DRAFT ANNUAL WORK PLAN (FY00)
October 1, 1999

I. Project Title: **Anadromous Fish Restoration Program (AFRP), Section 3406 (b)(1)**

II. Responsible Entities: **- USFWS, Dr. Martin A. Kjelson**
- USBR, Ken Lentz

III. Status of the Project:

A key provision of the Central Valley Project Improvement Act (CVPIA; Title 34 of Public Law 102-575) requires the Secretary of the Interior to develop and implement a program which makes all reasonable efforts to at least double natural production of anadromous fish in Central Valley rivers and streams. Further, the CVPIA requires that this program give first priority to measures which protect and restore natural channel and riparian habitat values through habitat restoration actions, modifications to Central Valley Project operations, and implementation of the supporting measures mandated by the CVPIA. The Anadromous Fish Restoration Program (AFRP) was established to implement this directive.

The U.S. Fish and Wildlife Service (USFWS) and Bureau of Reclamation (USBR) are the Interior agencies responsible for implementing the CVPIA. They are jointly and cooperatively implementing the CVPIA, with the USFWS assuming lead responsibility for the AFRP.

As part of efforts to coordinate with other State and Federal agencies, the AFRP receives guidance from a Core Group of senior fishery biologists representing the USFWS, USBR, National Marine Fisheries Service, U.S. Environmental Protection Agency, California Department of Fish and Game (CDFG), and California Department of Water Resources. The FWS, with assistance from the Core Group, developed the *Revised Draft Restoration Plan for the Anadromous Fish Restoration Program* (Restoration Plan) to guide the long-term development of the AFRP. The Restoration Plan provides a programmatic-level description of the AFRP, and will be used to guide implementation of all sections of the CVPIA that contribute to the goal of making all reasonable efforts to at least double natural production of anadromous fish. The Restoration Plan presents the goal, objectives, and strategies of the AFRP, as well as a list of reasonable actions and evaluations to implement to make progress toward doubling natural production of anadromous fish. The Restoration Plan identifies the need for partners, local involvement, public support, adaptive management, and flexibility as key attributes of the AFRP's

approach to making all reasonable efforts to at least double natural production of anadromous fish.

To implement this approach, the USFWS established five Habitat Restoration Coordinator (HRC) positions, each assigned a specific geographic area within California's Central Valley. In their assigned area, each HRC represents the AFRP, develops and nurtures partnerships, develops projects with partners that contribute to making all reasonable efforts to at least double natural production of anadromous fish, and oversees all aspects of implementation of projects in which the AFRP invests funds. In 1998, the AFRP added three more HRCs from the CDFG to this effort, one from each of the CDFG regions within the Central Valley, to provide assistance to the FWS and to ensure close coordination with the CDFG, the State agency with primary responsibility for restoration of anadromous fish habitat. Together, the FWS and CDFG HRCs form an interagency team to coordinate, develop and implement restoration projects consistent with the goal, objectives, strategies, processes and priorities described in the Restoration Plan.

The document you have before you is the Draft Annual Work Plan (FY00) for the AFRP. This AWP lists the projects that the AFRP staff expects to implement in FY00. The process the AFRP used to identify the projects listed in this AWP is briefly outlined below:

> *1) Habitat Restoration Coordinators work with partners to develop projects:* Following the strategies and priorities in the Restoration Plan, the HRCs worked with local watershed groups and interests and other potential partners to develop restoration projects that support the actions and evaluations listed in the Restoration Plan.
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> *2) HRCs propose projects for funding by the AFRP:* The HRCs then brought these projects forward for discussion with the AFRP managers and the HRCs from other geographic regions within the Central Valley. The focus of this discussion was to identify the highest priority projects that are ready for implementation in the coming fiscal year.
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> *3) HRCs and AFRP managers develop initial draft Annual Work Plan:* The HRCs and AFRP managers then developed the initial draft Annual Work Plan, wherein they identified the highest priority projects as likely for funding in the coming fiscal year, and those projects that are of a lower priority or are less ready for implementation as contingent on available funding in the coming fiscal year.
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> *4) Initial draft AWP shared with the Core Group:* The HRCs and AFRP managers then presented the actions listed in the initial draft AWP to the AFRP Core Group for their review and comment. Based on these comments, the initial draft AWP was revised and re-titled the Draft AWP. (This year, due to efforts to develop the AFRP web site and coordinate with the CALFED Ecosystem Restoration

Program's near-term restoration planning process, the Core Group has not yet met to review and comment on the AWP. The AFRP staff plans to convene a joint meeting of the Core Group and the members of the former CALFED Integration Panel for this purpose in late October or November).

5) Draft AWP released to the public for comment: The AFRP managers then release the Draft AWP to the public for their review and comment. This release is accompanied by a presentation to the public, including the Restoration Fund Roundtable, a group of stakeholders with an interest in the expenditure of the Central Valley Project Restoration Fund. The draft AWP will be revised to address comments received from the public.

6) AWP implementation starts with onset of Federal fiscal year: With the start of the Federal fiscal year, the AFRP staff will work with project proponents and the appropriate local watershed group to implement projects listed in the AWP.

The AFRP staff will continue to work with project proponents and the appropriate local watershed group and other potential partners to identify new projects that support actions in the Restoration Plan. In addition, AFRP staff will continue to work with Restoration Coordinator for the CALFED Bay-Delta Program to coordinate AFRP funded restoration efforts with those efforts funded through the CALFED Bay-Delta Program.

IV. FY99 Accomplishments:

AFRP staff, following the strategies and priorities in the Restoration Plan, worked closely with local watershed groups and interests to obligate a total of nearly $5 million in AFRP funds to help implement over 35 site specific restoration projects in 1999 (see Appendix A). In 1998, AFRP staff similarly obligated a total of nearly $5 million in AFRP funds to help implement over 35 site-specific restoration projects; in 1997, AFRP staff obligated a total of nearly $10 million to help implement over 30 projects; in 1996, AFRP staff obligated a total of nearly $2 million to help implement eleven projects; and in 1995, AFRP staff obligated $356,500 to two projects.

The AFRP developed a web site that serves as the Implementation Plan for the AFRP. The purpose of the site is to provide broad public access to the most current information available concerning the AFRP and its implementation information and to encourage input from interested parties and potential partners. The site reports on the status of the AFRP, describes how the AFRP works, reports on the status of projects funded in previous fiscal years, and describes projects likely for funding in the future. Because the AFRP will evolve in response to comments and as information is gathered, partnerships are formed, and projects are implemented, the site will evolve rapidly.

The AFRP encourages all interested parties to visit and comment on the site. The Internet address for the site is:

http://www.delta.dfg.ca.gov/afrp.html

The AFRP convened the first joint meeting of the AFRP Core Group and CALFED Intergration Panel to improve coordination of CVPIA and CALFED restoration efforts. At this meeting, the AFRP Habitat Restoration Coordinators and the Clear Creek Restoration Program manager reported on the status, future vision, and challenges for restoration in each of the major watersheds in the Central Valley.

The AFRP partnered with California State University at Chico and others to offer the first "Working at a Watershed Level" training course for all interests involved in restoring watersheds throughout the Central Valley. Over one hundred individuals attended, including local landowners and representatives from local watershed conservancies, governments, water districts, and universities, as well as state and federal agencies. The AFRP is building on this effort through a partnership with the San Joaquin River Management Program and California State University at Stanislaus to offer the training course again, this time in Stanislaus County.

The AFRP also partnered with the Tuolumne River Technical Advisory Committe and the Centers for Water and Wildland Resources at the University of California, Davis to convene a peer review forum to provide the TRTAC with expert opinion and evaluation of two proposed methodologies for monitoring the survival of chinook salmon smolts on the Tuolumne River. The AFRP plans to build on this experience to partner with others to develop additional peer review forums focused on specific restoration issues.

V. Program Goal and Objectives:

The goal of the AFRP, as stated in Section 3406(b)(1) of the CVPIA, is to "develop within three years of enactment and implement a program which makes all reasonable efforts to ensure that, by 2002, natural production of anadromous fish in Central Valley rivers and streams will be sustainable, on a long-term basis, at levels not less than twice the average levels attained during the period of 1967-1991." Section 3406(b)(1) also states that "this goal shall not apply to the San Joaquin River between Friant Dam and the Mendota Pool."

The objectives necessary to achieve the goal are listed below:

A. Improve habitat for all life stages of anadromous fish through provision of flows of suitable quality, quantity, and timing, and improved physical habitat. (All species)

B. Improve survival rates by reducing or eliminating entrainment of juveniles at diversions. (All species)

C. Improve the opportunity for adult fish to reach their spawning habitats in a timely manner. (All species)

D. Collect fish population, health, and habitat data to facilitate evaluation of restoration actions. (All species)

E. Integrate habitat restoration efforts with harvest and hatchery management. (All species)

F. Involve partners in the implementation and evaluation of restoration actions. (All species)

VI. Specific Actions and Implementation Costs:

The following are projects that AFRP staff are developing or plan to develop for implementation in FY00 in cooperation with project proponents and the appropriate local watershed groups. For many of these projects, implementation is dependent on successfully completing preliminary design and engineering work and environmental documentation and on how potential partnerships, including funding, develop. In addition, it should be noted that a considerable number of projects supporting programmatic actions listed in the Revised Draft Restoration Plan for the AFRP will be implemented in 2000 under the authority provided by other sections of the CVPIA. These projects and their implementation costs are shown in FY00 work plans for the programs authorized to implement those projects. Included below under Objective D are monitoring and evaluation efforts for FY00 that will be coordinated with evaluations designed to assess the effects of other CVPIA projects, including those actions resulting from modification of CVP operations and management of (b)(2) water [Section 3406(b)(2)], and other anadromous fish sampling programs such as the Comprehensive Assessment and Monitoring Program [CAMP, Section 3406(b)(16)] and the Interagency Ecological Program (IEP), including the Central Valley Salmon Project Work Team.

Projects are shown in two categories. The first category, titled "Projects likely for FY00 funding", includes those projects that the AFRP proposes to fund with the funding that Interior has allocated to the AFRP in FY00. To compile this list, the AFRP anticipated that partners would cost-share in many of these projects. The second category, titled "Projects contingent upon additional funding", includes projects that the AFRP could fund if there were additional funds available. This additional funding could arise from several sources, including an increase in dollars allocated to the AFRP, greater cost-sharing in

other projects than the AFRP presently anticipates, or an inability to commit funds to projects that the AFRP presently plans to fund.

Projects likely for FY00 funding:

A-1 Study the feasibility of restoring floodplain and riparian processes at the La Barranca Unit of the Sacramento River National Wildlife Refuge on the Sacramento River.

- C $230,000 contingent on available funding.
- C Project investigates opportunity to restore floodplain and riparian habitat function to a 1.5 mile section of the Sacramento River (river miles 239.5 to 238).
- C Supports mainstem Sacramento River Action 9, a high priority action in a high priority watershed.

Estimated Cost = $52,000

A-2 Acquire a riparian easement on the Hidden Marina Resort property at the confluence of Mill Creek and the Sacramento River.

- C Protects 19 acres, approximately 12 acres of which are riparian, at the mouth of Mill Creek.
- C Supports Mill Creek Action 4, a high priority action in a high priority watershed.

Estimated Cost = $76,800

A-3 Provide preliminary engineering and environmental documents for several erosion control projects in the upper Deer Creek watershed.

- C Develops preliminary engineering reports, outreach, and environmental documentation for priority sedimentation and erosion control projects in the upper Deer Creek watershed.
- C Supports Deer Creek Action 4, a high priority action in a high priority watershed.

Estimated Cost = $98,238

A-4 Protect riparian habitat on the Leininger property on Deer Creek.

- C Installs approximately 14,500 feet of fencing along lower Deer Creek, from the northeast corner of Red Bridge on Leininger Road and continuing 14,500 feet upstream along the riparian corridor.
- C Supports Deer Creek Action 4, a high priority action in a high priority watershed.

Estimated Cost = $69,000

A-5 Acquire Simmons Ranch on Big Chico Creek.

- Total cost of project is approximately $3,700,000.
- Protects approximately 2,700 acres which border about 2.5 miles along the north bank of Big Chico Creek, located at the upper boundary and adjacent to Bidwell Park.
- Supports Big Chico Creek Action 6, a high priority action in a high priority watershed.

Estimated Cost = $500,000

A-6 Acquire the Nock property on Big Chico Creek.

- Total cost of project is approximately $790,000.
- Protects 125 acres located at the confluence and between Big Chico and Mud Creeks, just east of the Sacramento River and the Peterson addition to the Bidwell-Sacramento River State Park. A nonprofit land trust would acquire this parcel, restore the existing walnut orchard to riparian forest, and gift the land to the California Department of Parks and Recreation for perpetual stewardship.
- Supports Big Chico Creek Action 7, a high priority action in a high priority watershed.

Estimated Cost = $50,000

A-7 Acquire the Singh property on Big Chico Creek.

- Total cost of project is approximately $250,000.
- Protects 40.4 acres located west of Mud Creek, east of the Sacramento River and north of the Peterson addition to the Bidwell-Sacramento River State Park. A nonprofit land trust would acquire this parcel, restore the existing walnut orchard to riparian forest, and gift the land to the California Department of Parks and Recreation for perpetual stewardship.
- Supports Big Chico Creek Action 7, a high priority action in a high priority watershed

Estimated Cost = $50,000

A-8 Promote re-vegetation of recently rip-rapped areas in the vicinity of Okie Dam on Butte Creek.

- Promotes re-vegetation of approximately 3,800 feet of stream bank that were rip-rapped to repair damage following high flows in 1997.

- C Supports Butte Creek Action 19, a high priority action in a high priority watershed

Estimated Cost = $59,083

A-9 Protect 2.3 acres of riparian habitat and reduce streambank erosion 1-1/2 miles downstream of Camanche Dam on the south side of the Mokelumne River.

- C $28,000 contingent on available funding.
- C Installs approximately 4,000 feet 5-strand barbed-wire fencing approximately 25 feet from the streambank and develops an off-stream water supply to exclude livestock from grazing in riparian habitat.
- C Supports Mokelumne River Action 7, a high priority action.

Estimated Cost = $20,000

A-10 Continue to restore the 7/11 segment of the mining reach on the Tuolumne River.

- C Total cost of project is $6,362,000 (with $2,855,800 provided by AFRP in fiscal years ‘98 and ‘97).
- C Contributes to efforts to restore proper channel characteristics to produce and improve spawning and rearing habitat for salmon and to remove predator habitat between river miles 43.5 and 44.
- C Supports Tuolumne River Action 2 and Evaluation 2, a high priority action and a medium priority evaluation in a high priority watershed.

Estimated Cost = $357,000

A-11 Continue to restore the Ruddy Mining Reach on the Tuolumne River.

- C Total cost of project is $5,400,000 (with $1,962,516 provided by AFRP in FY99).
- C Phase II of IV to rehabilitate the channel and floodplain system and improve natural geomorphic functions to restore and maintain instream and floodplain habitats in the Ruddy Reach (river mile 36.5-37.7) of the Tuolumne River for the benefit of salmon and other native riparian species.
- C Supports Tuolumne River Action 2 and Evaluation 2, a high priority action and a medium priority evaluation in a high priority watershed.

Estimated Cost = $1,182,484

A-12 Enhance salmon and steelhead/rainbow trout spawning habitat by adding gravel to three riffles below the Old La Grange Bridge on the Tuolumne River.

- C Total cost of project is $380,000 (seek partnership with the Four Pumps Program for remaining funds).

- C Place 12,000 cubic yards of spawning gravel at three sites in the upper end of the Tuolumne River accessible to salmon (between river miles 47 to 51). Phase II of ongoing project.
- C Supports Tuolumne River Action 2 and 6, both high priority actions and a high priority watershed.

Estimated Cost = $190,000

A-13 Evaluate channel restoration and aggregate source potential for Two-mile Bar on the Stanislaus River.

- C Provides funds to assess floodplain restoration potential in a critical spawning and rearing section of Goodwin Canyon at river mile 56, and to do the needed material and land appraisals and coordinate a potential acquisition strategy with the US Army Corps of Engineers.
- C Supports Stanislaus River Actions 2 and 6, both high priority actions in a high priority watershed.

Estimated Cost = $55,000

A-14 Evaluate proposed non-structural flood control management alternatives on the San Joaquin River National Wildlife Refuge (SJRNWR).

- C Evaluate floodplain rearing potential and stranding risk for juvenile anadromous fish in levee-breeched areas of the SJRNWR located near the confluence of the Tuolumne and Stanislaus rivers, and identifies alternatives to further improve floodplain habitat on the SJRNWR to benefit anadromous fish.
- C Consistent with Mainstem San Joaquin River Evaluation 1, a high priority evaluation within a high priority watershed.

Estimated Cost = $57,465

BC-1 Develop a final list of pumping plants requiring screens and collect site specific information for each pumping plant for the east side of Sutter Bypass on lower Butte Creek.

- C Provides list of pumping plants and information on those pumping plants necessary to develop preliminary engineering designs for screens to reduce or eliminate delay and injury to Butte Creek adult salmon and steelhead and reduce or eliminate entrainment of juvenile Butte Creek and Sacramento River salmon and steelhead under controlled-flow conditions, while maintaining the viability of associated managed wetlands and agricultural operations. Project is also known as the Lower Butte Creek Project: East-Side Sutter Bypass Small Pumping Plant Screens and will incorporate

information developed in Phases I and I(b) of the Lower Butte Creek Project.

- Supports Butte Creek Action 23 and Evaluation 6, a medium priority action and evaluation in a high priority watershed.

Estimated Cost = $195,000

BC-2 Develop recommendations for enhanced fish passage in the Butte Slough area on lower Butte Creek.

- Involves local landowners and technical experts in developing recommendations for enhanced fish passage in the Butte Slough area while maintaining the viability of associated agriculture and managed wetlands. The Butte Slough area begins at the Tarke/Colusa Shooting Outfall Weir (Tarke Weir) on Butte Creek and proceeds downstream to the confluence with Butte Slough then along Butte Slough to the East West Diversion Weir located at the upstream end of the Sutter Bypass. Project is also known as the Lower Butte Creek Project: Butte Slough analysis project.
- Supports Butte Creek Evaluation 1, a medium priority evaluation in a high priority watershed.

Estimated Cost = $26,400

C-1 Improve fish passage on the Cosumnes River.

- $90,000 contingent on additional funding, total cost of project is $357,511.
- Provide cost share to The Fishery Foundation of California's CALFED grant application for evaluation, engineering and design, and construction of appropriate fish passage solutions.
- Contributes to Cosumnes River Evaluation 2, a medium priority evaluation.

Estimated Cost = $90,000

D-1 Continue to analyze the genetics of winter-run chinook salmon.

- Continues genetic analysis of the natural population of endangered winter-run chinook salmon and provides molecular genetic and other technical support to the USFWS's winter-run chinook salmon captive broodstock and captive propagation programs.
- Supports Central Valley-wide Evaluations 2 and 4 in a high priority watershed.

Estimated Cost = $150,000

D-2a Expand the winter-run carcass survey on the upper mainstem Sacramento River.

- Continues United States Fish and Wildlife Service efforts to collect carcasses of winter-run chinook salmon to estimate escapement and collect tissue samples for baseline genetic monitoring.
- Supports Central Valley-wide Evaluations 2 and 4 in a high priority watershed.

Estimated Cost = $21,000

D-2b Expand the winter-run carcass survey on the upper mainstem Sacramento River.

- Continues California Department of Fish and Game efforts to collect carcasses of winter-run chinook salmon to estimate escapement and collect tissue samples for baseline genetic monitoring.
- Supports Central Valley-wide Evaluations 2 and 4 in a high priority watershed.

Estimated Cost = $15,000

D-3 Maintain real-time flow monitors on Antelope, Mill, Deer, Big Chico and Butte creeks.

- Verifies surface or ground water purchases or exchanges necessary to ensure adequate flows for anadromous fish passage.
- Supports Deer Creek Action 2, Mill and Deer creeks Actions 1, and the Antelope, Big Chico, and Butte creeks actions that address adult passage and stream flows, high and medium priority actions in high priority watersheds.

Estimated Cost = $122,500

D-4 Install and maintain real-time flow monitors at the Sanborn Slough Bifurcation Structure on Butte Creek.

- Installs real-time velocity and water temperature devices to monitor conditions for anadromous fish passage in both Butte Creek and Sanborn Slough below the soon to be reconstructed Sanborn Slough Bifurcation Structure.
- Supports Deer Creek Action 2, Mill and Deer creeks Actions 1, and the Antelope, Big Chico, and Butte creek actions that address adult passage and stream flows, high and medium priority actions in high priority watersheds.

Estimated Cost = $30,000

D-5 Continue to evaluate the juvenile life history of spring-run chinook salmon in Butte and Big Chico creeks.

- C Continue to collect and mark juvenile spring-run chinook salmon in Butte Creek to better understand their contribution to the fishery and to inventory adult spring-run salmon in the holding and spawning area. The project would be expanded to collect similar data on spring-run chinook salmon along with juvenile steelhead life history information on Big Chico Creek, although juvenile fish would not be marked.
- C Supports Butte Creek Evaluation 14, a medium priority evaluation in a high priority watershed. Contributes to Big Chico Creek Action 2 by evaluating spawning success and will contribute to identification of potential management alternatives to maintain and improve conditions for spring-run chinook salmon. Also supports Central Valley-wide Evaluation 9, a high priority evaluation to evaluate the ability of streams for which target production levels exist for chinook salmon but not for steelhead to support natural production of steelhead.

Estimated Cost = $135,000

D-6 Continue to extend outmigrant survey and salvage at the Hallwood-Cordua Diversion in the Yuba River through the summer of 2000.

- C Identify the timing and duration of downstream migration of juvenile chinook salmon and steelhead past Daguerre Point Dam, and would return fish to the river that would otherwise die.
- C Supports Yuba River Action 5, a medium priority action.

Estimated Cost = $25,000

D-7a Continue to conduct instream flow studies on the Sacramento, American, and Merced rivers.

- C Funds Fish and Wildlife Service efforts to provide information to reduce flow fluctuations and manage flows to improve anadromous salmonid habitat for spawning and rearing.
- C Supports the upper mainstem Sacramento River Action 1, American River Action 1, and Merced River Action 1, all high priority actions in high priority watersheds.

Estimated Cost = $250,000

D-7b Continue to conduct instream flow studies on the Sacramento, American, and Merced rivers.

- C Funds a portion of the California Department of Fish and Game efforts to provide information to reduce flow fluctuations and manage flows to improve anadromous salmonid habitat for spawning and rearing.

- Supports the upper mainstem Sacramento River Action 1, American River Action 1, and Merced River Action 1, all high priority actions in high priority watersheds.

Estimated Cost = $250,000

D-8 Continue to assess chinook salmon and steelhead distribution, habitat use, and food habits within the Cosumnes River Preserve floodplain.

- $20,000 contingent on additional funding.
- Contributes to efforts to assess fish distribution, habitat use, and food habits within recently restored floodplain reaches of The Nature Conservancy's Cosumnes River Preserve.
- Supports Cosumnes River Evaluation 3, a high priority evaluation, to evaluate the feasibility of restoring and increasing available spawning and rearing habitat for salmonids.

Estimated Cost = $44,040

D-9 Evaluate use of PHABSIM/2D modeling of spawning and rearing habitat to assess benefits of channel restoration on the Merced River.

- Supports all elements of construction and calibration of hydraulic and habitat simulation models that can be used to predict the amount of spawning and rearing habitat present over a range of discharges for pre- and post- habitat modification phases, and will be linked to the restoration of the Robinson Ranch segment of the Mining Reach.
- Evaluations will contribute to an overall monitoring plan for the large-scale habitat restoration efforts that are currently underway or will be soon.

Estimated Cost = $25,000

D-10 Study the feasibility of developing a long-term aggregate source for San Joaquin tributary channel restoration projects.

- Work with Merced County RCD, Merced Irrigation District, and CALTRANS to identify alternatives, feasibility, and permitting requirements to permit and secure a long-term source of aggregate material for channel restoration projects in the San Joaquin River tributaries. Focus likely on dredger tailing areas. Includes economic analysis of material quantity, quality, extraction method, permitting, and transport.
- Supports Merced River Action 3 and Evaluation 2, a high priority action and a medium priority evaluation in a high priority watershed.

Estimated Cost = $50,000

D-11 Analyze archived San Joaquin Basin chinook salmon scale samples and develop a comprehensive database accessible to interested parties.

- Provides the first year of funding necessary to read archived scale samples from CDFG spawning ground surveys and to develop a comprehensive database accessible to resource managers. Without these data, evaluations of factors affecting recruitment must make assumptions about cohort composition for any escapement year. For example, these data will allow for refinement and re-analysis of existing models that have looked at the relationship between spring flows and adult returns 2.5 years later.
- Support Stanislaus River Evaluation 3, a high priority evaluation in a high priority watershed.

Estimated Cost = $45,262

E-1 Assist with analysis of alternative management strategies designed to integrate Coleman National Fish Hatchery operations with restoration of natural populations of chinook salmon and steelhead in Battle Creek.

- Provides funding for additional United States Fish and Wildlife Service staff, or contracts with non-Service staff to assist the Service with an ongoing re-evaluation of CNFH operations.
- Supports Battle Creek Evaluation 4, a high priority evaluation; and Central Valley-wide Evaluations 2, 3, 4, and 5; all low priority evaluations, all in a high priority watershed.

Estimated Cost = $50,000

F-1 Provide support to the newly established Sacramento River Conservation Association.

- Provides staffing for the newly created nonprofit Sacramento River Conservation Association, which will coordinate management activities and work with local governments and landowners to resolve outstanding issues, and implement natural process and meander zone restoration, key SB1086 objectives.
- Supports upper mainstem Sacramento River Action 9, a high priority action in a high priority watershed.

Estimated Cost = $161,840

F-2 Provide support for Kids and creeks: Restoration Ecology in Action for students in grades 2 through 12 in the Big Chico and Butte creek and Feather River watersheds.

- Implements Streaminders Hands-On Environmental Education, a local program of the Izaak Walton League of America that presently includes

more than thirty-five classrooms in Butte County. Streaminders has sponsored comprehensive riparian education programs for area schools since the fall of l986, integrating basic ecology principles with the life cycle and habitat needs of salmonid species through: 1) teacher in-service workshops; 2) raising salmon and steelhead from eyed eggs to fry in refrigerated classroom aquaria; 3) creek ecology exploration; and 4) habitat restoration. *Kids And Creeks: Restoration Ecology In Action* is the restoration component of the Streaminders education program, available to students grades 2 - 12 from Chico, Oroville, Paradise and Durham School Districts.

- Supports Central Valley-wide Action 1, a lower priority action in two high priority watersheds.

Estimated Cost = $22,888

F-3 Continue to assist locally led efforts to facilitate coordination of the Butte Sink/Sutter Bypass stakeholders.

- Provides continued facilitation and coordination with local stakeholders for implementation of projects in the area from the Butte Sink through the Sutter Bypass to Sacramento Slough, Phase III of the Lower Butte Creek Project.
- Facilitates implementation of Butte Creek Actions 14, 15, 16, 18, 22, 23, and 24; and Evaluations 1, 2, 3, 4, 6, 7, 8, 9, 10, 11; all medium priority actions and evaluations, and Evaluation 5, a high priority evaluation, all in a high priority watershed.

Estimated Cost = $93,360

F-4 Develop a sediment management plan for the Tuolumne River.

- Develop a sediment management plan for the Tuolumne River (River Mile 52 downstream to the beginning of the sand-bedded reach at RM 25) that includes coarse sediment augmentation, fine sediment reduction measures, and a long- term monitoring and adaptive management program.
- Supports Tuolumne River Action 2 and 6, both high priority actions in a high priority watershed.

Estimated Cost = $202,300

F-5 Initiate broader stakeholder outreach and community awareness of restoration issues on the lower Stanislaus River.

- Provide matching funds to initiate an outreach effort on the Stanislaus River to provide and receive information and input on restoration opportunities and management issues.

- C Supports Stanislaus River Evaluation 2, a medium priority evaluation on a high priority watershed.

Estimated Cost = $50,000

F-6 Develop a river corridor physical habitat assessment and restoration plan for the Stanislaus River.

- C Provides cost-share to match funds for the first year's development of a historical watershed analysis and restoration strategy for the entire river corridor. This effort will build of initial floodplain habitat evaluations initiated in FY99 and will ultimately be integrated with the ongoing basin temperature and water management planning efforts. Includes an evaluation of all COE parklands to identify opportunities and constraints to incorporating fisheries management and restoration activities in areas that will provide the greatest benefit to anadromous fish.
- C Supports Stanislaus River Action 2, a high priority action in a high priority watershed.

Estimated Cost = $100,000

F-7 Develop floodplain property acquisition criteria for the San Joaquin Basin.

- C Provide support to initiate development of acquisition criteria specific to riparian, floodplain, and channel restoration needs, with an emphasis on improving natural channel and riparian habitat values for anadromous fish in the Merced, Tuolumne, Stanislaus, and San Joaquin rivers.
- C Supports multiple actions throughout the Restoration Plan, all high priority actions, many of which are in high priority watersheds.

Estimated Cost = $20,000

F-8 Develop an adaptive management forum for large-scale channel restoration projects.

- C Establishes a mechanism to access and organize fisheries, riparian, geomorphic, and engineering expertise and develops a forum to aid with the development and evaluation of restoration approaches.
- C Supports multiple actions throughout the Restoration Plan, all high priority actions, many of which are in high priority watersheds.

Estimated Cost = $100,000

ABCDEF-1 Develop, coordinate, and manage the Anadromous Fish Restoration Program.

Estimated Cost = $1,582,990

ABCDEF-2 Help support the California Department of Fish and Game Habitat Restoration Coordinators.

Estimated Cost = $239,029

ABCDEF-3 Retain professional experts for geomorphic reviews, analyses and environmental interpretation.

Estimated Cost = $9,224

Total Cost of Projects Likely for FY00 Funding: $5,494,313

Projects Contingent upon Additional Funding:

A-15 Acquire a conservation easement on the Eagle Canyon Ranch property at the confluence of Digger Creek and the North Fork of Battle Creek.

- Property is approximately 990 acres in size and includes approximately 2.5 miles of frontage on the south side of the North Fork of Battle Creek and riparian water rights on Digger Creek.
- Supports Battle Creek Evaluation 2, a high priority action in a high priority watershed.

Estimated Cost = $841,700

A-16 Control *Arundo donax* on Burch Creek: Nonnative species eradication, flood management, and restoration.

- Develops the techniques and approaches for *Arundo donax* eradication and control best suited to the Sacramento Valley ecosystem, while simultaneously meeting city and county flood control needs . Program would result in an ecosystem-based approach to the eradication and control of *Arundo* throughout the Sacramento River ecosystem and a prescriptive methodology for *Arundo* eradication on other, geomorphologically similar, west-side tributaries to the Sacramento River.
- Supports Central Valley-wide Evaluation 10, a low AFRP priority action in high priority watersheds.

Estimated Cost = $40,000

A-17 Enhance salmon habitat at Robinson Ranch segment of the Mining Reach on the Merced River.

- C Provide up to $500,000 to contribute to one or more tasks of a $5,677,518 restoration project currently funded by CALFED and Four Pumps restoration programs (existing obligations include: CALFED for $2,443,759 and Four Pumps Direct Loss Mitigation Program for $4,233,759).
- C Restore proper channel characteristics to produce and improve spawning and rearing habitat for salmon and to remove predator habitat between river miles 42.0 and 43.5.
- C Supports Merced River Action 3 and Evaluation 2, a high priority action and a medium priority evaluation in a high priority watershed.

Estimated Cost = $500,000

A-18 Continue to use spawning-sized gravel for irrigation diversion wing dam construction along the Merced River and monitor potential benefits.

- Provides appropriate spawning-sized material to be added to river at riparian diversions. Installation labor is provided by diverter.
- C Effort initiated by CDFG in FY 98/99 with Prop 70 funds (cost for materials was $37,000 with limited monitoring).
- C Expand the monitoring efforts to evaluate quality and use of potential spawning habitat.

Estimated Cost = $50,000

A-19 Initiate a comprehensive temperature management program for the Merced River.

- Develops alternatives and recommends one to three alternatives that may improve temperature management for chinook salmon (a) in the Merced River and (b) at Merced River Hatchery, including compiling and summarizing pertinent physical project specifications, operating strategies and requirements, related agreements, and existing thermal and flow information and biological monitoring activities in the four Merced River reservoirs and the lower Merced River.
- Supports Merced River Evaluation 1, a high priority evaluation in a high priority watershed.

Estimated Cost = $43,000

A-20 Partner with NRCS to acquire easements and restore lower Tuolumne River parcels identified through the NRCS Floodplain Easement Program.

- C Provides restoration planning funds to match NRCS Floodplain Restoration Program and CALFED acquisitions on three lower Tuolumne River properties (between RM 2 and 7) and six San Joaquin River properties near the Tuolumne River confluence. Evaluates programmatic

restoration strategies and determines priority and feasibility for restoration on the suite of nine Floodplain Easement properties and determine environmental compliance requirements.

- C Supports Tuolumne River Action 2 and 6, high priority actions in a high priority watershed.

Estimated Cost = $20,000

A-21 Reduce fine sediment transport from lower Gasburg Creek to the Tuolumne River.

- C Reduces acute and point source sediment input to the Tuolumne River spawning reach and improves watershed management to reduce non-point source degradation of spawning habitat in a primary chinook salmon production area.
- C Supports Tuolumne River Action 2, a high priority action in a high priority watershed.

Estimated Cost = $175,902

A-22 Restore in-channel habitat at Special Run-Pool 10 on the Tuolumne River.

- C Total project cost is $4,593,000, of which CALFED received a proposal requesting $2,179,000.
- C Next phase to rehabilitate the channel and floodplain system and improve natural geomorphic functions to restore and maintain instream and floodplain habitats for the benefit of salmon and other native riparian species in the lower Tuolumne River at river mile 25.
- C Engineering and restoration design, environmental documentation, and pre-project monitoring has been completed through previous AFRP contributions.
- • Supports Tuolumne River Action 2 and Evaluation 2, a high priority action and a medium priority evaluation in a high priority watershed.

Estimated Cost = $2,384,000

A-23 Acquire Bobcat Flat on the Tuolumne River.

- C Acquire 150 acres of the total 280 acre offering and seek partnership funding for the remainder of the project. Assess mineral and agricultural value of a combined three parcel unit of 280 acres along 1.6-miles of river from RM 42.7 to 44.3.
- C Supports Tuolumne River Action 2 and 6, both high priority actions in a high priority watershed.

Estimated Cost = $933,400

A-24 Reduce sediments and improve water quality using soil additives in conjunction with agricultural best management practices for agricultural production areas of the San Joaquin River and lower eastside San Joaquin River tributaries.

- Partners with NRCS to further evaluate the benefit and use of chemical approaches in combination with the development of Best Management Practices for agriculture to minimize soil erosion and fine sediment inputs
- Consistent with Mainstem San Joaquin River Evaluation 1, a high priority evaluation in a high priority watershed.

Estimated Cost = $50,000

B-1 Complete small diversion inventory and develop an initial assessment of cumulative impact for the San Joaquin Basin.

- Funds would match CDFG funding to build off of existing GIS data base to evaluate individual and cumulative riparian diversion pump impacts on anadromous fish. Individual diversion attributes need to be compiled (i.e. rate, time and quantity of diversion, relative impact on anadromous fish, etc) and assessment of impact on anadromous fishes should be ascertained and restoration priorities identified.
- Consistent with medium priority actions for each of the San Joaquin River tributaries and mainstem.

Estimated Cost = $50,000

D-12 Continue to survey and monitor adult winter and spring-run chinook salmon on Battle Creek.

- Uses carcass surveys, video monitoring, and snorkel surveys to assess the numbers of marked and unmarked adult winter-run and spring-run chinook salmon returning to spawn in Battle Creek.
- Helps develop a baseline and monitor success of ongoing Battle Creek actions and evaluations, all high and medium priority actions and evaluations in a high priority watershed.

Estimated Cost = $100,000

D-13 Develop a geomorphic model for demonstration and feasibility assessment of setback levees on Central Valley river systems.

- Funds would match $30,000 from The Nature Conservancy to develop a geomorphic model that allows simulation and demonstration of the response of river systems to levee removal and setback. The prototype model can be used in leveed reaches of rivers in throughout the Central Valley. This model also provides data for a riparian habitat model that is

currently being developed by collaborator Steven E. Greco, also of UC Davis.

- Supports upper mainstem Sacramento River Action 9, a high priority action in a high priority watershed.

Estimated Cost = $85,000

D-14 Evaluate the life history and status of chinook salmon in the Yuba River.

- Identifies the timing of upstream migration of adult steelhead past Daguerre Point Dam, spawning location and juvenile distribution. Traps adult steelhead passing Daguerre Point Dam and collects scale and tissue samples that can be used to help determine stock characteristics and life-history patterns.
- Evaluation would contribute to the identification of potential projects to maintain and improve conditions for steelhead.

Estimated Cost = $200,000

D-15 Evaluate the life history and status of juvenile chinook salmon and steelhead in the Yuba River.

- Documents the timing of emergence, size and condition at emigration, duration of emigration, and develops a measure of relative abundance of juvenile chinook salmon and steelhead in the Yuba river.
- Evaluation contributes to the identification of potential projects to maintain and improve conditions for chinook salmon and steelhead on the Yuba River .

Estimated Cost = $125,000

D-16 Continue to evaluate spawning gravel in the Mokelumne River.

- Cost share an EBMUD spawning gravel assessment to identify mechanisms responsible for spawning habitat selection and quality to further identify spawning habitat restoration strategies and priorities.
- Supports Mokelumne River actions 2 and 3, high priority actions, improve and replenish salmonid spawning habitat.

Estimated Cost = $20,000

D-17 Initiate sonar-based counting of migrating chinook salmon on the Mokelumne River.

- Installs and tests sonar-based equipment downstream of Woodbridge Dam to automatically count adult and juvenile chinook salmon migrating in the Mokelumne River.

C Supports Mokelumne River Evaluations 1 and 2, high priority evaluations.

Estimated Cost = $672,000

D-18 Apply scale patten analyses to document the fate of wild and hatchery produced chinook salmon from the Mokelumne River.

C Uses automated image processing and scale pattern analysis techniques to: (1) determine what percentage of juvenile chinook salmon salvaged at the south Delta pumping facilities originate from the Mokelumne River; and (2) estimate what percentage of adult chinook salmon returning to the Mokelumne River originate from the Mokelumne River hatchery.

C Supports Sacramento-San Joaquin Delta evaluations 1 and 2, high priority evaluations in the highest priority watershed; and Central Valley-wide Evaluation 7, a low priority evaluation.

Estimated Cost = $125,000

D-19 Investigate regional variation in wild and hatchery reared chinook salmon bioenergetics: effects of ration and fluctuating temperatures.

C Tests the hypothesis that significant, latitude-based strain differences (Merced River, CA; Klamath River, CA; and Little White Salmon River, WA) in bioenergetic performance and tolerance limits exist, and hatchery fish significantly deviate from their parent wild stocks. Results can be used to refine temperature and flow management alternatives to benefit anadromous fish.

• Supports Merced River Evaluation 1, a medium priority evaluation in a high priority watershed.

Estimated Cost = $80,000

D-20 Investigate the life history of juvenile rainbow trout in the Stanislaus River.

C Use otolith micro-chemistry to assess maternal life history patterns in anadromy.

C Information would be help evaluate the extent of andromous life history expression by O. mykiss in a San Joauqin River tributary.

Estimated Cost = $100,000

F-9 Assist locally led efforts to develop a comprehensive watershed assessment for Cow Creek.

C Total cost of project is $139,719 ($100,000 of which is already being provided, including $70,000 in 205(j) funds for a watershed assessment including two meetings with local landowners and other stakeholders, and

$30,000 in "in kind" funds from California Department of Fish and Game, the Regional Water Quality Control Board, Shasta College, and Western Shasta Resource Conservation District).

- Builds on previously funded efforts to survey and type existing and potential habitat on Cow Creek to assess the potential for restoration of natural production of chinook salmon and steelhead.
- Supports Cow Creek Actions 1 through 4, high and medium priority actions.

Estimated Cost = $39,719

Total Cost of Projects Contingent upon Additional Funding–at Least $6,634,721

VII. CVPIA Budget:

1. *Fund Sources and Amounts*:

- Restoration Funds:	$7,000,000
- Energy & Water Appropriations:	$0
- State Proposition 204 Funds:	$0
- Total Funds Available:	***$7,000,000***

2. *Anticipated CVPIA Expenditures*:

- Personnel Compensation and Benefits:----------$*1,444,500*
  - a. Sacramento-San Joaquin Estuary Fishery Resource Office AFRP administrative activities: $665,000
  - b. USBR coordination support: $25,000
  - c. Sacramento Fish and Wildlife Office (SFWO), Central Valley Fish and Wildlife Restoration Program AFRP administrative activities: $192,000
  - d. SFWO, Habitat Conservation Division environmental documentation support: $272,500
  - e. North Central Valley Fish and Wildlife Office AFRP administrative activities: $200,000
  - f. Real estate easement and acquisition support: $90,000

- Contract Services:----------$*5,417,178* [1]
  - a. All actions under Section VI except ABCDEF-1: $5,417,178

- Administrative Expenses:----------*$138,290*
  - a. USFWS Regional Office budget and administrative

[1]Includes costs for all projects likely for FY00 funding under VII. A-F (p 5-16).

support: $138,290

- Miscellaneous Expenses:----------$*0*

- Total Anticipated CVPIA Expenditures:----------***$7,000,000***

3. *Other Funding Sources*: (Not all inclusive, other FY00 potential funds to be determined.) It is estimated that funding is available for these types of actions from private and public entities, including the Four Pumps Agreement, Tracy Direct Loss Mitigation Program, Proposition 70, Category III, CALFED Federal funds, and the state cost share for the CVPIA. The amount, although considered conservative, is estimated to be $12,500,000.

   - Total of projects contingent upon additional funding is at least *$6,634,721*.

VIII. Contractual Information: *(see specifics under Section VII. for all restoration actions)*

IX. Future Years' Commitments and Actions:

Because funding for the majority of the restoration projects are through annual grants with private parties and cooperative agreements with federal and state agencies, and others, future year's funding will be conditional on the satisfactory completion of previous years objectives.

Several of the projects proposed for funding in FY00 have the potential for future years' commitments. These are listed below:

FY00: (Projects likely for FY00 funding) A-1, 3, 5 through 8, 10, and 13 through 15; BC-1 and 2; D-1 through 10; E-1; and F-1 through 8; and (Projects contingent upon additional funding) A-17 through 25; B-1; D-12 through 20; and F-9.

Many of the projects funded by the AFRP are focused on planning potential future projects or monitoring the overall success of the program. When watershed plans are completed, grants will be targeted toward specific restoration actions and will continue with a partnership and cost-sharing approach. Action-specific monitoring will generate data needed to evaluate specific actions and evaluations and to develop actions for which a need has been identified largely "pre-project" in nature or are designed to assess overall production or survival for a single watershed or the Delta. As site specific actions are completed, more definitive monitoring programs will be designed and implemented. AFRP monitoring is being done in coordination with the Comprehensive Assessment and Monitoring Program (CAMP) [3406 (b)(16)]. It is foreseen that many restoration actions

once taken will require a long-term commitment for construction, operation, maintenance and monitoring on the part of the USFWS, USBR and respective governmental agencies and private partners.

APPENDIX A

FY99 AFRP Funded Projects

A-1 Acquire a riparian easement on the Klinesteker property on Mill Creek.

- Provides a permanent conservation easement to protect approximately 11 acres of riparian habitat while permitting the existing residential uses to continue in a manner consistent with riparian habitat protection and enhancement, but will limit further subdivision and development.
- Supports Mill Creek Action 4, a high priority action in a high priority watershed.

Cost = $25,000

A-2 Acquire a riparian easement on the Peek property on Deer Creek.

- Provides a permanent conservation easement to protect approximately 600 acres of riparian habitat on the Peek property, with the remaining 1600 acre upland portion of the property being proposed for acquisition through a CALFED grant. This easement will permit the existing agricultural use to continue in a manner consistent with riparian habitat protection and enhancement, but will limit further subdivision and development.
- Supports Deer Creek Action 4, a high priority action in a high priority watershed.

Cost = $100,000

A-3 Acquire a riparian easement on the Porter property on Deer Creek.

- Provides a permanent conservation easement and provides for initial restoration of 162 acres of riparian habitat on the Porter property while permitting the existing agricultural uses to continue in a manner consistent with riparian habitat protection and enhancement, but limiting further subdivision and development.
- Supports Deer Creek Action 4, a high priority action in a high priority watershed.

Cost = $50,000

A-4 Acquire a riparian easement on the New Clairvaux Abby property on Deer Creek.

- Provides protection along the south side of Deer Creek from the mouth of Deer Creek at the Sacramento River extending about one mile up Deer Creek.

- Supports Deer Creek Action 4, a high priority action in a high priority watershed.

Cost = $25,000

A-5 Remove a large block of concrete debris obstructing flow near the Keeney Property on Butte Creek.

- Removes a hydraulic control from Butte Creek and allows natural channel and riparian habitat restoration to proceed.
- Supports Butte Creek Action 19, a high priority action in a high priority watershed.

Cost = $10,000

A-6 Restore in-channel habitat at the Ratzlaff Reach on the Merced River.

- Contributes to efforts to restore proper channel characteristics to produce and improve spawning and rearing habitat for salmon and to remove predator habitat downstream of Robinson Ranch.
- Supports Merced River Action 3, Evaluation 2, a high priority action and a medium priority evaluation in a high priority watershed.

Cost = $250,000

A-7 Enhance salmon habitat at the Lower Western Stone segment of the Robinson/Ratzlaff Reach on the Merced River.

- Contributes to efforts to restore proper channel characteristics to produce and improve spawning and rearing habitat for salmon and to remove predator habitat between river miles 43.5 and 44.
- Supports Merced River Action 3, Evaluation 2, a high priority action and a medium priority evaluation in a high priority watershed.

Cost = $125,000

A-8 Restore the Ruddy Mining Reach on the Tuolumne River.

- Total cost of project is $5,400,000.
- Phase II of IV to rehabilitate the channel and floodplain system and improve natural geomorphic functions to restore and maintain instream and floodplain habitats in the Ruddy Reach (river mile 36.5-37.7) of the Tuolumne River for the benefit of salmon and other native riparian species.
- Supports Tuolumne River Action 2 and Evaluation 2, a high priority action and a medium priority evaluation in a high priority watershed.

Cost = $1,962,516

B-1 Continue to develop a long-term solution for screening Coleman National Fish Hatchery's water intake system on Battle Creek.

- Total cost of project is $3,700,000 to $5,800,000.
- Completes alternatives analyses to develop a long-term solution that prevents chinook salmon and steelhead from being entrained at three water intakes for the hatchery's water supply.
- Supports Battle Creek Action 8, a medium priority action in a high priority watershed.

Cost = $8,200

B-2 Develop fish screen and diversion bypass feasibility alternatives at the Hallwood-Cordua Irrigation Districts Diversion on the Yuba River.

- Develops a feasibility report for fish screen improvements at the Hallwood-Cordua Diversion.
- Supports Yuba River Action 5, a medium priority action.

Cost = $60,000

C-1 Provide analyses to improve fish passage through Iron Canyon on Big Chico Creek.

- Conduct preliminary engineering analyses and design to improve spring-run chinook salmon passage over a greater range of stream flows through Iron Canyon.
- Supports Big Chico Creek Evaluation 2, a high priority evaluation in a high priority watershed.

Cost = $125,000

C-2 Provide analyses to improve fish passage at Sutter Bypass Weir 5 (Farmers Weir) on Butte Creek.

- Provides preliminary engineering and environmental analyses for structural elements, which may include a fish ladder and screen or removal of the weir and construction of an alternate delivery point and potential alternative water source, as recommended in TNC's Lower Butte Creek Phase 1b analysis. Project is supported by local stakeholders involved in the TNC Lower Butte Creek Project evaluation and will be coordinated with the overall operations plan for Sutter Bypass.
- Supports Butte Creek Action 23, and Evaluations 7 and 8; all medium priority actions and evaluations in a high priority watershed.

Cost = $100,000

C-3 Provide analyses to improve fish passage at Sutter Bypass East-West Diversion Weir on Butte Creek.

- Provides preliminary engineering and environmental analysis for structural elements recommended in TNC Lower Butte Creek Phase 1b analysis, which may include upgraded structure with fish ladder and screen at Sutter Bypass East-West Diversion Weir or removal of delivery point to another site. Analysis will be coordinated with overall operations plan for Sutter Bypass.
- Supports Butte Creek Evaluation 2, a medium priority evaluation in a high priority watershed.

Cost = $50,000

C-4 Provide analyses to improve fish passage at Sutter Bypass Weir 3 (Guisti Weir) on Butte Creek.

- Provides preliminary engineering and environmental analysis for removal of Sutter Bypass Weir 3, and installation of fish screens on upstream diversions, as recommended in TNC's Lower Butte Creek Phase 1b analysis. Project is supported by local stakeholders involved in the TNC Lower Butte Creek Project evaluation and will be coordinated with overall operations plan for Sutter Bypass.
- Supports Butte Creek Action 23 and Evaluations 6 and 11, all medium priority actions and evaluations in a high priority watershed.

Cost = $100,000

C-5 Replace and upgrade existing adult exclusion weir and riser at Drumheller Slough on Butte Creek.

- Provides for construction cost of replacement and upgrade of existing adult exclusion barrier. Preliminary engineering will be completed using Tracy Direct Loss Mitigation Program funds. Project is supported by local stakeholders involved in the TNC lower Butte Creek Project evaluation.
- Implements Butte Creek Action 16, a medium priority action in a high priority watershed.

Cost = $200,000

D-1 Continue to analyze the genetics of winter-run chinook salmon.

- Continues genetic analysis of the natural population of endangered winter-run chinook salmon and provides molecular genetic and other technical

support to the USFWS's winter-run chinook salmon captive broodstock and captive propagation programs.

- Supports Central Valley-wide Evaluations 2 and 4 in a high priority watershed.

Cost = $200,000

D-2 Expand the winter-run carcass survey on the upper mainstem Sacramento River.

- Continues efforts to collect carcasses of winter-run chinook salmon to estimate escapement and collect tissue samples for baseline genetic monitoring.
- Supports Central Valley-wide Evaluations 2 and 4 in a high priority watershed.

Cost = $21,000

D-3 Continue to survey and monitor adult winter and spring-run chinook salmon on Battle Creek.

- Uses carcass surveys, video monitoring, and snorkel surveys to assess the numbers of marked and unmarked adult winter-run and spring-run chinook salmon returning to spawn in Battle Creek.
- Helps develop a baseline and monitor success of ongoing Battle Creek actions and evaluations, all high and medium priority actions and evaluations in a high priority watershed.

Cost = $40,000

D-4 Continue to evaluate the juvenile life history of spring-run chinook salmon in Butte and Big Chico creeks.

- Continue to collect and mark juvenile spring-run chinook salmon in Butte Creek to better understand their contribution to the fishery and to inventory adult spring-run salmon in the holding and spawning area. The project would be expanded to collect similar data on spring-run chinook salmon along with juvenile steelhead life history information on Big Chico Creek, although juvenile fish would not be marked.
- Supports Butte Creek Evaluation 14, a medium priority evaluation in a high priority watershed. Contributes to Big Chico Creek Action 2 by evaluating spawning success and will contribute to identification of potential management alternatives to maintain and improve conditions for spring-run chinook salmon. Also supports Central Valley-wide Evaluation

9, a high priority evaluation to evaluate the ability of streams for which target production levels exist for chinook salmon but not for steelhead to support natural production of steelhead.

Cost = $135,000

D-5 Evaluate the life history and status of steelhead in the Yuba River.

- Identify timing of upstream migration of adult steelhead past Daguerre Point Dam, spawning location and juvenile distribution. Trap adult steelhead passing Daguerre Point Dam and collect scale and tissue samples that can be used to help determine stock characteristics and life-history patterns.
- Evaluation would contribute to the identification of potential projects to maintain and improve conditions for steelhead.

Cost = $120,000

D-6 Extend outmigrant survey and salvage at the Hallwood-Cordua Diversion in the Yuba River through the summer of 1999.

- Identify the timing and duration of downstream migration of juvenile chinook salmon and steelhead past Daguerre Point Dam, and would return fish to the river that would otherwise die.
- Supports Yuba River Action 5, a medium priority action.

Cost = $19,999

D-7a Continue to conduct instream flow studies on the Sacramento, American, and Merced rivers.

- Funds Fish and Wildlife Service efforts to provide information to reduce flow fluctuations and manage flows to improve anadromous salmonid habitat for spawning and rearing.
- Supports the upper mainstem Sacramento River Action 1, American River Action 1, and Merced River Action 1, all high priority actions in high priority watersheds.

Cost = $250,000

D-7b Continue to conduct instream flow studies on the Sacramento, American, and Merced rivers.

- Funds a portion of the California Department of Fish and Game efforts to provide information to reduce flow fluctuations and manage flows to improve anadromous salmonid habitat for spawning and rearing.

- Supports the upper mainstem Sacramento River Action 1, American River Action 1, and Merced River Action 1, all high priority actions in high priority watersheds.

Cost = $250,000

D-8 Assess chinook salmon and steelhead distribution, habitat use, and food habits within the Cosumnes River Preserve floodplain.

- Contributes to efforts to assess fish distribution, habitat use, and food habits within recently restored floodplain reaches of The Nature Conservancy's Cosumnes River Preserve.
- Supports Cosumnes River Evaluation 3, a high priority evaluation, to evaluate the feasibility of restoring and increasing available spawning and rearing habitat for salmonids.

Cost = $30,000

D-9 Evaluate spawning gravel in the Mokelumne River.

- Cost share an EBMUD spawning gravel assessment to identify mechanisms responsible for spawning habitat selection and quality to further identify spawning habitat restoration strategies and priorities.
- Supports Mokelumne River actions 2 and 3, high priority actions, improve and replenish salmonid spawning habitat.

Cost = $20,582

D-10 Survey spawning habitat for chinook salmon in the Calaveras River.

- Contributes to efforts to assess spawning habitat availability and use in the Calaveras River, consistent with recent efforts to improve access to these habitats for chinook salmon.
- Supports Calaveras River Evaluation 2, a high priority evaluation.

Cost = $9,000

D-11 Update and validate the spawning riffle atlas for the San Joaquin tributaries.

- Total cost of project $135,000 with $50,000 CDFG cost share.
- Update and validate 1988 riffle atlas for San Joaquin River tributaries to make available as GIS layer to technical committees for comprehensive watershed management. Compile CDFG data sets in spatial data layers for monitoring and planning restoration projects and establish data sharing procedures.

- Supports Stanislaus River Action 2, Tuolumne River Action 2, and Merced River Action 3, and Mainstem San Joaquin River Evaluation 1, all high priority actions or evaluations in high priority watersheds.

Cost = $42,500

D-12 Evaluate the use of radio-tagged juvenile chinook salmon to identify cause and location of their mortality in the Stanislaus River.

- Supplements an ongoing Oakdale Irrigation District study of the migration rates of radio-tagged juvenile chinook salmon by attempting to recover tags for fish that do not complete their migration.
- Supports Stanislaus River Evaluation 2, a high priority evaluation in a high priority watershed.

Cost = $36,000

D-13 Continue to conduct a pilot study of the use of otoliths to evaluate the role of Delta rearing in the life history of Central Valley chinook salmon and steelhead.

- Continues to study otolith microstructure analysis as a tool that can aid in answering high priority questions on how the Delta is used by juvenile chinook salmon and steelhead, including when they enter and when they leave and how use of the Delta may ultimately influence cohort survival under varying ambient conditions.
- Supports many juvenile salmon survival evaluations associated with the Sacramento-San Joaquin Delta section of the Restoration Plan, high priority evaluations in the highest priority watershed.

Cost = $12,500

D-14 Analyze the genetics of steelhead throughout the Central Valley.

- Determine if genetic differences exist between steelhead stocks in various waters and will aid in maintaining genetic diversity in natural and hatchery stocks.
- Supports Central Valley-wide Evaluation 4, a low priority evaluation.

Cost = $75,000

F-1 Study effects of public ownership of meander-belt properties on property tax income along the Sacramento River.

- Studies the potential effects of public ownership of meander-belt properties on property tax income in counties bordering the meander belt on the upper mainstem Sacramento River.

- C Supports upper mainstem Sacramento River Action 9, a high priority action in a high priority watershed.

Cost = $84,162

F-2 Continue to develop a regional conservation plan for the Battle Creek watershed to restore winter-run and spring-run chinook salmon and steelhead.

- C Continues to develop a community-based, comprehensive plan to restore naturally spawning populations of winter-run and spring-run chinook salmon and steelhead in the Battle Creek watershed.
- C Supports Battle Creek Evaluations 2 and 4, both are high priority evaluations in high priority watersheds.

Cost = $28,733

F-3 Provide "Adopt-A-Watershed" training for teachers in the Chico Unified School District.

- C Involves training ten teachers to develop specific curricula appropriate to each grade level.
- C Supports Central Valley-wide Action 1, a low priority action.

Cost = $10,000

F-4 Assist locally led efforts to facilitate coordination of the Butte Sink/Sutter Bypass stakeholders.

- C Provides continued facilitation and coordination with local stakeholders for implementation of projects in the area from the Butte Sink through the Sutter Bypass to Sacramento Slough, continuing a program which was begun with the TNC Lower Butte Creek Project.
- C Facilitates implementation of Butte Creek Actions 14, 15, 16, 18, 22, 23, and 24; and Evaluations 1, 2, 3, 4, 6, 7, 8, 9, 10, 11; all medium priority actions and evaluations, and Evaluation 5, a high priority evaluation, all in a high priority watershed.

Cost = $75,000

F-5 Assist locally led efforts to develop a watershed management strategy for the Dry Creek watershed.

- C Supports locally-led effort to organize and develop and implement restoration and stewardship activities in the Dry Creek Watershed.

- Supports Central Valley-Wide Evaluation 11, a high priority evaluation, to evaluate watershed problems, identify restoration feasibility, and encourage restoration activities on small tributaries.

Cost = $20,000

F-6 Support programs to provide educational outreach and involvement in restoration for teachers and students in the Lodi, Modesto and Merced unified school districts.

- Provides opportunities teachers and their students to learn about and become involved in local restoration efforts in the Lodi, Modesto and Merced school districts.
- Supports Central Valley-wide Action 1, a low priority action.

Cost = $9,999

F-7 Continue to assist development of locally-led restoration planning efforts on the Merced River.

- Provides supplemental funding for Merced River stakeholder group to help develop a comprehensive watershed management strategy, including a framework to describe existing conditions and identify restoration issues to be addressed in a comprehensive watershed management plan.
- Supports Merced River Actions 3 and 5, a high priority and a low priority action in a high priority watershed.

Cost = $30,000

F-8 Assist with technical outreach for the Tuolumne River Technical Advisory Committee.

- Provide support for peer review of monitoring methodologies and restoration project design and for technical outreach to the local community.
- Supports Tuolumne River Actions 2 and 5, a high and a low priority action in a high priority watershed.

Cost = $25,000

F-9 Continue to provide funding for watershed group leaders to attend the "Working at a Watershed Level" course

- Involves training local watershed coordinators and leaders; course is aimed at a broad audience, teaching the full scope of the interdisciplinary field of working in watersheds.
- Supports Central Valley-wide Action 1, a low priority action. This action is important for enabling responsible leadership and management by local

watershed group leaders in Central Valley watersheds that support anadromous fish.

Cost = $20,000

ABCDEF-1 Develop, coordinate, and manage the Anadromous Fish Restoration Program.

Cost = $1,527,918

ABCDEF-2 Help support the California Department of Fish and Game Habitat Restoration Coordinators.

Cost = $239,029

ABCDEF-3 Retain professional experts for geomorphic reviews, analyses and environmental interpretation.

Cost = $1,861

Total of projects funded in FY99: $6,524,000