Compliance. All necessary environmental compliance will be undertaken by the USBR. This may include appropriate sections from National Environmental Policy Act (NEPA), Section 7 of the federal Endangered Species Act (ESA), Section 401 of the Clean Water Act, Section 404 of the Clean Water Act, Fish and Wildlife Coordination Act (FWCA), Section 106 of the National Historic Preservation Act, and California Environmental Quality Act (CEQA).

Task A6- Bid Solicitation. Final plans and specifications will be written for the contract to do the construction.

Task A7- Construction. The contract will be awarded to a qualified contractor and will require the contractor to abide by all local, state, and federal permits. Work will be scheduled around state in-water work periods.

Task A8- Monitoring. The USFWS currently has ongoing monitoring projects within the Battle Creek watershed that will assist in the assessment of the improved fish ladder. Biological monitoring by USFWS will assess the efficacy of the fish ladder using snorkel/carcass surveys, video monitoring, trapping, and a proposed radio telemetry study. [See also, the section on Monitoring, page 11.]

Task A9- Public Outreach. The BCWC will plan, organize, and conduct public outreach. Public outreach will include two press releases to at least four local newspapers, up to four public meetings, and an informational booth at the Salmon Festival held at the CNFH. The BCWC will work with Lassen Volcanic National Park, USFWS, and CDFG to include information about this project in ongoing educational activities at four local schools serving students from the Battle Creek watershed.

Task A10- Project Management – The USFWS will coordinate the cooperating agencies and will facilitate the completion of this project.

Objective B – Improve the barrier to make it more “fish tight”

The barrier is currently designed and operated to accomplish three purposes: broodstock collection for the hatchery, restricting access to the upper watershed to prevent hybridization of spring and fall chinook, and restricting access to the upper watershed by fall and late-fall chinook from to limit disease transmission into the hatchery's water supply. The second and third purposes are not being met. The second and third purposes are not being met as undesired fish passage over the barrier weir has been documented. Therefore, the barrier weir is not functioning as a true barrier. **We propose modifying the barrier to make it more fish tight during the July through November fall chinook migration period.**

Actions to repair this inadequacy are encompassed by the three phases of tasks shown below:

Phase I: includes assessing and designing repairs to the damaged portions of the weir, then completing the first steps (preliminary design, final design and bid solicitation) for the barrier modification (Tasks B1, B2, B4, B5);

Phase II: is the construction phase (Tasks B3, B6);

Phase III: monitoring, public outreach and project management (Tasks B7, B8 and B9).

[Note: Tasks included in any one of the “phases” are considered inseparable.]

Task B1- Damage Assessment. Assess existing damage to the concrete at the existing barrier weir and recommend remedial actions. (Note: in the course of putting this proposal together, we noticed some minor damage. Parts of the concrete surface of the downstream face of the weir are eroding and steel re-bar within the concrete has been exposed and is deteriorating. It makes sense to remedy these problems at the same time that we are working on a “fish-tight” fix.)

Task B2- Design repairs to the weir. A short report will be prepared detailing proposed repair procedures. Any necessary environmental compliance documentation would be completed by the USBR. This could include appropriate sections from National Environmental Policy Act (NEPA), Section 7 of the federal Endangered Species Act (ESA), Section 401 of the Clean Water Act, Section 404 of the Clean Water Act, Fish and Wildlife Coordination Act (FWCA), Section 106 of the National Historic Preservation Act, and California Environmental Quality Act (CEQA).

Task B3- Repair damaged areas on the barrier weir. (Implement the remedial actions recommended in Task B1.)

Task B4- Preliminary Design

Preliminary designs for modifications to the barrier weir will be peer-reviewed and finalized. At the time of this proposal submission, the type of seasonal fix that we are recommending is a metal, drop-in "finger" weir that could be installed on the lip of the existing concrete barrier weir (Figure 3).

Throughout the design process of developing this option, the technical experts working on this project will utilize the practice of adaptive management to insure that the "fix" prevents passage, is easily maintained and minimizes fish injury. Detailed comments from a group of peer-review engineers and fishery biologists will be incorporated into final design plans, specifications, and contract language. These comments will provide detailed refinements (e.g. spacing between bars, length of bars) to the fix that we have prescribed.

Task B5 - Final Design and Bid Solicitation. The final plans will be packaged into a bid solicitation. The work will be awarded to a contractor who will be required to obtain all local, state, and federal permits. Work will be scheduled around state mandated in-water work periods.

In terms of durability, it is hard to estimate how long this structure will last. Whenever a steel structure is placed in a dynamic stream environment, we can estimate that periodic replacement of the structure will be required.

Task B6- Construct and install the barrier modifications, This modification will be installed on a seasonal basis during the low-flow fall chinook salmon migration season from early July through late November (note that this schedule is flexible, based on seasonal water conditions for safe removal). Any necessary environmental compliance documentation would be completed by the USBR (see Task B2 for a detailed description).

Task B7- Monitor. Spawning ground surveys and direct observation at the weir will indicate if fish are circumventing the weir. [See also, the section on Monitoring -- page 11.]

Task B8 - Outreach (see task A9).

Task B9- Project Management. The USFWS will coordinate the cooperating agencies and will facilitate the completion of this project.

SCHEDULE

Objective A: Improve Fish Ladder		Deliverable	Completion Date
Task:			
A1:	Topographic Survey & Map	Survey & Map	10/99
A2:	Inspection: Geol & Environ.	Document	11/99
A3:	Preliminary Design	Plates/Reports	5/00
A4:	Final Design	Plates/Reports	12/00
A5:	Environmental Compliance	Reports/Permits	12/00
A6:	Bid Solicitation	Plans/Specs	2/01
A7:	Construction	New/modified facility	8/01
A8:	Monitoring	Monitoring report	12/01
A9:	Public Outreach	Mtgs./Press Releases	12/01
A10:	Project Management	Completed project	12/01

Objective B: Improve Barrier		Deliverable	Completion Date
Task:			
B1:	Damage Assessment	Draft Assessment Report	8/99
B2:	Design repairs to weir	Design report	10/99
B3:	Repair weir	Renovated facility	8/00
B4:	Preliminary Design	Report	9/99
B5:	Final Design & Bids	Bid Package	9/99
B6:	Construct barrier modification	Drop-in Barrier	11/99*
B7:	Monitor	Report	12/01
B8:	Public Outreach	Mtgs./Press Releases	12/01
B9:	Project Management	Reports/Permits	12/01

* Ideally, the barrier could be modified to be more fish-tight prior to the 1999 July-November fall chinook migration season – but this can only occur if we receive the funding promptly (task B4, B5 and B6 may require up to 6 months to complete after funding is received). During this first year, it may work out that the drop-in barrier is only in place for only a few weeks before needing to be removed. In this case, the technical committee recommends a short-term installation of the barrier modification to protect against hybridization during this critical time period.

PROJECT LOCATION

The proposed project will occur at a single site within the Battle Creek watershed, on the boundary between Shasta and Tehama counties. The project site is adjacent to the CNFH located at latitude 40° 23' 54" N, longitude 122° 8' 43" W (USGS Quad - Bails Ferry, California).

ECOLOGICAL/BIOLOGICAL OBJECTIVES

The abundance and distribution of salmon and steelhead populations in Battle Creek are artificially managed by the operation of a large, permanent fish barrier weir at CNFH since 1952 (CDFG 1951). Prior to that time, adult salmon were collected from Battle Creek at seasonally installed racks near the historic Battle Creek Hatchery (Cope and Slater 1957).

Linkages identified in the Ecosystem Restoration Program Plan (CALFED 1999):

- **Species and Species Groups Strategic Objectives, Volume I: pp 177-178:**
 - Priority Group One: Sacramento winter-run chinook salmon p220,
Sacramento spring-run chinook salmon p220,
Sacramento late-fall-run chinook salmon p221,
fall-run chinook salmon p222,
steelhead trout p229.
- **Vision for reducing or eliminating stressors:**
 - Artificial Fish Propagation: Volume I: page 522
- **Population Targets, Volume II:**
 - Sacramento winter-run chinook salmon p25,
Sacramento spring-run chinook salmon p26,
Sacramento late-fall-run chinook salmon p27,
fall-run chinook salmon p28,
steelhead trout p29.
- **Stage 1 action:** Improve the fish passage facilities at the Coleman National Fish Hatchery. p218

Note: A secondary benefit to improving the upstream ladder may include improving passage for fish in the lamprey family (Priority Group II : Lamprey family p 178 volume I).

ECOLOGICAL/BIOLOGICAL OBJECTIVES (continued)

Objective A

Current design philosophies on fish ladders call for optimal conditions being 10 percent of total stream flow flowing through the ladder (Rainey 1991). The existing ladder was adequately designed in 1992 to meet flow criteria during the dry season when fall chinook are migrating. However, this ladder fails to meet the professionally recognized standards from December through June when steelhead and winter, spring and late-fall chinook migrate into the watershed under higher flows. Steelhead, winter and spring chinook salmon are all priority species in the restoration of Battle Creek and are listed under federal and/or state endangered species acts.

To properly meet the standards for attraction flow into the ladder, the fish ladder at the barrier weir needs be improved to a capacity of about 85 cfs. Objective A in this proposal will survey, design, and construct a new fish ladder or modify the existing ladder to meet the criteria commonly in use throughout the Pacific Northwest (Rainey 1991). In this way, this ladder will meet the same standards used in designing the ladder at other dam sites in Battle Creek (e.g., Eagle Canyon, CDWR 1997).

ECOLOGICAL/BIOLOGICAL OBJECTIVES (continued)

Objective B

Currently, the fish ladder at the barrier weir is closed to create a migration barrier during July through early March (Figure 1). The reasons for this closure include stock management, broodstock collection and disease control. We anticipate the need to better manage fish passage into the watershed. Therefore, the barrier weir must be able to block fish to achieve fisheries management objectives. One management objective, preventing the hybridization of spring and fall chinook salmon, can only be achieved by having a tool to manage the passage timing of fall chinook into the upper watershed. Such regulation is only possible if the barrier weir can exclude all migrating salmonids at specific times of the year.

The July through November time period is critical for exclusion of fall chinook from the upper watershed to prevent hybridization with spring chinook. We know that fall chinook are getting upstream of the barrier because we have found floy tagged fall chinook in upper Battle Creek (USFWS 1998a). The floy tagged fish represent part of the California Department of Fish & Game's mainstem Sacramento River fall chinook population estimate (i.e. DFG biologists tag fall chinook salmon as they ascend the ladder at Red Bluff Diversion Dam). Carcass surveys conducted on upper Battle Creek by Fish & Wildlife Service biologists later found six floy tagged fish (beginning at stream mile 9). These six floy tagged fish represent a much larger population of fall chinook salmon.

Observations show that the barrier weir becomes increasingly passable when flows exceed 350 cfs (USFWS 1996). We have also observed fish making it over the barrier at lower flows. During the July through November time period, the average daily flows range from approximately 250 - 400 cfs, but, the percent of time that flow that peak flows are greater than 350 cfs (due to storm events) is: July 30%; August 10%, September 10%, October 20%, and November 30%. Biologists working on the 1998 U.S. Fish and Wildlife Battle Creek snorkel/carcass survey recovered 82 carcasses in the upper Battle Creek watershed. Of these 82 carcasses, four were adipose fin clipped. The recovered tags from these four fish revealed that they originated from Coleman National Fish Hatchery's fall chinook stocking program (USFWS 1998a). We need to prevent large numbers of hatchery-produced fall chinook from entering the upper portion of the watershed. Our proposed modifications to the barrier would make it fish tight during this crucial time period.

The fish tight barrier weir modifications do not need to be installed during other times of the year because it is not necessary to block other races of chinook. For example, late-fall chinook don't hybridize with spring chinook. Our intent is that this drop-in barrier will only be in place when it will not impact migration of ESA-listed species, and large numbers of hatchery fish are present.

This project includes tasks to survey, design, and construct a removable series of horizontal grates that would be installed on the lip of the existing weir during the fall chinook spawning period (Figure 3). These actions would help to preclude passage of salmonids and fix the deficiencies of the existing weir. After completion of the actions in Objective B, we would have a tool for genetic management of returning fish populations to Battle Creek. The research and discussions needed to resolve the intricacies of a genetic/population management plan have not yet occurred, but the need for a tool to manage fish passage is currently apparent.

Additionally, the existing barrier weir is physically deteriorating. Recent surveys of the weir have indicated that parts of the concrete surface of the downstream face of the weir are eroding. Steel support structures underlying the concrete have been exposed. These deficiencies need to be repaired to reduce potential injury of fish attempting to navigate the structure and to insure the future integrity and function of this weir.

Accomplishment of these objectives will have synergistic, system-wide ecosystem benefits – not only will habitat become available for utilization by salmonids, but a tool for future population genetic management will be in place. In the future, funding will be sought for additional facility modifications to address the need to sort and selectively pass fish upstream.

FEASIBILITY AND TIMING

The table on page 7 lists the targeted completion dates for all tasks. These are based on the assumption that funding and a contract are in place by July 15, 1999. Instream construction work is contingent on flows and must be completed at low to moderate to flows; therefore, we target July as the earliest month for construction, when flows average 318 cfs (Kier Associates 1999).

FEASIBILITY AND TIMING (continued)

Also note that if Objective B is funded alone, then there are not enough funds for data collection. Objective A must be funded first.

The proposed approaches to remedy the barrier weir passage issues (i.e. improving upstream passage and more adequately blocking passage during July through November) were arrived at after thorough consideration by the technical subcommittee of the Battle Creek Work Group that was established to do this work. In the process of coming up with this collaborative recommendation, other, similar approaches were considered. The technical subcommittee had long discussions and heard presentations from other professionals before arriving at the recommendations presented here. For example, we decided not to seek funding for the re-build that was proposed in the January 1999 CALFED solicitation (i.e. the addition of height to the barrier weir could/would cause further erosion).

MONITORING AND DATA COLLECTION METHODOLOGY

Four questions will be examined to monitor the efficacy of an improved fish ladder and modified barrier weir, including:

- 1) Are migrating anadromous salmonids effectively locating the entrance of the improved fish ladder?

Approach: USFWS will compare pre-project and post-project rates at which salmonids tagged with radio-transmitters locate the fish ladder entrance from a downstream release site. We will also compare the amount of time (i.e. delay) from when a tagged fish reaches the vicinity of the barrier dam to the time that it reaches the fish ladder entrance. This work will be conducted during the high-flow season (March - April) when attraction-flow and ladder efficacy will be most challenged. This study will utilize existing USFWS automated radio telemetry equipment. We anticipate tagging as many as 30 fish per year during two years (pre-project and post-project).

- 2) Do fish effectively ascend the improved fish ladder?

Approach: USFWS will compare pre- and post-project ladder-ascension rates. That is, of the fish that reach the fish ladder entrance, what proportion successfully ascend to a trap installed at the upstream end of the fish ladder? For this study element, a crew will need to operate the fish-ladder trap.

MONITORING AND DATA COLLECTION METHODOLOGY (continued)

- 3) Are migrating anadromous salmonids sustaining injuries or mortality as a result of the modifications to the weir?

Approach: Indices of fish injury (e.g. organosomatic index) will be utilized to determine if salmonids attempting to pass upstream are sustaining injuries. A high correlation between time required to pass upstream and the injury index would indicate that fish are becoming injured while attempting to navigate the barrier weir.

- 4) Can migrating anadromous salmonids circumvent the barrier weir at times when the fish ladder is closed?

Approach: USFWS will record observations of marked fall chinook salmon, during surveys of spawning grounds. We will conduct direct observations at the weir to identify unintentional fish passage. Additional information will come from radio-tagged fish that circumvent the weir and are tracked upstream.

All results of these monitoring studies will be analyzed and published in a peer-reviewed document. This project will be coordinated with radio telemetry studies on the Sacramento River at Red Bluff Diversion Dam (RBDD) and the Anderson-Cottonwood Irrigation District dam. This study may be augmented by the RBDD radio telemetry studies -- to the extent that fall chinook salmon tagged at RBDD migrate to Battle Creek. Spawning ground surveys and direct observations at the weir will be integrated with ongoing monitoring conducted by USFWS. The proposed projects are supported by existing data on fish ladder criteria (Bell 1991, Rainey 1991, CDWR 1997), and concepts for fish restoration in the Battle Creek Restoration Plan (Kier Associates 1999).

Note: See also Task A-8 and B-6. The USFWS is currently monitoring juvenile production in Battle Creek with funding from the 1998/1999 Comprehensive Assessment and Monitoring Program (CAMP). Adult monitoring is also underway as part of the evaluation of the winter-run chinook salmon propagation program (USFWS 1996 and 1997 (draft)).

LOCAL INVOLVEMENT

Representatives of both Tehama County and Shasta County Boards of Supervisors are aware of Battle Creek restoration planning. They have been notified in writing of the proposed restoration project and the Tehama County Board of Supervisors have expressed their support in writing (February 2, 1999, attached). On January 12, 1999, the Tehama County Fish and Game Commission passed a motion to support this proposed project.

The following groups are aware of the overall Battle Creek restoration efforts:

Battle Creek Watershed Conservancy	Deer Creek Watershed Conservancy
Tehama Fly Fishers	Mineral Home Owners Association
Boole Ditch Water Users	Tehama County Cattlemen's Association
Crooker/Harrison Water Users	Nor-Cal Guides
Rock Creek Water Users	Manton Grange
Manton Elementary School Board	Mt. Lassen Historical Society
Mineral Elementary School Board	Pacific Gas & Electric Company
Manton Historic Society	The Nature Conservancy
Mill Creek Conservancy	

Information on these improvements to the barrier weir and upstream ladder have been discussed at Battle Creek Watershed Conservancy meetings. Adjacent and affected landowners are aware of and support the proposed project. No groups or landowners have come forward opposing the overall restoration of salmon and steelhead in Battle Creek. Members of the Battle Creek Working Group have been informed and support this potential action (see BCWG meeting summaries from November 1998, December 1998, February 1999 and March 1999).

Public outreach will include two press releases to at least four local newspapers, up to four public meetings, and an informational booth at the Battle Creek watershed Salmon Festival held at the CNFH. The BCWC will work with Lassen Volcanic National Park, USFWS, and CDFG to include information about this project in ongoing educational activities at four local schools serving students in the Battle Creek watershed.

Costs for Improving the Upstream Ladder and Barrier Weir at Coleman National Fish Hatchery, Battle Creek, California

<u>Task</u>	<u>Total</u>	<u>Direct Labor</u> <u>Hours</u>	<u>Direct Salary</u> <u>& Benefits</u>	<u>Service</u> <u>Contracts</u>	<u>Material &</u> <u>Acquisition</u>	<u>Misc &</u> <u>Direct</u>	<u>Overhead</u> <u>& Indirect</u>
A1: Survey & Map	\$60,300	500	22,691	0	500	35,353	1,756
A2: Geo & Env. Survey	\$56,800	300	13,615	20,000	0	21,212	1,654
A3: Preliminary Design	\$43,000	360	16,338	0	0	25,454	1,254
A4: Final Design	\$98,000	820	37,214	0	0	57,979	2,856
A5: Bid Solicitation	\$12,000	100	4,538	0	0	7,071	348
A6: Enviro. Compliance	\$59,800	500	22,691	0	0	35,353	1,741
A7: Construction	\$731,300	0	0	710,000	0		21,300
A8: Monitoring	\$130,800	1,313	114,000	0	13,000		3,810
A9: Project Management	\$92,100	960	74,400	0	15,000		2,682
A10: Public Outreach	\$15,000	160		13,000	1,500		435
Objective A Total	\$1,299,100						
B1: Damage assessment	\$7,200	60	2,723	0	0	4,242	209
B2: Design repairs to weir	\$29,900	250	11,346	0	0	17,677	870
B3: Repair weir	\$59,800	500	22,691	0	0	35,353	1,741
B4: Prelim design	\$35,900	300	13,615	0	0	21,212	1,045
B5: Final design & bids	\$81,300	680	30,860	0	0	48,080	2,368
B6: Construct barrier mods	\$106,100			100,000	0	0	3,090
B7: Monitoring	\$30,800	327	29,000	0	0	0	896
B8: Project Management	\$13,300	139	12,500	0	0	0	386
Objective B Total	\$364,300						
Total Project Cost	\$1,663,400						

Notes:

FWS serves as Project Coordinator with a 3% overhead rate - shown in the column titled "Overhead & Indirect". DWR's overhead for tasks A1-A7 and B1-B5 are shown in the column titled "Misc & Direct". The responsibility for the tasks is shown on the following page and is subject to revision. The figures shown in the total budget column are rounded to the nearest hundred.

<u>Responsibility</u>	<u>DWR</u>	<u>USBR</u>	<u>USFWS</u>	<u>Contractor</u>	<u>other</u>
A1: Survey & Map	X				
A2: Geo & Env. Survey	X				
A3: Preliminary Design	X				
A4: Final Design	X				
A5: Bid Solicitation	X				
A6: Env. Compliance	X	X			
A7: Construction				X	
A8: Monitoring			X		
A9: Project Management			X		
A10: Public Outreach			X		X
B1: Damage assessment	X				
B2: Design repairs to weir	X				
B3: Repair weir	X				
B4: Preliminary Design	X				
B5: Final Design & Bids	X				
B5: Construct barrier mods			X	X	
B6: Monitoring			X		
B7: Project Management					

COST AND COST-SHARING

We seek funding for the two objectives described above: Objective A -- improving the fish ladder at the CNFH barrier weir, and Objective B -- modifying the barrier weir to repair existing damage and to assist management of restoring populations.

This project is supported by members of the Battle Creek Work Group, technical subcommittees, and resource agencies -- and is consistent with CVPIA AFRP actions, CALFED Category III priorities, and state and federal ESA concerns. The CNFH barrier weir directly impacts three CALFED tier-one primary-species including winter-run, spring-run, and steelhead. Additionally, Battle Creek has been identified by CALFED as a primary Ecological Unit.

This proposal will assist future restoration of the Battle Creek watershed by allowing efficient fish passage into the watershed and effective fisheries management at the barrier weir. As recommended by the CALFED Ecosystem Roundtable, actions of this type reduce negative impacts to listed species (i.e. winter and spring chinook) by reducing the stressors that they encounter. Although CVPIA funds could be used for this project, it is unlikely that this project would be funded by CVPIA in the immediate future.

All four monitoring aspects of this proposal will be cost-shared with USFWS. The specific proportion of contributions from other sources are unknown at this time. Funds shown in this proposal will partially support one year of fish trapping and video monitoring at the improved ladder as well as spawning ground surveys to evaluate successful fish passage. USFWS will provide staff to operate and maintain the ladder and weir (CNFH staff) and provide the equipment and staff for radio telemetry monitoring (Northern Central Valley Fish & Wildlife Office staff).

Operations and maintenance of the modifications to the barrier weir will be handled by CNFH staff. The cost estimate for installation and removal (labor, crane rental, etc) will amount to approximately \$6,000 per year (USBR annual funding to operate the hatchery).

APPLICANT QUALIFICATIONS

U.S. Fish and Wildlife Service – The U.S. Fish and Wildlife Service's Northern Central Valley Fish and Wildlife Office has been conducting surveys on Battle Creek to obtain adult life history information on spring and winter chinook salmon since 1995. Juvenile outmigration is also being monitored. Biologists with this office have been extensively involved with monitoring chinook salmon in the upper Sacramento River since 1978. The Service has a strong interest in Battle Creek -- as it has been operating the Coleman National Fish Hatchery located in the Battle Creek watershed since 1942. Engineering staff from our Regional Office in Portland will also be available for technical assistance. The USFWS will take the lead role in proposal submittal, contract administration, project management, project facilitation, and monitoring. Contacts: Tricia Parker, Jim Smith, Scott Hamelberg, Tom Nelson and Jim Stow.

California Department of Water Resources – The Northern District of CDWR has a long history of providing engineering support to fishery restoration programs. Experienced staff will perform the tasks outlined in this proposal and cooperate with collaborating agencies. The project manager is Mr. William Mendenhall. He has over 20 years of experience with fishery restoration planning and design. CDWR is local and has the equipment, technology, and resources to support this proposal. CDWR offers its engineering expertise and will direct project reconnaissance and feasibility engineering. Contact: Brian Stewart.

National Marine Fisheries Service- National Marine Fisheries Service (NMFS) is the federal trustee for anadromous fish and critical habitat affected by this restoration project. The Santa Rosa Field Office of the NMFS Southwest Region will be the contact point for NMFS. NMFS staff will participate in review of the drafts and final design of the facility improvements as well as participating in the preparation of environmental documentation to comply with the applicable state and federal regulations (including conducting Federal Endangered Species Act section 7 (a) (2) consultations required for actions authorized, funded, or carried out by federal agencies). Contact: John K. Johnson, Dan Free.

U.S. Bureau of Reclamation – USBR is a multi disciplinary agency familiar with these projects and associated actions. The USBR is prepared to carry out the tasks of environmental compliance, final engineering design and construction. In addition to staff specializing in environmental compliance and engineering, other experienced staff from the Mid-Pacific Regional Office will be available for this work on an as-needed basis and to provide peer review. Also available on an as-needed basis, is the USBR Technical Service

Center (TSC) in Denver. The TSC has a wide range of experience in providing concept studies, final designs, model studies, and construction support for the fish related facilities. Contact: Mary Marshall, Warren Searls.

California Department of Fish and Game – CDFG is the state trustee for anadromous and resident fish and stream dependant wildlife affected by the project. The Department has over 70 years of experience in fish ladder design and over 100 years of experience in hatchery operations. CDFG will: 1) participate in the review of draft and final designs, 2) participate in preparation of the environmental documentation to comply with applicable state and federal regulations, 3) participate in completion of required permit applications including, but not limited to, a Streambed Alteration Permit from CDFG and California Endangered Species Act Permit. The Region I office of the Department of Fish and Game will be the contact point for the Department.

Battle Creek Watershed Conservancy – The Battle Creek Watershed Conservancy was formally organized in late 1997 as a non-profit organization representing landowners and residents of the Battle Creek watershed. The goal of the Conservancy is “To preserve the environmental and economic resources of the Battle Creek watershed through responsible stewardship, liaison, cooperation and education.” The Conservancy will be primarily responsible for public outreach and project interpretation. Contact: Leland Davis, President.

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- Cope, O.B. and D.W. Slater. 1957. Role of Coleman Hatchery in Maintaining a King Salmon Run. U.S. Fish & Wildlife Service Research Report 47. 22pp.
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USFWS (U.S. Fish and Wildlife Service). 1997. Revised draft restoration plan for the anadromous fish restoration program: a plan to increase natural production of anadromous fish in the Central Valley of California. Prepared by USFWS and the Anadromous Fish Restoration Program Core Group. Sacramento, California.

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USFWS (U.S. Fish and Wildlife Service). 1998 (draft). Evaluation of the Sacramento River winter chinook salmon (*Oncorhynchus tshawytscha*) propagation program in 1997.

USRFRHAC (Upper Sacramento River Fisheries and Riparian Habitat Advisory Council). 1989. Upper Sacramento River fisheries and riparian habitat management plan. State of California Resources Area. 158pp.

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Figure 1: Relationship between operations of fish ladder and proposed seasonal barrier at Coleman National Fish Hatchery barrier weir and upstream migration and spawning timing of fall chinook and spring chinook salmon.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ladder to upper Battle Creek ¹	Closed		Opened				Closed					
Ladder to hatchery holding ponds ²	Opened		Closed						Opened			
Fall chinook upstream migration										Peak		
Fall chinook spawning										Peak		
Proposed seasonal barrier ³	Out						In				Out	
Spring chinook upstream migration				Peak								
Spring chinook spawning									Peak			

¹Proposal includes improving the attraction flow through the upstream ladder. Note spring chinook salmon migration period.

²Fish can, and are, passed through to upper Battle Creek via return tubes from the spawning building (e.g. steelhead).

³Purpose: Exclude fall chinook salmon from upstream habitat occupied by spring chinook salmon. Prevent hybridization of spring and fall chinook salmon.

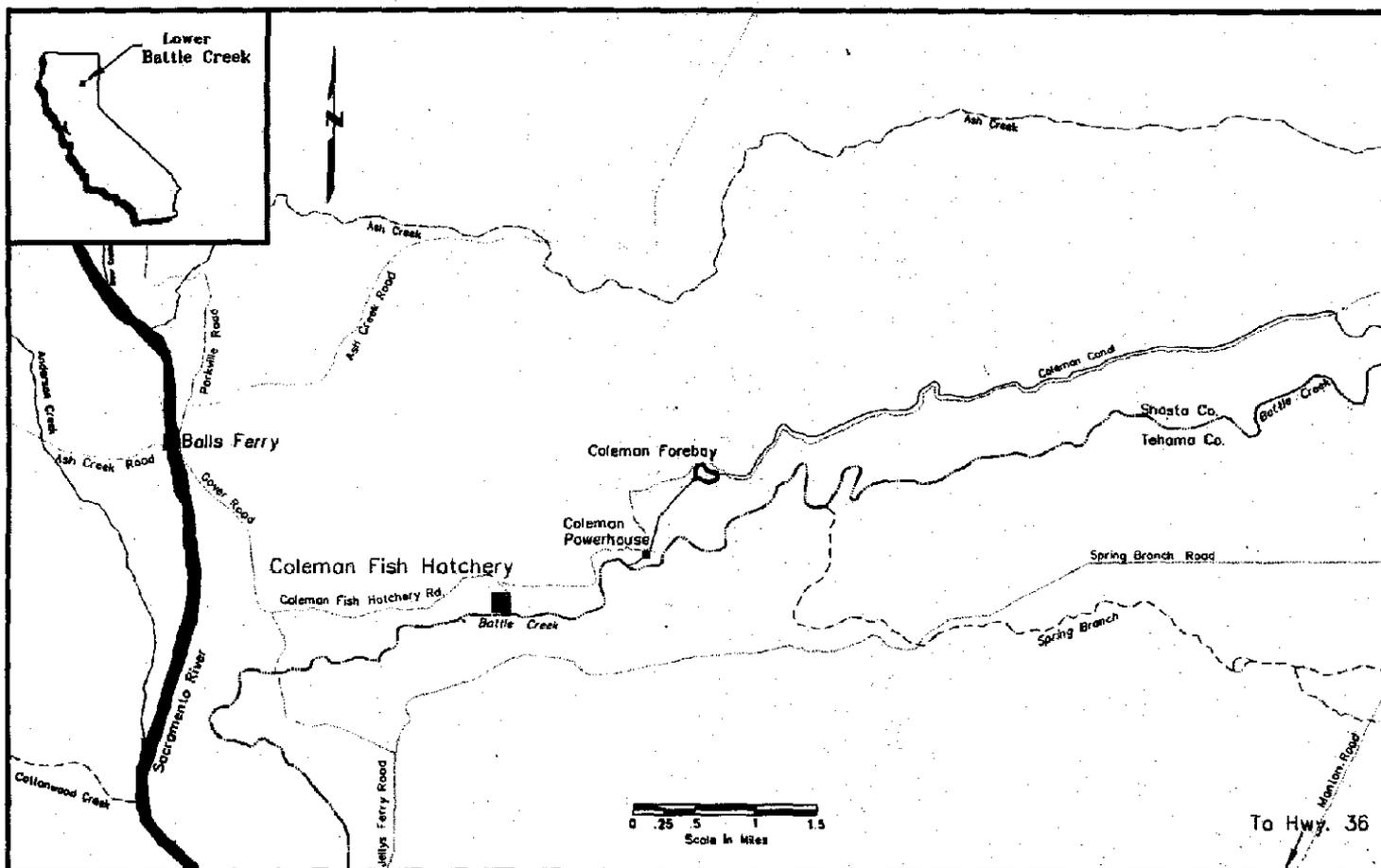
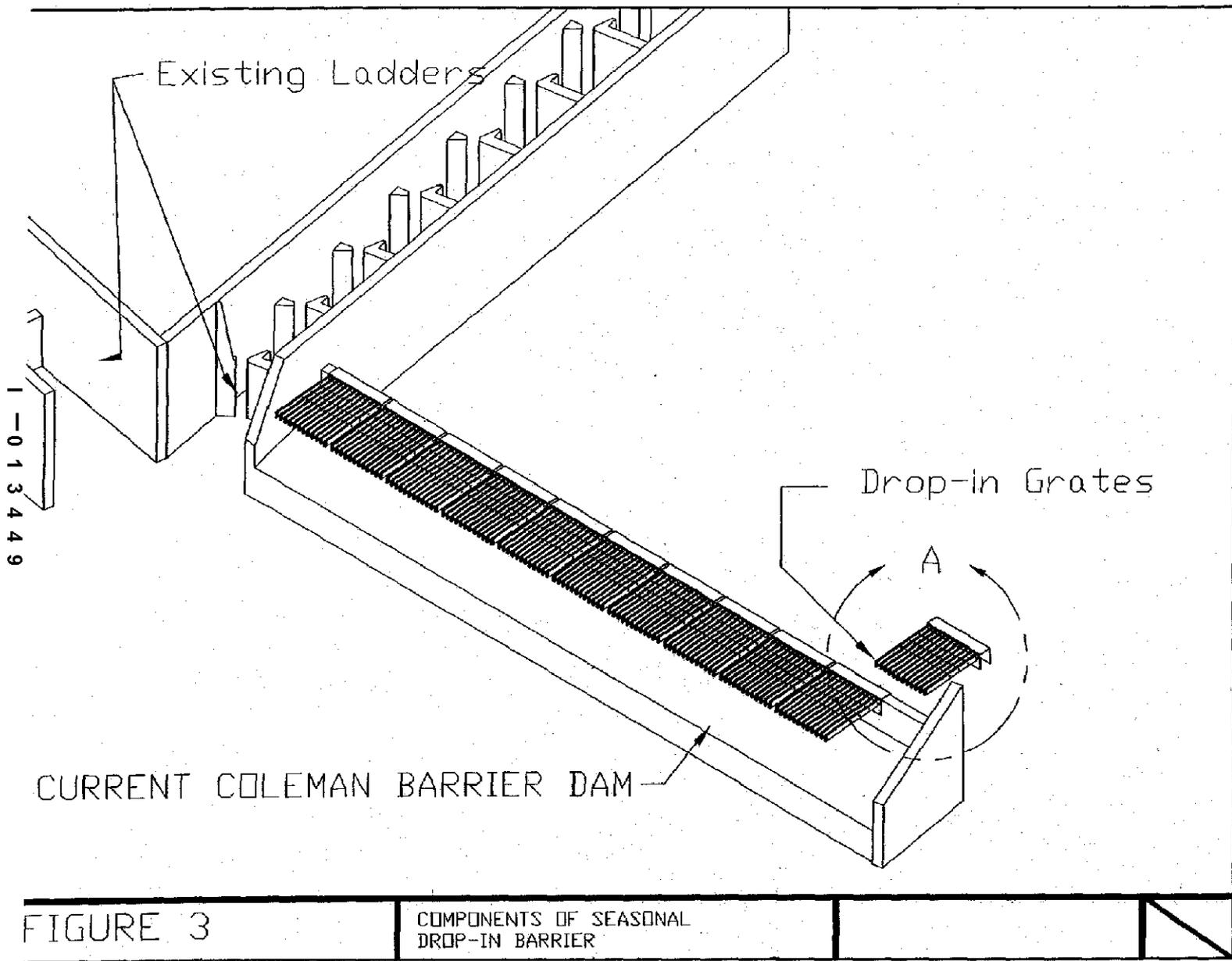


Figure 2: Location Map for
LOWER BATTLE CREEK SYSTEM
 near Balls Ferry, California

State of California
 The Resources Agency
 DEPARTMENT OF WATER RESOURCES
 Northern District





Board of Supervisors
COUNTY OF TEHAMA

*District 1 - Barbara McIver
District 2 - George Russell
District 3 - Charles Willard
District 4 - Ross Turner
District 5 - Bill Berror*



Tehama County Courthouse

*Richard Robinson
Chief Administrator*

February 2, 1999

Mr. James G. Smith, Project Leader
United States Fish and Wildlife Service
Northern Central Valley Fish and Wildlife Office
10950 Tyler Road
Red Bluff, CA 96080

RE: Coleman National Fish Hatchery's Barrier Weir
and Upstream Ladder Project

Dear Mr. Smith:

Thank you for your brief presentation before the Board on January 12, 1999, regarding this project. Since we are well aware of the economic and recreational value of the salmon runs to Tehama County, we are interested in supporting efforts to increase those runs. Certainly, the improvement and expansion of natural stream spawning areas is very important to increasing the endangered spring run populations.

It is our understanding that the Coleman barrier weir and upstream fish ladder project is a significant step in the overall efforts to improve the Battle Creek watershed's salmon production. We understand that you are currently submitting a proposal for funding. Based on the recommendation of the Tehama County Fish and Game Commission, we are pleased to send you our letter of support for this project.

Good luck in your efforts.

Sincerely,

Ross Turner
Chairman

cc: Warren Duke, Chair
Fish and Game Commission

FEB 3 1999