

Attachment H

COVER SHEET (PAGE 1 of 2)

May 1998 CALFED ECOSYSTEM RESTORATION PROPOSAL SOLICITATION

Proposal Title: Monitoring adult and juvenile spring and winter chinook salmon and steelhead in Battle Creek, California.

Applicant Name: U.S. Fish and Wildlife Service, Northern Central Valley Fish and Wildlife Office.

Mailing Address: 10950 Tyler Road, Red Bluff, CA 96080

Telephone: (530)527-3043
 Fax (530)529-0292

Amount of funding requested: \$314,422/ year for 1999

Indicate the Topic for which you are applying (check only one box). Note that this is an important decision: see page 8 of the Proposal Solicitation Package for more information

- Fish Passage Assessment
- Floodplain and Habitat Restoration
- Fish harvest
- Watershed Planning/Implementation
- Fish Screen Evaluations - Alternatives and Biological Priorities
- Fish Passage Improvements
- Gravel Restoration
- Species Life History Studies
- Education

Indicate the geographic area of your proposal (check only one box):

- Sacramento River Mainstem
- Delta
- Suisun Marsh and Bay
- San Joaquin River Mainstem
- landscape (entire Bay-delta watershed)
- Sacramento Tributary: Battle Creek
- East Side Delta Tributary: _____
- San Joaquin Tributary: _____
- Other: _____
- North Bay: _____

Indicate the primary species which the proposal addresses (check no more than two boxes):

- San Joaquin and East-side Delta tributaries fall-run chinook salmon
- Winter-run chinook salmon
- Late-fall run chinook salmon
- Delta smelt
- Splittail
- Green sturgeon
- Migratory birds
- Spring-run chinook salmon
- Fall-run chinook salmon
- Longfin smelt
- Steelhead trout
- Striped bass

COVER SHEET (PAGE 2 of 2)

May 1998 CALFED ECOSYSTEM RESTORATION PROPOSAL SOLICITATION

Indicate the type of applicant (check only one box):

- | | |
|--|--|
| <input type="checkbox"/> State agency | <input checked="" type="checkbox"/> Federal agency |
| <input type="checkbox"/> Public/Non-profit joint venture | <input type="checkbox"/> Non-profit |
| <input type="checkbox"/> Local government/district | <input type="checkbox"/> Private party |
| <input type="checkbox"/> University | <input type="checkbox"/> Other: _____ |

Indicate the type of project (check only one box):

- | | |
|--|---|
| <input type="checkbox"/> Planning | <input type="checkbox"/> Implementation |
| <input checked="" type="checkbox"/> Monitoring | <input type="checkbox"/> Education |
| <input type="checkbox"/> Research | |

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 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 I.L.K) and waives and all rights to privacy and confidentiality of the proposal on behalf of the applicant, to the extent as provided in the Section.

James G. Smith
(Signature of Applicant)

**MONITORING ADULT AND JUVENILE SPRING AND
WINTER CHINOOK SALMON IN BATTLE CREEK, CALIFORNIA.**

U.S. Fish and Wildlife Service
Northern Central Valley Fish and Wildlife Office
10950 Tyler Road, Red Bluff, California 96080
Phone: (916)527-3043
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Principle Investigator - Steve Croci

Federal Agency, tax exempt

Participants/Collaborators - none



II.

EXECUTIVE SUMMARY

a. Project Title and Applicant Name

Monitoring adult and juvenile spring and winter chinook salmon and steelhead in Battle Creek, California.

U.S. Fish and Wildlife Service, Northern Central Valley Fish and Wildlife Office

10950 Tyler Road, Red Bluff, California 96080

Phone: (530)527-3043, FAX: (530)529-0292, E-mail: JIM_SMITH@MAIL.FWS.GOV

Principle investigator - Steve Croci

b. Project Description and Primary Biological/Ecological Objectives

The goal of this project is to obtain life history information on spring and winter chinook salmon and steelhead in Battle Creek. This information will assess the suitability of the current habitat and provide an evaluation tool for restoration activities. The following twelve objectives will be determined separately for both spring chinook salmon and steelhead in Battle Creek (similar information on winter chinook salmon will also likely be produced):

1. number of adults returning;
2. timing of adult migration;
3. age, size and gender of returning adults;
4. timing of spawning;
5. location of spawning
6. timing of fry emergence;
7. growth rate of juvenile salmonids;
8. timing of juvenile emigration;
9. size of emigrating salmonids;
10. number of juveniles produced;
11. potential limiting factors effecting survival at various life stages; and,
12. collect tissue samples from adult and juvenile salmonids for genetic analysis.

c. Approach/Tasks/Schedule

Fish counts, snorkel surveys, and juvenile monitoring with rotary screw traps will be conducted to generate the data.

Table 1.--Activity description, starting and ending date of spring and winter chinook salmon monitoring on Battle Creek beginning in January 1999 and continuing yearly thereafter.

| Activity | Start Date | End Date | Deliverable |
|-------------------------------------|------------------|------------------|-----------------------------|
| Coleman NFH barrier dam fish counts | Late - February | Early - July | Quarterly and annual report |
| Snorkel surveys | Early - May | Early - November | Quarterly and annual report |
| Juvenile monitoring | Start of January | End of December | Quarterly and annual report |

d. Justification for Project and Funding by CALFED

Spring chinook salmon are considered a candidate species by the State of California and have been proposed for federal listing. Winter chinook salmon are federally listed as endangered and steelhead are federally listed as threatened. All are identified as tier one primary species by CALFED. Additionally, Battle Creek has been identified by CALFED as a primary Ecological

Unit and this proposal will serve to evaluate restoration actions accomplished within that watershed.

Conducting items in this proposal will provide information on life history characteristics and the suitability of the available habitat in Battle Creek for winter and spring chinook salmon and steelhead. Surveys will also identify limiting factors and assess the effectiveness of restoration actions. The benefits to this project include assessing efforts to maintain a remnant population of spring chinook salmon, assessing the effectiveness of the winter chinook salmon propagation program, and assessing the feasibility of developing a winter chinook salmon population in Battle Creek. Additionally, surveys may coincidentally provide information on other species such as squawfish, suckers, bald eagles, yellow-legged frogs as well as numbers other organisms

e. *Budget Costs and Third Party Impacts*

Annual project costs in 1999 will be \$314,422 and expected to be the same for following years. This project should be funded for a minimum of three years, however, this project is envisioned to be multi-year and should continue as long as the data is needed by managers and researchers working on restoration projects in Battle Creek. There are expected to be no third party impacts.

f. *Applicants Qualifications*

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. Limited juvenile sampling has also been conducted during this time period. The Northern Central Valley Fish and Wildlife Service has been extensively involved with monitoring chinook salmon in the Northern 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.

g. *Monitoring and Data Evaluation*

Quarterly reports will be developed describing recent findings. Annual reports will describe life history information for a particular brood year. Compiled data will be reviewed by peers (California Department of Fish and Game, Interagency Ecological Program, National Marine Fisheries Service, Battle Creek Watershed Conservancy, and other Service offices) in order to make the best decisions to enhance Battle Creek.

h. *Local Support/Coordination with Other Programs/Compatibility with CALFED Objectives*

The objective of monitoring, assessing and reporting on priority species, habitat and stressors of concern will be met by this proposal. Aspects of this proposal will address recommendations by the and the Anadromous Fish Restoration Plan to assess the feasibility of developing a winter chinook salmon run in Battle Creek. Conducting these monitoring activities will assist in the evaluation of the winter chinook salmon propagation program being conducted at Coleman National Fish Hatchery located on Battle Creek. Methodologies used are recommended by Comprehensive Assessment and Monitoring Program. Additionally, California Department of Water Resources is proposing to improve passage and reduce entrainment at Pacific Gas and Electric barriers in Battle Creek and this proposal would be a means to assess the effectiveness of those improvements.

IV.

PROJECT DESCRIPTION

a. Project Description and Approach.—The goal of this project is to obtain life history information on spring and winter chinook salmon and steelhead in Battle Creek. This information will assist in assessing the suitability of the current habitat and provide an evaluation tool for restoration activities. The following objectives will be determined separately for spring and winter chinook salmon and steelhead in Battle Creek:

1. number of adults returning;
2. timing of adult migration;
3. age, size and gender of returning adults;
4. timing of spawning;
5. location of spawning
6. timing of fry emergence;
7. growth rate of juvenile salmonids;
8. timing of juvenile emigration;
9. size of emigrating salmonids;
10. number of juveniles produced;
11. potential limiting factors effecting survival at various life stages; and,
12. collect tissue samples from adult and juvenile salmonids for genetic analysis.

Number of adults returning —The number of adult spring and winter chinook salmon returning to Battle Creek will be determined by counting adult salmon that ascend the Coleman NFH's barrier dam fish ladder and counting salmon redds. Passage at the Coleman NFH barrier dam will be conducted from early - March through early - July. All other times of the year, the barrier prevents fish passage and is used to divert salmon into Coleman NFH for propagation purposes. Most passage will be video recorded and the tapes will then be reviewed to count salmon that had passed. Some fish ascending the ladder will be trapped to obtain biological information. The number of fish trapped and then passed above the barrier or relocated will be used in escapement estimates. Estimates will be derived by expanding the total number of salmon counted by the percentage of time that passage was observed.

Five times a week from May through October, snorkel surveys will be conducted on Battle Creek to count chinook salmon redds. A salmon per redd ratio above the Coleman NFH barrier dam will be determined based on estimates from barrier dam counts and spawning ground surveys. The number of salmon returning to Battle Creek which do not pass the barrier dam will be estimated by multiplying the number of redds observed below by the salmon per redd ratio above. The estimate below the barrier dam will likely only occur for winter chinook salmon since difficulties exist in distinguishing spring and fall chinook salmon redds due to lack of temporal isolation. A more thorough explanation of the methodology for adult escapements estimation in Battle Creek can be found in "Escapement of hatchery-origin winter chinook salmon (*Oncorhynchus tshawytscha*) to the Sacramento River, California in 1995, with notes on spring chinook salmon in Battle Creek" (USFWS 1996).

The number of steelhead returning to Battle Creek will be estimated from data gathered while collecting salmonids for propagation at Coleman NFH. Propagation generally occurs from October and continues through February which likely encompasses the complete steelhead migration and spawning in Battle Creek. No attempt will be made to collect in stream data for steelhead as environmental conditions rarely allow for adequate surveys.

Timing of adult migration—Timing and peak adult migration periods for spring and winter chinook salmon will be determined by observing fish passage at the Coleman NFH barrier dam.

The estimated number of spring and winter chinook salmon ascending the barrier dam will be plotted weekly for the time period that passage was observed. This will be accomplished by both video monitoring and trapping. The timing of steelhead returning to Battle Creek will be estimated using data gathered while collecting steelhead and chinook salmon for propagation at Coleman NFH. No attempt will be made to collect in stream data for steelhead as environmental conditions rarely allow for adequate surveys and it is assumed that the timing of the migration into the hatchery would be similar to the naturally spawning population.

Age, size and gender of returning adults—Age, size and sex of spring and winter chinook salmon will be collected from live fish trapped at the Coleman NFH barrier dam or from carcasses collected during spawning ground surveys. Scales will be collected from carcasses for ageing and length (fork length in mm) will also be collected from carcasses and live fish. A length frequency distribution will be plotted, and age-at-length will be determined by scale reading. Gender information will be gathered from live salmon and carcasses. The age, size and gender of steelhead returning to Battle Creek will be estimated using data gathered while collecting steelhead and chinook salmon for propagation programs at Coleman NFH. No attempt will be made to collect in stream data for steelhead as environmental conditions rarely allow for adequate surveys and it is assumed that the steelhead returning to the hatchery would be similar in age, size and gender to the naturally spawning population.

Timing of spawning—Snorkel surveys will be conducted daily on Battle Creek (excluding weekends and holidays) to locate spring and winter chinook salmon holding and spawning locations beginning in May and continuing into November. The total numbers and location of salmon observed will be recorded. Redds will be marked with flagging or some other visible marker to avoid counting twice. Timing and peak spawning will be determined by redd counts. No attempt will be made to collect in stream data for steelhead as environmental conditions rarely allow for adequate surveys and it is assumed that the timing of the spawning at the hatchery would be similar to the naturally spawning population.

Timing of fry emergence and growth rate—Fry emergence will be determined by comparing peak spawning with water temperature. By knowing timing and peak of spawning, daily temperature units can be used to determine emergence. As a part of this proposal, temperature recorders will be deployed where redds were observed. These areas will then be sampled by electro-fishing, beach seine or snorkeling to capture or observe fry. These areas will be sampled twice a week until juveniles have emigrated. Growth rates and condition factors will be determined from length and weight measurements of captured juveniles. Temperature recorders will be deployed near areas where concentrations of redds were observed and will also be used to obtain daily temperature units.

Timing of emigrating juveniles—A 5-foot diameter rotary screw trap will be fished daily at a location just upstream of the Coleman NFH barrier dam. A location above the barrier dam should eliminate capturing steelhead, and fall and late-fall chinook salmon juveniles released from Coleman NFH. Trapping will occur year round. Captured fish will be identified to species, enumerated, and measured (fork length in mm). A length frequency distribution will be determined as well as a fry to yearling emigration ratio. The timing and peak emigration of fry and yearlings will also be determined.

Size of emigrating salmonids—A 5-foot diameter rotary screw trap will be fished daily at a location just upstream of the Coleman NFH barrier dam. A location above the barrier dam should eliminate capturing steelhead, and fall and late-fall chinook salmon juveniles released from Coleman NFH. Trapping will occur year round. Captured fish will be identified to species, enumerated, and measured (fork length in mm) some fish will be weighed (g). A length frequency distribution will be generated and a condition factor will be determined for fish that were weighed.

Number of juveniles produced—An estimate of the of the number of juveniles produced will be determined using methodology as described by the CVPIA - Comprehensive Assessment and Monitoring Program (CVPIA 1997). This methodology will ensure consistency with other rotary screw trap sampling sites throughout the North Sacramento Valley Ecological Zone. The bi-weekly efficiency studies and daily year-round trapping should provide for sound estimates of production. Juvenile production estimates will provide information on the influence of restoration actions.

Identification of potential limiting factors—Potential limiting factor will be identified while collecting data to meet other objectives. Personnel snorkeling will be able to identify obvious stressors and identify immediate changes to the environment. Fish counts for both juvenile and adult production will provided evidence if some life stage experience survival rates different than normal. Potential limiting factors will be noted in annual and quarterly reports.

Tissue collection for genetic analysis—Tissue samples will be collected from adult carcasses during stream surveys, live adults from trapping operations and from juveniles collected by rotary screw-trap, electro-fishing and beach seining. A hole punch will be used to obtain 3 small pieces of tissue (primarily fin) from adult salmon. Samples will be stored in a small vial containing tris - glycine buffer.

Juveniles will be sampled by clipping a small (<1 mm²) of the caudal fin. The sample will also be preserved in a vial containing tris - glycine buffer and archived at the Northern Central Valley Fish and Wildlife Office (NCVFWO). Collection of tissue samples from 400 juvenile will be spread throughout the entire year. Sampling will be proportional to the number of juveniles collected at the rotary screw trap. Tissue samples from both adult and juveniles will be forwarded to the University of California's Bodega Marine Laboratory and CDFG (Sacramento) tissue archive for eventual genetic analysis. A sample will also be archived at the NCVFWO, Red Bluff, California. These samples will be used in a continuing projects to discriminate between runs of chinook salmon.

b. Proposed Scope of Work—Work will begin in January 1999 and should be considered to be a multi-year project. This project should continue as long as the data is needed by managers working on restoration actions in Battle Creek. The project has three main tasks: Coleman National Fish Hatchery barrier dam monitoring, snorkel surveys and juvenile monitoring (Table 2). Updates on accomplished work will be provided quarterly. Each February an annual report will be disseminated that summarizes the previous years activity including recommendations.

Table 2.—Activity description, starting and ending date of spring and winter chinook salmon and steelhead monitoring on Battle Creek beginning in January 1999 and continuing yearly thereafter.

| Activity | Start Date | End Date | Deliverable |
|-------------------------------------|------------------|------------------|-----------------------------|
| Coleman NFH barrier dam fish counts | Late - February | Early - July | Quarterly and annual report |
| Snorkel surveys | Early - May | Early - November | Quarterly and annual report |
| Juvenile monitoring | Start of January | End of December | Quarterly and annual report |

c. Location and/or Geographic Boundaries of Project—Battle Creek is located in northern Tehama and southern Shasta counties, California, and drains the volcanic slopes of Lassen Peak into the Sacramento River (river mile 272) from the east. The creek is fed by many springs. Battle Creek has been identified as a creek with high restoration potential because of its relatively high natural and consistent flow of cold water.

d. Expected Benefits—This proposal is designed benefit tier one primary species, the winter and spring chinook salmon and steelhead and the instream aquatic habitats in which they reside. The primary stressors addressed are alteration of flows and other effects of water management, population management, artificial propagation of fish and human disturbances. The primary expected benefits for completing the work in this proposal include: 1) preserving a remnant population of spring chinook salmon; 2) assessing the effectiveness of the winter chinook salmon propagation program; 3) assessing the feasibility of developing a winter chinook salmon population in Battle Creek, and; 4) evaluating the effectiveness of ongoing restoration actions. Restoration actions currently underway include increasing flows below Eagle Canyon and Coleman Diversion dams, opening up the Coleman National Fish Hatchery barrier dam for a longer duration of time, and investigating the feasibility of screening and improving passage at Pacific Gas and Electric diversion dams. Secondary benefits include observing and recording information on other aquatic dependant species such as Sacramento squawfish, Sacramento suckers, bald eagles, and otters.

e. Background and Ecological/Biological/Technical Justification

Background—The Service estimated escapement of winter and spring chinook returning to Battle Creek in 1995, 1996, 1997 and collected most data to make estimates in 1998. Estimates were based on counts at the Coleman National Fish Hatchery (NFH) barrier dam and stream surveys. In 1995 an estimated 84 hatchery-origin winter chinook salmon and 66 unmarked chinook salmon returned to Battle Creek (USFWS 1996; unmarked salmon could potentially be spring run). In 1996, 228 hatchery-origin winter-run chinook salmon and 34 unmarked chinook salmon returned (Crocini and Hamelberg 1998 a & b) and in 1997, 256 hatchery-origin and 106 spring chinook salmon returned (Crocini et al. 1998). Current management attempts to restricts the available habitat for winter and spring chinook salmon below Coleman Diversion Dam on the south fork and Eagle Canyon on the north fork. Restricting the salmon in what is believed to be

suitable habitat is an effort to confine the adults to assist in pairing (i.e. finding mates; Elliott 1995), prevent entrainment of the resultant juveniles into water diversions and provide more control over flow management. However, salmon are likely able to pass these barriers during high flows.

Limited effort has been afforded to determine if spring and winter chinook salmon and steelhead are successfully reproducing in Battle Creek. In 1995, potential rearing habitat was sampled by beach seine on 4 occasions, however, no juvenile salmon were observed. No effort was made to sample for spring chinook salmon or steelhead. In 1996, while conducting adult snorkel surveys for winter chinook salmon in mid-May through mid-October, juvenile salmon were observed. During September through mid-October juvenile salmon were captured using beach seine, electro-fishing and angling in areas from Coleman Diversion and Eagle Canyon dams downstream to creek mile 4. Captured juvenile salmon ($N = 86$) ranged in size from 60 to 158 mm. Genetic samples were collected from all salmon. The specific run of these juveniles is unknown as adults of all four runs were known to inhabit the surveyed area, including the area above the Coleman NFH barrier dam.

Very limited effort has been afforded to understanding the life history of winter and spring chinook salmon and steelhead in Battle Creek. With a better knowledge of the life history, factors potentially limiting production may be identified. Specific restoration activities that will aid in restoring the system to its potential can be pursued and evaluated once these limiting factors are known.

The Service's involvement in counting salmonid abundance in Battle Creek has been primarily to evaluate the products of Coleman NFH, especially winter chinook salmon. Funding has been obligated for the purpose of monitoring winter chinook salmon and subsequently limited data on spring chinook salmon has been obtained. However, winter chinook salmon have not been raised at Coleman NFH for the last three years, therefore, evaluating this program in Battle Creek will not be necessary and current funding will be redirected.

Justification—Spring chinook salmon are considered a candidate species by the State of California and proposed for federal listing. Winter chinook salmon are state and federally listed as endangered. Additionally, steelhead are federally listed as a threatened species. Currently restoration efforts are being conducted on Battle Creek for chinook salmon and steelhead, and, the Central Valley Project Improvement Act - Anadromous Fish Restoration Plan and the Winter Chinook Salmon Recovery Team recommended exploring the potential of developing a winter chinook salmon population in Battle Creek. Current restoration efforts on Battle Creek allow spring run the opportunity to access what is believed to be suitable habitat, however, conditions for winter chinook salmon are questionable.

Conducting items in this proposal will provide information on life history characteristics and the suitability of the available habitat in Battle Creek for winter and spring chinook salmon and steelhead. Surveys will also identify limiting factors and assess the effectiveness of restoration actions. The benefits to this project include assessing efforts to maintain a remnant population of spring chinook salmon, assessing the effectiveness of the winter chinook salmon propagation program, and assessing the feasibility of developing a winter chinook salmon population in

Battle Creek. Additionally, surveys may coincidentally provide information on other species such as squawfish, suckers, bald eagles, yellow-legged frogs as well as numbers other organisms.

ERPP Objectives and Stressors—This project will address several objectives and stressors listed for chinook salmon and steelhead within the North Central Valley Ecological Zone - Battle Creek Ecological Unit outlined in the ERPP. Conducting this study will provide baseline information on the existing conditions in Battle Creek. As restoration actions are initiated and completed an evaluation of their benefits can be obtained. Restoration actions suggested by the ERPP include those relating to flow, riparian and shaded riverine aquatic habitats, water diversions, dams, weirs, other structures and land use (Table 3).

Table 3.—Implementation objectives, targets and programmatic actions addressed by this project for the North Central Valley Ecological Zone - Battle Creek Ecological Unit.

| Heading | Subheading | Target number | Programmatic action number | Page number |
|-----------------------------------|---|---------------|----------------------------|-------------|
| Ecological Process | Central Valley stream flows | 3 | 3a | 182 |
| Habitats | Riparian and shaded riverine aquatic habitats | 1 | 1c | 184 |
| Eliminating or Reducing Stressors | Water diversions | 1 | 1a | 185 |
| | | | 1b | 185 |
| | Dams, reservoirs, weirs and other structures | 5 | 5a | 186 |
| | | | land use | 1 |

f. Monitoring and Data Evaluation—This proposal is designed to be a monitoring program to assist in determining life history strategies, identifying limiting factors and evaluating restoration actions in Battle Creek. Similar life history monitoring programs are conducted by California Department of Fish and Game on Deer, Mill and Butte creeks. Proposed restoration actions such as determining alternatives to screening and ladder at Pacific Gas and Electric diversions are developing proposals to be funded through CALFED. Monitoring for adult and juvenile salmon will be consistent with those outlined in the CVPIA - CAMP guidelines. Proposed monitoring will complement the evaluation of the winter chinook salmon propagation program being conducted at the Service's Coleman National Fish Hatchery.

g. Implementability—The Service has the required collecting permits for sampling aquatic species and permission from several landowners to access Battle Creek. The proposed project may be effected by extreme hydrologic/climatic conditions but various techniques employed will allow objectives to be met.

Local support for current project undertaken by the Service has been favorable and the Service's involvement with the Battle Creek Watershed Conservancy will likely foster further support as partnerships are achieved.

References

- Croci, S.J. and S. Hamelberg. 1998a. *Draft* Evaluation of the Sacramento River winter chinook salmon (*Oncorhynchus tshawytscha*) propagation program in 1996. USFWS Report. U.S. Fish and Wildlife Service, Northern Central Fish and Wildlife Office, Red Bluff, CA.
- Croci, S.J., and S. Hamelberg. 1998b. *Draft* Escapement of spring chinook salmon (*Oncorhynchus tshawytscha*) to Battle Creek, California in 1996. USFWS Report. U.S. Fish and Wildlife Service, Northern Central Valley Fish and Wildlife Office, Red Bluff CA.
- Croci, S.J., S. Hamelberg, V. Free, M. Campbell, J. Zerr and R. O'Flaherty. 1998. *Draft* Evaluation of the Sacramento River winter chinook salmon (*Oncorhynchus tshawytscha*) propagation program in 1997. USFWS Report. U.S. Fish and Wildlife Service, Northern Central Valley Fish and Wildlife Office, Red Bluff, CA.
- CVPIA. 1997. CVPIA comprehensive assessment and monitoring program standard protocol for rotary screw trap sampling. Central Valley Fish and Wildlife Restoration Program Office, Sacramento, CA.
- Elliott, Richard L., Regional Manager, California Department of Fish and Game. [Letter to Mr. R.J. Sandhofner, Pacific Gas and Electric Company]. 1995 April 20.
- USFWS. 1996. Escapement of hatchery-origin winter chinook salmon (*Oncorhynchus tshawytscha*) to the Sacramento River, California in 1995, with notes on Spring chinook salmon in Battle Creek. USFWS Report. Northern Central Valley Fish and Wildlife Office. Red Bluff, CA.

V. COSTS AND SCHEDULE TO IMPLEMENT PROPOSED PROJECT

a. Budgeted Costs

Annual project costs in 1999 will be \$314,422 and expected to be the same for following years. This project should be funded for a minimum of three years, however, this project is envisioned to be multi-year and should continue as long as the data is needed by managers and researchers working on restoration projects in Battle Creek. Particular components of this monitoring proposal could also be funded as they are essentially stand-alone projects (see Table 4). Funding could be potentially shared with Anadromous Fish Restoration Plan and CAMP programs, if and when the funds become available.

b. Scheduled Milestones

See Table 2.

c. Third Party Impacts

There are expected to be no third party impacts.

Table 4.—Proposed budget to complete identified tasks associated with monitoring adult and juvenile spring and winter chinook salmon and steelhead trout in Battle Creek, California.

| Project Phase and Task | Direct Labor Hours | Direct Salaries and Benefits | Overhead Labor | Service Contracts | Materials and Acquisition Contracts | Miscellaneous and other Direct Costs | Total Costs |
|--------------------------------|--------------------|------------------------------|----------------|-------------------|-------------------------------------|--------------------------------------|-------------|
| Coleman NFH barrier dam counts | 1820 | \$35,819 | \$7,880 | \$0 | \$0 | \$4,636 | \$48,335 |
| Snorkel surveys | 4140 | \$68,575 | \$15,086 | \$0 | \$0 | \$8,296 | \$91,957 |
| Juvenile Monitoring | 10,400 | \$138,730 | \$30,520 | \$0 | \$0 | \$4,880 | \$174,130 |
| Total Cost 1999 | | | | | | | \$314,422 |

I-010499

I-010499

VI. APPLICANT QUALIFICATIONS

The U.S. Fish and Wildlife Service's Red Bluff 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. Limited juvenile sampling has also be conducted during this time period. The Red Bluff Fish and Wildlife Service has been extensively involved with monitoring chinook salmon in the Northern Sacramento River since 1978. The Service has a strong interest in Battle Creek as it has operated the Coleman National Fish Hatchery located in the Battle Creek watershed since 1942.

VII. COMPLIANCE WITH STANDARD TERMS AND CONDITIONS

Appropriate documents and signatures regarding Submittal/Compliance of Standard Terms and Conditions will be provided prior to signing final contracts, as indicated in Table D-1 matrix of Standard Clauses/Proposal Request for a public agency proposing a Group 3 (Services) application type.