I. **Executive Summary**

a. Project title: Butte Creek Salmon and Steelhead Restoration Plan Development
Applicant name: Institute for Fisheries Resources

b. Project description and primary biological/ecological objectives.

The goal of the project is to prepare a plan for opening up reaches of Butte Creek now blocked by both natural barriers and hydroelectric dams so that salmon and steelhead, particularly spring-run chinook salmon, may use the stream for migration, holding, spawning and rearing.

c. Approach/tasks/schedule

The project will be developed in three general phases, as follows:

- Organize a project advisory committee of Upper Butte Creek watershed community representatives and representatives of local, State and federal agencies having expertise and jurisdiction. Involve the advisory committee in the final development and adoption of the project work-plan. Complete this task within a month of initiation

- Gather the information needed to evaluate Upper Butte Creek's salmon and steelhead habitat restoration potential - flows, temperatures, gravel quality and quantity, number and location of potential holding pools, barriers to anadromous fish migration, fish screening needs. Organize the information in a map-based information system (GIS). Integrate the information into a draft Upper Butte Creek Salmon and Steelhead Restoration Plan. Complete all information gathering within eleven months of project initiation, complete draft GIS within twelve months, complete draft Plan within 13 months of project initiation.

- Obtain community and peer review of the draft Plan. Prepare appropriate environmental documentation. Circulate draft and environmental document for review by public and agencies. Prepare responsiveness summary. Complete, deliver final Plan. Plan review will be completed within 15 months of project initiation, environmental documents with 16 and a half, the final Plan will be completed within 18 months of project initiation.

Details of the project tasks may be found at Section III-e of this proposal.

d. Justification for project and funding by CALFED

The restoration of Upper Butte Creek salmon and steelhead habitat is called for in the California Department of Fish and Game's 1995 Restoring Central Valley Streams Plan, the Central Valley Project Improvement Act Anadromous Fish Restoration Program (AFRP), and CALFED's June 5, 1997 "Summary of Technical Team Reports - Stressors

and Example Restoration Actions". Spring-run chinook salmon populations have been severely diminished through hydro-modification of the species' homestream habitats and of their rearing and migration habitats in the San Francisco Bay-Delta estuary.

e. Budget costs and third party impacts

The cost of the proposed project is estimated to be $184,500. Details of the budget are presented in Section III, Tables 1 and 2, of this proposal.

The third party impacts that can be identified at this time are:

- Likely decrease in Pacific Gas and Electric Company's (PG&E) DeSabla-Centerville Hydroelectric System output due to reallocation of streamflow to improve salmon and steelhead instream habitat conditions. These impacts will be the subject of subsequent negotiations concerning some form of compensation to the Company.

- Possible interference with present-day suction gold-dredging in the Upper Butte Creek canyon reaches. If these reaches can be restored as spring-run chinook summer holding habitat, the dredging activity will have to be moderated. If the spring-run are listed under State or federal endangered species acts, the gold-dredging will likely be banned.

f. Applicant qualifications

The Institute for Fisheries Resources has successfully completed six fishery conservation projects, including analyses of salmon restoration costs and benefits in the Columbia, Klamath and Sacramento river basins, in the past 18 months. Kier Associates has successfully completed large-scale anadromous fish habitat evaluation, restoration planning, and data management projects for the U.S. Fish and Wildlife Service (Klamath River), the U.S. Bureau of Reclamation (Trinity River), and for the Mendocino County Resource Conservation District (Garcia River). Mr. Reisner has directed the National Fish and Wildlife Foundation-funded Butte Creek Fish Access project.

g. Monitoring and data evaluation

Project information will be organized in an easy-to-use geographic information system (GIS). See section III-f for details of the system and plans for its coordination with others.

h. Local support/coordination with other programs/compatibility with CALFED objectives

Support for the proposed project has been expressed by the Butte Creek Watershed Conservancy, the U.S. Fish and Wildlife Service (Anadromous Fish Restoration Program) and the California Department of Fish and Game. Support for the Butte Creek Fish Access project is currently being provided by PG&E and Sierra Pacific Industries.

II. **Title page**

Upper Butte Creek Salmon and Steelhead Restoration Plan Development

b. Name of applicant/principal investigators

Institute for Fisheries Resources - applicant (project contract, fiscal agent)
Marc Reisner - co-investigator (project outreach coordinator)
William M. Kier - co-investigator (project technical director)

c. Type of organization

Tax-exempt 501(c)(3) non-profit public service research organization

d. Tax identification number

94-3176524

e. Technical and financial contact persons

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f. Participants

Institute for Fisheries Resources	Butte Creek Watershed Conservancy
Butte Creek Watershed Project/CSUChico	Lassen National Forest
Pacific Gas and Electric Company	Sierra Pacific Industries, Inc.
California Department of Fish and Game	U.S. Fish and Wildlife Service

g. RFP project group: Group 3 - Services

III. **Project description**

a. Project description and approach

The proposed project follows on work launched in 1997 under Cooperative Agreement 1425-96-FG-81-07011 ("Butte Creek Fish Access") between the National Fish and Wildlife Foundation and the non-profit Institute for Fisheries Resources (IFR). That $28,000 grant has enabled a reconnaissance-level study of prospects for opening up Butte Creek between Pacific Gas and Electric Company's Centerville and Butte diversion dams, a river distance of approximately ten miles (see map, Figure 1), to anadromous fish migration and use. The 1997 work consists of establishing cooperation with PG&E and making a first-stage determination of whether the potential quantity and quality of habitat, particularly for spring run chinook salmon, warrants closer habitat evaluation and development of a restoration plan.

Although the report of the 1997 field studies will not be available until later this year, the early indications are that these remote Butte Creek canyon reaches will provide excellent holding habitat for spring run chinook salmon once the barrier issues are resolved. It is appropriate, therefore, that closer evaluation of habitat quality and quantity, and measures for dealing with the barriers to migration through the canyon be pursued. We propose, in addition to the habitat and barrier removal analysis in these canyon reaches, to evaluate the reaches above PG&E's Butte Diversion Dam as to their steelhead restoration potential. Finally, we propose to round out the assessment of Butte Creek salmon and steelhead habitat by evaluating holding, spawning and rearing conditions below the Centerville diversion dam and powerhouse. In this way, the plan proposed here will serve as a baseline from which individual restoration actions may be undertaken and their efficacy for the restoration of Butte Creek salmon and steelhead resources measured over time.

The project will proceed in the following manner:

- establish (and maintain coordination with) a restoration planning advisory committee of interested technical and watershed community representatives
- adopt, with the guidance of the advisory committee, the final restoration planning workplan
- gather and analyze data concerning salmon and steelhead habitat quality and quantity, building on IFR's 1997 field work
- evaluate migration barrier removal and fish screening needs
- identify, gather, and organize restoration plan information into a GIS program for guiding and tracking restoration progress over time

- integrate habitat, barrier, screening and GIS elements into a draft Upper Butte Creek Salmon and Steelhead Restoration Plan

- obtain peer and public review of the draft plan

- complete the plan for restoration actions, necessary environmental documentation, and GIS-based monitoring

b. Location and/or geographic boundaries of the project

Butte Creek, Butte County, from its headwaters on the Lassen National Forest to below Pacific Gas and Electric Company's Centerville powerhouse east of Paradise (Figure 1).

c. Expected benefits

The "stressors" in this case are a number of barriers to upstream migration by salmon and steelhead, both natural and manmade (i.e., very old, fairly low power-dams). Inasmuch as their removal and/or modification will require significant investment, including possible compensation for hydroelectric production foregone, it is necessary to obtain a thorough evaluation of the habitat restoration potential and measures and preliminary costs of reopening these Butte Creek reaches.

The species involved are (1) spring run chinook salmon and (2) steelhead - in that order of priority. Spring run restoration would be served by opening Butte Creek's canyon reaches no further than PG&E's Butte head dam. Steelhead restoration would likely require providing spawner access past the head dam to the reaches up to and including the Lassen National Forest.

Although the 1997 first stage habitat evaluation is only half completed, it would appear reasonable, based on that analysis thus far, to suggest that Butte Creek's present spring run population, estimated to have been between 2,000 and 8,000 adults in recent years, could be significantly increased by creating access to the canyon reaches. We would prefer to withhold judgment on the number of steelhead that might be accommodated in the system until the habitat evaluation contemplated here has been performed.

Because of its deeply incised nature the Butte Creek canyon is only moderately impacted by roads and trails. Its many inaccessible pools would appear to be prime spring salmon holding habitat. Temperature records from the 1997 IFR project will begin the documentation of the extent and quality of this habitat.

d. Background and biological/technical justification

The need to seize upon opportunities to increase the natural production of spring-run chinook salmon has been well documented in plans recently prepared by the California Department of Fish Game, the Central Valley Project Improvement Act Anadromous Fish

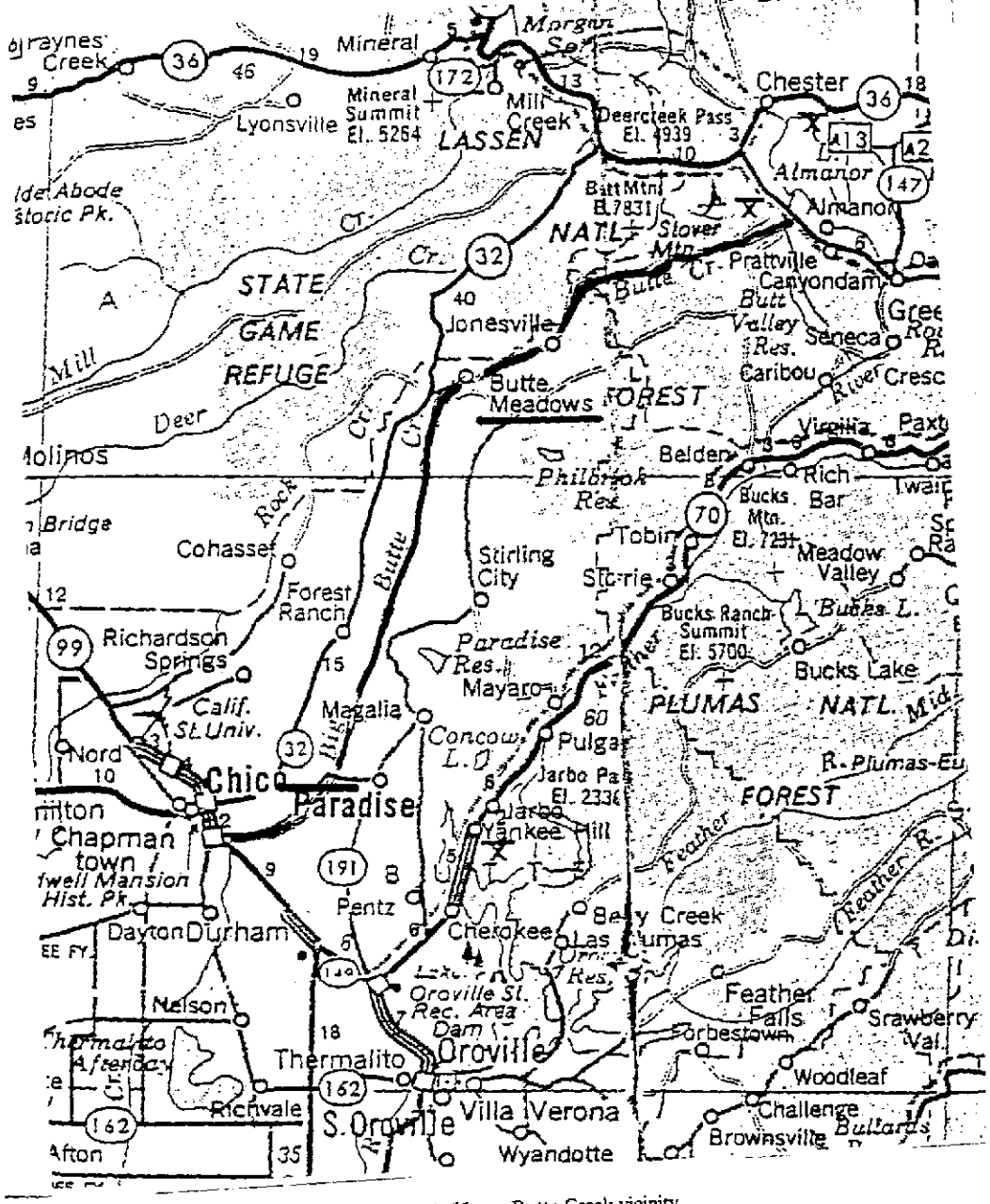

Figure 1. Upper Butte Creek vicinity

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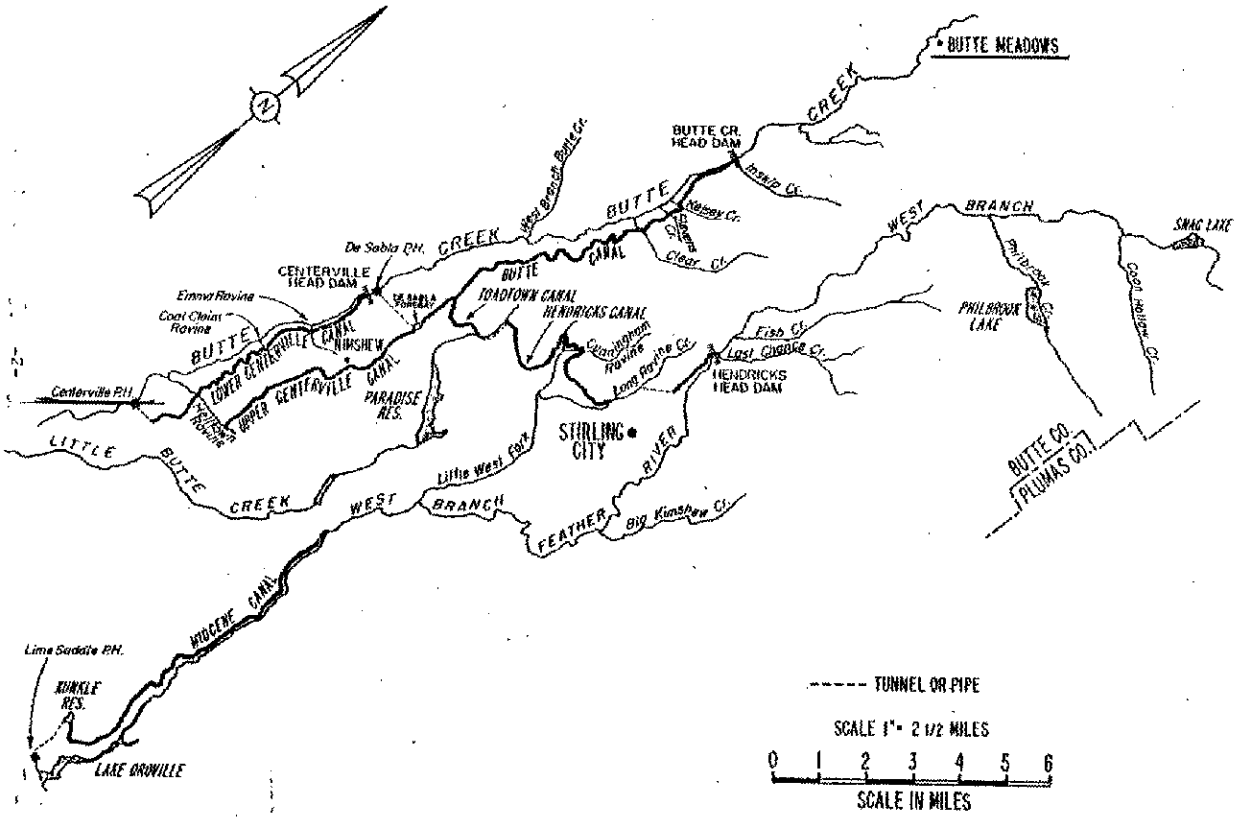

Figure 2. Upper Butte Creek, Butte Meadows downstream to Centerville Powerhouse

Restoration Program (AFRP) and CALFED. Both the AFRP and CALFED's June 5, 1997 "Summary of Technical Team Reports - Stressors and Example Restoration Actions" emphasize the need to improve access to potential spring run salmon habitat in upper Butte Creek.

The alternative to increasing natural production opportunities for spring salmon, artificial propagation, has performed poorly in the Central Valley due likely to unsuitable hatchery water quality. Further, both the State Anadromous Fish Program Act (SB-2261) and the Central Valley Project Improvement Act stress the need to increase salmon and steelhead numbers through natural, rather than artificial means.

The need to open up the Butte Creek canyon to spring run salmon and steelhead was not adequately addressed in the federal re-licensing of these PG&E DeSabla Project facilities more than a decade ago. Had fishery conservation agencies pushed for fish access in the largely-adversarial licensing proceedings the company would likely have countered, correctly, that no clear record exists that anadromous fish every used the canyon. Again, the hydroelectric facilities here are so old they pre-date organized stream or fish surveys in the region.

With the 1996 launch of State de-regulation of private electricity providers and the availability of significant habitat restoration funds from the proceeds of Proposition 204 and elsewhere, the stage is set for a negotiated, rather than regulated, restoration of the stream. These new circumstances provided the incentives for IFR to enter into its exploratory, NFWF-funded Butte Creek project.

IFR's 1997 field work has been undertaken in close coordination with the Department of Fish and Game, PG&E, U.S. Fish and Wildlife Service, Sierra Pacific Industries, Chico State's Butte Creek Watershed Project, and the Butte Creek Watershed Conservancy.

Implementation of the proposed Upper Butte Creek Salmon and Steelhead Restoration Plan will provide high quality habitat for as many as 15,000 spring run chinook salmon spawners and an as-yet-undetermined number of steelhead.

e. Proposed scope of work

The work proposed here will extend over an 18-month period and will culminate in the adoption of an integrated program of specific restoration actions, the Upper Butte Creek Salmon and Steelhead Plan. A task-by-task description of the project is presented here with the caveat that adjustments to the workplan will be made, within time and budgetary allowances, on the basis of input from the proposed advisory committee of interested technical and community representatives.

Task 1. Establish, maintain community support, technical guidance for the project

An advisory committee to guide the planning process, to secure community-level support and to assure the technical soundness of the methods employed will be organized as a first order of business. Invitees will include the California Department of Fish & Game, Butte Creek Watershed Conservancy, PG&E, Sierra Pacific Industries, U.S. Fish & Wildlife Service, Lassen National Forest, Chico State University, National Marine Fisheries Service, and Central Valley Project Water Association. The advisory committee's first order of business will be to review and recommend improvements, as needed, to the proposed workplan. The advisory committee will be convened periodically to review major issues identified in the planning process.

Task 2. Adopt final workplan

A final plan of work will be established after thorough consultation with the project advisory committee.

Task 3. Collect and organize habitat evaluation and watershed assessment information

A major focus of data collection will be that concerning the number, location, volume and water quality of pools in the canyon reaches that appear suitable for holding spring salmon through the summer. IFR's 1997 NFWF-funded project enabled a start on this inventory. A three-person crew has been working downstream, locating and gauging pools with the use of a hip chain and stadia rod. Global positioning system (GPS) equipment has proved useless in the canyon due to its deeply-incised, steep-sided nature.

Temperature data will be another key to successful planning. IFR deployed a half-dozen temperature recorders in the central canyon reaches in mid-summer 1997. The records obtained from this work will be extended, particularly to the upper reaches, in search of additional spawning and rearing habitat potential.

Gravel quality and quantity , by reach, will be determined. Because of the difficult access and its modest budget, the current IFR crew has substituted a modified pebble count to determine gravel quality for the more desirable McNiel sampling method which entails removing a portion of the sample for later laboratory analysis. We will reach agreement with our advisory committee experts on a suitable and affordable method of establishing good baseline data on the quality of the stream's prospective salmon spawning gravels.

Streamflow and habitat relationships will be determined through modified instream flow incremental methods. IFIM methods have been quite rigorous where the results have been applied to adversarial proceedings like power project relicensing or water rights hearings. The streamflow reallocation approach contemplated here will be a negotiated one requiring, we believe, a less rigorous approach to the determination of streamflow and habitat relationships. Flow in the canyon section in early July, 1997 was approximately 40 cubic feet per second. It is our professional judgment that the canyon's habitat elements

were well served at that flow. PG&E's Butte Creek head dam was out of service during early summer, 1997 due to January storm damage to the diversion canal. That had the effect of restoring five miles of stream habitat for awhile down to the Forks of Butte diversion The Forks of Butte diversion has a modern fish bypass requirement. That leaves the Centerville diversion-to-Centerville powerhouse reach as the principal question mark concerning flow and habitat relationships.

Measurement of the flow and habitat relationships will be the subject of consultation with the advisory committee.

Information concerning fish habitat-impacting land uses will be gathered with the assistance of the Butte Creek Watershed Conservancy and the Chico State Butte Creek Watershed Project.

Task 4. Evaluate salmon migration barrier resolution needs

IFR's 1997 Butte Creek project will locate and provide an initial assessment of natural and manmade structures that appear to be barriers to fish migration. The proposed project will provide more precise measurements of the barriers, the water velocities they create at times critical to fish movement and will determine in each case the most suitable method of resolving the barrier - blasting or laddering. This work will be assisted by a qualified engineering subcontractor to the project who will be selected with the assistance of the advisory committee.

Task 5. Evaluate fish screen needs

Fish screens at the canyons' three water diversion intakes will be evaluated to determine their sufficiency for protecting new downstream salmon and steelhead migrants. The engineering subcontractor will assist in the performance of this task.

Task 6. Organize information in a geographic information system

It is proposed to organize the key watershed, stream habitat, barrier and screen information into the geographic information system, or GIS, described below in the discussion concerning project monitoring and data evaluation.

Task 7. Integrate Task 3-6 elements into a draft restoration plan

The information gathered in tasks 3 through 6, plus preliminary recommendations for restoration actions will be gathered into a draft restoration plan.

Task 8. Obtain public and peer review of the draft plan

The project advisory committee will be accorded the first draft plan review opportunity, following which the draft will be distributed for wider review by agencies having expertise and jurisdiction. Public briefings on the draft plan will be conducted.

Task 9. Prepare appropriate environmental documentation for the program

The appropriate level of environmental review will depend in part on which agency or agencies is determined to be the lead agency for purposes of adopting the plan. Because the plan will select, but not itself undertake the necessary restoration actions, the level of review will likely be that of a National Environmental Policy Act Environmental Assessment or its State equivalent.

Task 10. Complete, deliver final Butte Creek Salmon and Steelhead Restoration Plan

Following community and peer review, environmental review and preparation of a responsiveness summary, a final Butte Creek Salmon and Steelhead Restoration Plan will be printed and delivered to CALFED and its constituent agencies for implementation of the program of restoration actions.

A schedule of project milestones is presented at Table 3 (Section IV). IFR proposes to present the contract administrators with monthly reports of progress on the workplan, project budget condition reports, and progress payment invoices.

f. Monitoring and data evaluation

We propose to organize project information in an easy-to-use GIS program like that developed for salmon and steelhead restoration efforts of the U.S. Fish & Wildlife Service and U.S. Bureau of Reclamation on the Klamath and Trinity rivers - the Klamath Resource Information System , or KRIS. KRIS enables watershed community-based participation in information development, management and use. The Department of Fish and Game is using KRIS to capture similar information concerning its salmon restoration program on Battle Creek. We will use the GIS layers being developed by Chico State under a Category III agreement. Opportunities to integrate Butte Creek Plan information with the Department of Water Resource's Sacramento River GIS and the CVPIA's Comprehensive Assessment and Monitoring Program (CAMP) will be pursued vigorously.

g. Implementability

The project's main compliance requirement will be the satisfaction of federal and State environmental policy/quality statutes. The principal landowners, PG&E and Sierra Pacific Industries, have thus far supported the evaluation of watershed conditions and restoration options. The principal watershed-community organization, the Butte Creek Watershed Conservancy, has indicated strong interest in, and support for the project.

IV. Costs and schedule to implement proposed project

Table 1. Butte Creek Project Budget by Planning Task

Planning task	Cost
1. Establish project community, technical advisory committee	$2,500.00
2. Adopt final workplan	-0-
3. Collect, organize watershed, habitat information	74,500.00
4. Evaluate barrier removal, modification needs	32,500.00
5. Evaluate diversion screening needs	3,000.00
6. Organize information in geographic information system	15,000.00
7. Integrate task 3-6 information into a draft restoration plan	21,000.00
8. Coordinate public and peer review	12,500.00
9. Prepare environmental documents, response summary	11,000.00
10. Complete, print, deliver final Butte Cr salmon and steelhead plan	12,500.00
Total project budget	$184,500.00

Table 2. Butte Creek Project Budget by Expenditure Item

Expenditure item	Cost
Professional services	
Project technical director	$22,500.00
Project outreach coordinator	19,500.00
Watershed, fisheries specialist	21,600.00
Watershed, fisheries assistant	19,750.00
Project engineer	31,950.00
Watershed, fisheries information management specialist	24,600.00
Total professional services	139,000.00
Direct costs	
Travel and transportation	7,820.00
Supplies	4,785.00
Equipment	8,922.00
Phones, faxes, copies	6,300.00
Total direct costs	27,827.00
IFR administrative costs @ 10%	16,773.00
Total project budget	$184,500.00

Table 3. Schedule of Butte Creek Project Milestones

Task	Completion date 1/
1. Establish advisory committee	2/01/98
2. Adopt final workplan	3/01/98
3. Collect watershed, fish habitat information	3/01/99
4. Evaluate barrier removal needs	11/15/98
5. Evaluate fish screening needs	11/15/98
6. Organize information in a geographic information system	12/31/98
7. Integrate task 3-6 information in a draft restoration plan	2/01/99
8. Coordinate public and peer review	4/01/99
9. Prepare, circulate environmental documents for review	5/15/99
10. Deliver final Butte Cr salmon and steelhead restoration plan	6/30/99

1/ assumes a 1/01/98 project initiation

Applicant qualificiations

The Institute for Fisheries Resources

- Technical participants concerning the impacts on salmon of the Ricelands Habitat Partnership, a Sacramento Valley alternative to the burning of rice stubble and weeds.
- Authors of reports on the costs and benefits of salmon restoration programs on the Columbia and Klamath Rivers (Sacramento River salmon restoration analysis is currently undergoing peer review.)
- Administrators of the current evaluation of salmon access opportunities in Upper Butte Creek under a grant from the National Fish and Wildlife Federation.

William M. Kier Associates

- Currently serve as fisheries and planning consultants to the California Department of Fish and Game's Category III-funded Battle Creek Chinook Salmon Restoration Plan development
- Currently serve as fisheries consultants to the Institute for Fisheries Resources' NFWF-funded Butte Creek Fish Access project
- Served as the California Advisory Committee on Salmon and Steelhead's principal consultants

- Prepared the *Long Range Plan for the Klamath River Basin Conservation Area Fishery Restoration Program* for the U.S. Fish and Wildlife Service

- Conducted a review of water quality and habitat monitoring programs on private timberlands for the California Department of Fish and Game

- Prepared the Garcia Watershed Restoration Plan for the Mendocino County Resource Conservation District

- Developed the Klamath Resource Information System (KRIS) to support salmon restoration programs on the Klamath and Trinity rivers.

Marc Reisner

- Principal investigator for the Institute for Fisheries Resources' Butte Creek Fish Access project

- Senior consultant for ecosystem restoration planning, Levine Fricke Recon, Emeryville

- Consultant to the Nature Conservancy concerning the Sacramento Valley Ricelands Habitat Partnership, particularly regarding water availability, competing uses, fisheries impacts, and economic and legal issues.