

Draft CVPIA Fiscal Year 2013 Annual Work Plan

August 1, 2012

Program Title: Anadromous Fish Restoration Program 3406(b)(1)

Responsible Entities:

Staff Name	Agency	Role
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Program Goals and Objectives for FY 2013

The goal of the Anadromous Fish Restoration Program (AFRP), as stated in Section 3406(b)(1) of the Central Valley Project Improvement Act (CVPIA), is to "develop within three years of enactment and implement a program which makes all reasonable efforts to ensure that, by the year 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 for the AFRP can be found in the Final Restoration Plan for the Anadromous Fish Restoration Program (Restoration Plan)¹:

1. Improve habitat for all life stages of anadromous fish through provision of flows of suitable quality, quantity, and timing, and improved physical habitat.
2. Improve survival rates by reducing or eliminating entrainment of juveniles at diversions.
3. Improve the opportunity for adult fish to reach their spawning habitats in a timely manner.
4. Collect fish population, health, and habitat data to facilitate evaluation of restoration actions.
5. Integrate habitat restoration efforts with harvest and hatchery management.
6. Involve partners in the implementation and evaluation of restoration actions.

The Restoration Plan was completed in 2001 to guide the long-term development of the AFRP. The Restoration Plan provides a programmatic-level description of the AFRP and, is used to guide the implementation of all of the provisions of the CVPIA that contribute to the goal of making all reasonable efforts to at least double natural production of anadromous fish (AFRP doubling-goal). The following provisions contribute to accomplishing the goal of the AFRP (b)(1) program: (b)(1)(B), (b)(2), (b)(3), (b)(5), (b)(9), (b)(10), (b)(12), (b)(13), (b)(15), (b)(16), (b)(19), (b)(21), and 3406 (g).

In 1994, the California Department of Fish and Game (CDFG) issued a report that quantified abundance of fish taxa in the Central Valley between 1967 and 1991². The AFRP used the CDFG fish abundance

¹ Final Restoration Plan for the Anadromous Fish Restoration Program, A Plan to Increase Natural Production of Anadromous Fish in the Central Valley of California. Released as a Revised Draft on May 30, 1997 and adopted as final on January 9, 2001. CVPIA, AFRP, Stockton, CA. [http://www.fws.gov/stockton/afrp/restplan_final.cfm].

²Mills, T.J., and R. Fisher. 1994. Central Valley Anadromous Sport Fish Annual Run-Size,

estimates to develop the doubling goal production targets for nine anadromous fish taxa in the Sacramento-San Joaquin River Delta and 22 watersheds in the Central Valley. The doubling goal targets were developed for fall-, late-fall-, winter-, and spring-run Chinook salmon; steelhead; striped bass; American shad; white sturgeon; and green sturgeon. The doubling goal targets for fall, late-fall, winter, and spring runs of Central Valley Chinook salmon are 750,000, 68,000, 110,000, and 68,000, respectively. The doubling goal targets for steelhead, striped bass, American shad, white sturgeon, and green sturgeon are 13,000, 2,500,000, 4,300, 11,000, and 2,000, respectively. The Restoration Plan also describes the process by which actions and evaluations were determined to be reasonable and list a total of 289 actions and evaluations that encompass the Sacramento-San Joaquin River Delta and the 22 watersheds in the Central Valley. The Restoration Plan identifies the need for partners, local involvement, public support, adaptive management, and flexibility as key attributes of the AFRP approach.

In 2006, Reclamation, in coordination with the Fish and Wildlife Service (Service), completed an initial Program Assessment Rating Tool (PART) evaluation for CVPIA at the request of the Federal Office of Management and Budget (OMB). Seventy-three high and medium priority structural actions and evaluations in the Restoration Plan encompassing 105 different projects were identified as performance goals and measures for AFRP under PART. Also in 2006, the Assistant Secretary for Water and Science of the Department of the Interior (Assistant Secretary) directed Reclamation to conduct a performance review of the CVPIA, with specific attention to the fish and wildlife provisions of the CVPIA. This activity was undertaken in coordination and partnership with the Service. The primary purpose of this review was to determine when the relevant provisions of the CVPIA would be sufficiently implemented as to consider them “complete” for funding purposes. In response to the directive by the Assistant Secretary, Reclamation and the Service conducted the CVPIA Program Activity Review (CPAR) focused on the fish, wildlife, and habitat restoration provisions of Section 3406 (Fish, Wildlife, and Habitat Restoration) which are funded by the Restoration Fund. Performance goals were developed for “annual” provisions that occur in perpetuity, or at least indefinitely, and for “time certain” provisions or program activities that have a limited term or end point. The CPAR Report³ identified 128 Restoration Plan high and medium priority actions (53 structural and 75 non-structural) that are “time certain” performance goals for AFRP. Progress toward achieving the anadromous fish doubling goal targets were also identified as “annual” outcome based performance goals for AFRP. There is an overlap between the broader Performance Goals and Measures of the PART Implementation Plan and the more specific provision by provision performance goals and measures of CPAR.

The AFRP is one of five CVPIA programs that was integrated with the CALFED Ecosystem Restoration Program (ERP) (Record of Decision, 2000)⁴. To facilitate this integration, the Restoration Plan objectives were included in the CALFED ERP Draft Stage 1 Implementation Plan.⁵ These objectives are also complementary to other goals and objectives listed in the Draft Stage 1 Implementation Plan and would help address the objectives of the CALFED Multi-Species Conservation Strategy⁶ and the Biological Opinion on the Long Term Operations of the Central Valley Project and State Water Project⁷. The AFRP shares ERP’s vision of the Single Blueprint concept which provides a unified and cooperative approach to

Harvest, and Population Estimates, 1967 through 1991. Revised August 1994. Report prepared for the California Department of Fish and Game. Inland Fisheries Technical Report. Sacramento, California. [<http://www.fws.gov/stockton/afrp/documents/BookofNumbers.pdf>].

³USBR. 2009. Central Valley Project Improvement Act Program Activity Review Report. Sacramento, CA [http://www.usbr.gov/mp/cvpia/docs_reports/docs/2009_Final%20CPAR%20Report%208-25-09.pdf].

⁴Programmatic Record of Decision, CALFED Bay-Delta Program, August 28, 2000. Sacramento, CA.

⁵Draft Stage 1 Implementation Plan, August 2001. Ecosystem Restoration Program, CALFED Bay-Delta Program. Sacramento, CA.

⁶CALFED Bay-Delta Program Multi-Species Conservation Strategy. August 28, 2000. California Bay-Delta Program. Sacramento, CA.

⁷Biological Opinion on the Long Term Operations of the Central Valley Project and State Water Project. June 4, 2009. USBR, Sacramento, CA.

restoration. AFRP has continued to coordinate with ERP and remains committed to the complementary goals and objectives that were recently updated in the Conservation Strategy for Restoration⁸. In addition, AFRP strives to integrate with and contribute to the adaptive management approach and continue consistency and collaboration with a wide variety of programs and efforts that are consistent with AFRP goals and objectives. AFRP frequently partners with and contributes to planning and implementation projects with entities such as the Delta Stewardship Council (<http://deltacouncil.ca.gov>), Delta Science Program (<http://deltacouncil.ca.gov/science-program>), the Bay Delta Conservation Plan (<http://baydeltaconservationplan.com>), the Fish Passage Improvement Program (<http://www.water.ca.gov/fishpassage/>), the San Joaquin River Restoration Program (www.restoresjr.net), the Interagency Ecological Program (<http://www.water.ca.gov/iep/>), and others.

In 2008 an Independent Review⁹ of CVPIA was conducted to assess the fisheries programs activities and progress toward achieving the anadromous fish doubling goals. The Independent Review identified four major recommendations which include 1) Improve the Program's Science Based Framework; 2) Reorganize Program Structure and Management; 3) Improve Implementation by Making Full Use of CVPIA Authorities; and 4) Improve Collaboration with All Related Programs in the Central Valley. The resulting report recommendations have led us to improve our approaches to adaptive management and implement an improved science-based strategy to achieve our goals and objectives through the use of physical and biological metrics to capture ecosystem function, standardizing methods and data management, developing hypotheses specific to the implementation of restoration actions, characterizing pre-project existing conditions, and implementation of pre- and post-project monitoring to evaluate and document project success. AFRP also supports recommendations to improve collaboration and coordination both within the CVPIA Programs, as well as with other programs focused on similar goals. AFRP will be working diligently to increase our efforts to integrate the CVPIA Fisheries Resource Area programs and implement actions comprehensively in a holistic ecosystem approach.

Status of the Program

The Restoration Plan presents the goal, objectives, and strategies of the AFRP, as well as a list of reasonable actions and evaluations for each Central Valley watershed. AFRP actions and evaluations implemented since 1995 have addressed environmental limiting factors listed in the AFRP Working Paper (Working Paper)¹⁰. These factors were identified by the AFRP technical team as limiting natural production of anadromous fish in Central Valley streams (i.e. instream flows, water temperature, loss of natural stream habitat, obstacles to fish passage, entrainment of juveniles at diversions, Central Valley Project and State Water Project Delta pumping operations, contaminants, and harvest). Prior to the completion of the Restoration Plan, the AFRP emphasized planning and environmental inventories. These were followed by implementation of habitat restoration projects and actions. Restoration Plan actions are implemented throughout the Central Valley watersheds in accordance with AFRP restoration priority criteria.

Progress made towards addressing the environmental limiting factor categories identified in the Working Paper and implementation of the restoration actions and evaluations in the Restoration Plan is available on the AFRP website (<http://www.fws.gov/stockton/afrp/>). About 23% of all Restoration Plan actions

⁸Draft Conservation Strategy for Restoration of the Sacramento-San Joaquin Delta Ecological Management Zone and the Sacramento and San Joaquin Valley Regions, July 2011. Ecosystem Restoration Program, Delta Science Program, Sacramento, CA.

⁹USBR and USFWS. 2008. Listen to the River: An Independent Review of the CVPIA Fisheries Program. Prepared under contract with Circlepoint for the U.S. Bureau of Reclamation and the U.S. Fish and Wildlife Service. Sacramento, CA. [http://www.usbr.gov/mp/cvpia/docs_reports/indep_review/FisheriesReport12_12_08.pdf].

¹⁰ USFWS. 1995. Working paper on restoration needs, habitat restoration actions to double natural production of anadromous fish in the Central Valley of California, Volume 3, AFRP. [<http://www.fws.gov/stockton/afrp/workingpaper.cfm>].

and evaluations (289) have been completed in the 1995 to 2012 time period. Of the 105 projects identified by PART as high and medium priority structural actions and evaluations in the Restoration Plan, 69 (66%) have been completed. The CPAR identified 128 Restoration Plan high and medium priority actions that are “time certain” performance goals. Of the 128 actions in CPAR, forty-six (36%) have been completed. There are also annual or in perpetuity projects such as gravel augmentation (replacing gravel lost behind dams) and flow augmentation in the Restoration Plan that are reported under other provisions of the CVPIA such as the (b)(2), (b)(3), and (b)(13) programs.

The AFRP also documents its progress toward achieving its doubling goal targets by calculating anadromous fish natural production estimates that incorporate in-river and hatchery escapement, ocean and in-stream harvest, and the proportion of hatchery returns that spawn in-river¹⁰. The Central Valley Chinook salmon (all races) natural production average from 1992-2011 was 399,690 fish which dropped below the 1967-1991 baseline average Chinook salmon production of 497,054 as a result of the continued low returns of fall run fish in 2011 that totaled 169,126 fish. Average Chinook salmon natural production for the period 1992-2011 has exceeded the watershed doubling goal target on Clear Creek, Butte Creek, and Battle Creek and in 2011 the Mokelumne River observed high returns (13,522 naturally produced fish). Substantial gains in fish populations have been observed where investment in flow and passage has occurred (Butte, Battle, and Clear Creeks). Clear Creek and the Mokelumne River have also had a substantial investment in habitat restoration. Winter-run natural production numbers had continued to trend upward since 1994 until the poor returns in the last five years (2007-2011). Spring-run numbers have trended upwards since 1991, but production was reduced in 2008 to 2011. Fall-run natural production has decreased to the baseline levels due to the recent stock collapse observed in 2007-2010 though numbers have increased in some watersheds in 2011. Late fall-run production had increased greatly since the low period (1993-1997) but continued to decline in 2011. Data on Chinook salmon doubling can be found in the Chinookprod file on the AFRP website (<http://www.fws.gov/stockton/afrp>). Progress for the AFRP production targets for white and green sturgeon, American shad, and striped bass are reported under the (b)(16) provision in the CAMP annual report (http://www.fws.gov/sacramento/Fisheries/CAMP-Program/Documents-Reports/Documents/2011_CAMP_annual_report.pdf). 2012 production numbers are not yet reported but will be updated when the data becomes available in April 2013.

Adaptive Management

The AFRP continues to implement a science-based management framework that uses an adaptive management process. Adaptive management is a structured, iterative process of optimal decision making that emphasizes designing experiments to address key uncertainties, monitoring outcomes, analyzing and learning, improving management actions, and continually evaluating and refining program actions. The AFRP will build on the existing framework put forth in the CVPIA Record of Decision; the Final Restoration Plan; the recommendations from the CVPIA Fisheries Independent Review Panel; and lessons learned to-date in implementing CVPIA. In addition, the AFRP will use information obtained from the adaptive management process and the program will be managed so that incremental benefits are gained, new knowledge is obtained, and progress is made towards program goals and establishing natural ecosystem functions.

Specifically for FY13, AFRP is proposing to fund projects that were planned and prioritized from information obtained in FY12 from monitoring, evaluations, studies, and research. Some specific FY12 examples follow:

Sturgeon studies experimented with egg mats and underwater video survey techniques to identify and map sturgeon habitat. Consequently, sixty-five white sturgeon eggs were collected in 2012 at four sampling locations in the San Joaquin River, representing at least six spawning events and three new spawning locations. Additionally, 10 white sturgeon were captured and implanted with acoustic transmitters. Movements of these fish will be tracked to learn more about the spatial and temporal

distribution of white sturgeon in the San Joaquin River (SJR). Additionally, a multibeam sonar and RTK-GPS was used to map detailed bathymetry of the river bed and potentially identify substrate type and assess the habitat quality for sturgeon. This information will be used to spatially and temporarily focus our FY13 sampling efforts in the lower San Joaquin River and expand the existing knowledge for future evaluation of habitat restoration activities.

AFRP continued to implement floodplain and spawning habitat restoration projects in the American, Stanislaus, and Merced rivers where project monitoring and evaluations provided additional insight for planning future phases of these projects. In the American River, pre- and post-project monitoring at both treatment and control sites suggest that habitat restoration efforts have been effective. Monitoring at the Upper Sunrise Project continued to reveal immediate response from Chinook salmon and steelhead moving up into the side channel to spawn after completion of the project though the spawning gravel placed in the main river channel received little use. Consequently, additional spawning gravel was added to the site, and instream woody material was anchored near the north bank to provide increased habitat complexity for juveniles. The additional work appears to have further improved the habitat quality at the Upper Sunrise site. Chinook salmon spawning increased and Chinook salmon fry were seen using woody debris at the site in late winter. AFRP also completed a side-channel restoration project in collaboration with local landowners along Lancaster Rd. on the Stanislaus River. Similarly, restoration projects on the Merced River have been built to maximize the fisheries benefits through improved spawning and rearing habitat creation that will function under the existing regulated flow regime. Floodplain benches were created to inundate at the 1-3 year, 3-5 year, and 10 year flow recurrence. Subsequent evaluations were conducted in each of these projects during spring flows and documented site use by juvenile salmon and steelhead, as well as evaluating sediment movement and invertebrate populations. The data from these intensive studies will influence designs for future floodplain and side-channel restoration within these and other Central Valley streams.

Preliminary reports, fish monitoring, and assessments regarding fish passage barriers, relative temporal and spatial flows, as well as potential restoration opportunities have been completed by the California Department of Fish and Game (CDFG) and the Service for Antelope, Mill, Deer, Cow, and Cottonwood creeks. Additionally, the Lower Antelope Creek Geomorphology Study preliminary report determined that there was an additional need to collect stream gage data and hydraulic modeling in order to develop fish passage restoration actions. This information was used to prioritize and plan FY13 fish passage projects and studies in Deer Creek, Cow Creek, and Antelope Creek.

AFRP staff also worked with multiple water agencies to coordinate fall and spring pulse flows in the San Joaquin River Basin tributaries, Mokelumne River, American River, Yuba River, and Sacramento River. The AFRP continued to monitor and evaluate the effectiveness of these measures by implementing redd dewatering studies and collecting real-time monitoring data through fish counting weirs and other activities. For example, AFRP worked with the East Bay Municipal Utility District (EBMUD) and other signatories of the Lower Mokelumne Joint Settlement Agreement to adaptively manage the watershed and coordinate fall pulse flows (approximately 90,000 acre feet) in an effort to improve adult Chinook salmon returns. These efforts led to the development of a pilot project that incorporated the management of the fall pulse flows in October and the closing of the Delta Cross Channel (DCC) gates to minimize adult straying of Mokelumne origin Chinook salmon. The DCC gates were closed for 2 and 10 days in October of 2010 and 2011 respectively. Preliminary results of this experiment found that straying of Mokelumne River origin fish can be reduced considerably and therefore contribute toward the watershed doubling goal for this river.

Managing the cold water pool in Folsom Reservoir to achieve temperature targets for both steelhead rearing in late summer and Chinook salmon spawning in fall continues to be a challenge on the lower American River, as does the prevention of fry and redd stranding. Flow and temperature effects on fish are monitored primarily through the CVPIA (b)(2) interagency technical team and American River

Operations Group. Redd stranding surveys were implemented in November and December of 2011 when tributary inflow was low in the mainstem Sacramento River. Eighty-three redds were surveyed of which 25 were identified in areas of “concern” due to being so close to being dewatered. AFRP will continue to coordinate with the various interagency technical teams in both the American and Sacramento rivers and collect information that will assist in adaptively managing flows to benefit anadromous fish.

On the Yuba River, an interagency team optimized efforts to benefit juvenile salmon through development of a beneficial flow schedule consistent with the Yuba River Accord flow allocations. The Yuba Accord was developed with the aim to implement a new flow regime that would improve conditions for Chinook salmon and steelhead in the 24-mile reach of the lower Yuba River, but also allow for a reliable water supply for consumptive users. Yuba Accord flows are released according to six “schedules” based on water year type. In all years, Yuba Accord flows are intended to the extent possible to provide sufficient habitat, including suitable water temperatures, for spawning and egg incubation from October through March; provide adequate conditions for rearing and cues for emigration of juveniles from April through June; and provide suitable water temperatures for rearing and holding of juveniles and adults from July through September. These efforts have been largely successful in improving conditions for salmonids in the lower Yuba River and are intensively monitored to test various hypotheses. Seasonal high flows in February 2012 were optimized by the Yuba River Management Team in a manner that accommodated hydrologic conditions while benefiting juvenile salmonid survival and growth.

The AFRP also coordinated fall and spring pulse flows with multiple water and fishery agencies in the San Joaquin Basin to improve Chinook salmon survival and habitat conditions. The total volume of “fish flows” that were scheduled in the Merced, Tuolumne, Stanislaus, and Calaveras Rivers in 2012 were 25,000, 125,152, 81,322 and 12,000 acre feet, respectively. The CVPIA Dedicated Project Yield (b)(2) program annually manages 800,000 acre feet of Central Valley Project (CVP) water. In dry years such as 2012, the amount of Central Valley Project (CVP) water for fish, wildlife, and habitat restoration purposes may be reduced by up to 100,000 acre feet. The AFRP was able to coordinate additional “fish flows” that supplemented the (b)(2) water to help improve habitat conditions to help meet the AFRP doubling goals. Fall pulse flows in the San Joaquin Basin help to improve water quality in the mainstem San Joaquin River, guide fish into their natal streams, and improve water temperatures for spawning and egg incubation. Spring pulse flows improve water temperature and juvenile outmigrant survival as described by the Vernalis Adaptive Management Program¹¹ and other ongoing studies. Annual collaborations on the use of fisheries flows will continue as the AFRP works to maximize the beneficial uses of available resources on these streams through the various ongoing regulatory processes.

The first year data collection of a multi-year survival study using radio tags to assess geographic sources of juvenile salmon (~60mm) mortality within the Stanislaus River migratory corridor was completed. The study aims to pinpoint geographic areas of high juvenile salmon mortality to guide future restoration efforts. Data from the previous (and other) studies is shared by AFRP with the Stanislaus Operations Group (SOG) which is comprised of representatives from state and federal agencies representing water and fish interests. The information provided feeds adaptively into decisions about water management and also influences decisions by the National Marine Fisheries Service regarding Reasonable and Prudent Alternatives under the Biological Opinion on the Long Term Operations of the Central Valley Project and State Water Project (OCAP) which is currently under remand, and being revised. Additionally, as part of the SOG, AFRP provided expertise regarding flow and habitat requirements to minimize salmon redd stranding and scour. The program will continue to use the adaptive management process to improve habitat conditions and design experiments that will improve management actions and inform the development of future projects and/or recommendations.

¹¹San Joaquin River Group Authority. 2010. Annual Technical Report. Sacramento, CA.

Table 1. FY2013 Proposed Activities and Costs

CVPIA Section 3406 (b)(1), Anadromous Fish Restoration Program

	3406 (b)(1) Requested Funding for Fiscal Year 2013				
	Restoration Fund	Water and Related Resources	State Cash	State In-Kind	Total All Sources
Total Funding	\$5,500,000	\$0	\$0	\$0	\$5,500,000
Reclamation	\$76,191	\$0			\$76,191
Service	\$5,423,809	\$0			\$5,423,809
CA DFG			\$0	\$0	\$0
CA DWR			\$0	\$0	\$0

1.1 Program Management											
AWP Activity Number	Activity Name	Activity Description	Agency		Program Performance Goal	FY2013 Projected Performance	3406 (b)(1) Requested Funding for Fiscal Year 2013				
			Name	Fractional FTE			Restoration Fund	Water and Related Resources	State Cash	State In-Kind	Total All Sources
1.1.1	USFWS Lead	Program Manager. Provide program management, budgeting, program reviews, and program coordination. Represent the FWS on interagency teams. (FRFR48330833FR0)	FWS	0.80			\$189,549				\$189,549
1.1.2	USBR Co-lead	Participate in interagency development, BOR representative to the AFRP work teams, and assist with program management, budgeting, program reviews, and program coordination. (H37-02142025-0000000 199189)	BOR	0.10			\$19,968				\$19,968
1.1.3	USFWS Assistant Program Manager	Direct the program activities, develop annual work plan, and manage program budget. (FRFR48330833FR0)	FWS	1.00			\$236,936				\$236,936
							Sub-Total for Program Management, FY2013				
							Restoration Fund	Water and Related Resources	State Cash	State In-Kind	Total All Sources
Subtotal Funding							\$446,453	\$0	\$0	\$0	\$446,453
Reclamation							\$19,968	\$0			\$19,968
Service							\$426,485	\$0			\$426,485
CA DFG									\$0	\$0	\$0
CA DWR									\$0	\$0	\$0

1.2		Program Support									
AWP Activity Number	Activity	Activity Name & Description	Agency		Program Performance Goal	FY2013 Projected Performance	3406 (b)(1) Requested Funding for Fiscal Year 2013				
			Name	Fractional FTE			Restoration Fund	Water and Related Resources	State Cash	State In-Kind	Total All Sources
1.2.1	Habitat Restoration Coordinator	Manage contracts and grants, develop projects, facilitate communication and environmental permitting, provide outreach, and analyze and report data for the Mokelumne, Cosumnes, and Lower Sacramento River. (FRFR48330833FR0)	FWS	0.75			\$177,702				\$177,702
1.2.2	Habitat Restoration Coordinator	Manage contracts and grants, develop projects, facilitate communication and environmental permitting, provide outreach, and analyze and report data for the Merced River. (FRFR48330833FR0)	FWS	0.50			\$118,468				\$118,468
1.2.3	Habitat Restoration Coordinator	Manage contracts and grants, develop projects, facilitate communication and environmental permitting, provide outreach, and analyze and report data for the Tuolumne and San Joaquin Rivers. (FRFR48330833FR0)	FWS	0.50			\$118,468				\$118,468
1.2.4	Habitat Restoration Coordinator	Manage contracts and grants, develop projects, facilitate communication and environmental permitting, provide outreach, and analyze and report data for the Stanislaus River. (FRFR48330833FR0)	FWS	1.00			\$236,936				\$236,936
1.2.5	Habitat Restoration Coordinator	Manage contracts and grants, develop projects, facilitate communication and environmental permitting, provide outreach, and analyze and report data for the Feather, Yuba, and American Rivers. (FRFR48330833FR0)	FWS	1.00			\$236,936				\$236,936
1.2.6	Habitat Restoration Coordinator	Manage contracts and grants, develop projects, facilitate communication and environmental permitting, provide outreach, and analyze and report data for Battle, Big Chico, and Butte Creeks. (FRFR48330833FR0)	FWS	1.00			\$239,608				\$239,608
1.2.7	Habitat Restoration Coordinator	Manage contracts and grants, develop projects, facilitate communication and environmental permitting, provide outreach, and analyze and report data for Antelope, Cottonwood, Cow, Deer, and Mill Creeks. (FRFR48330833FR0)	FWS	1.00			\$239,608				\$239,608
1.2.8	Assistant Habitat Restoration Coordinator	Manage contracts and grants, develop projects, facilitate communication and environmental permitting, provide outreach, and analyze and report data. (FRFR48330833FR0)	FWS	1.00			\$236,936				\$236,936
1.2.9	Assistant Habitat Restoration Coordinator	Manage contracts and grants, develop projects, facilitate communication and environmental permitting, provide outreach, and analyze and report data. (FRFR48330833FR0)	FWS	1.00			\$236,936				\$236,936
1.2.10	FWS Financial Support	Provide FWS budget and finance support. (P2O) (FRFR48330833FR0)	FWS	0.26			\$56,473				\$56,473
1.2.11	FWS Regional Program Administration	FWS Region 8 management and administration. (PA) (FRFR48330833FR0)	FWS	0.34			\$73,641				\$73,641

1.2		Program Support										
AWP Activity Number	Activity	Activity Name & Description	Agency		Program Performance Goal	FY2013 Projected Performance	3406 (b)(1) Requested Funding for Fiscal Year 2013					
			Name	Fractional FTE			Restoration Fund	Water and Related Resources	State Cash	State In-Kind	Total All Sources	
1.2.12	State Coordination	CDFG Habitat Restoration Coordinators: Funding is for the continued support of three full time CDFG senior or equivalent biologists, one each from CDFG's Region 1 (Upper mainstem Sacramento River and tributaries from Keswick Dam south to, and including, Butte Creek on the east side and to Colusa Basin Drain on the west side of the upper mainstem of the Sacramento River) , Region 2 (Lower Sacramento River and Delta tributaries from the Feather River south to the Calaveras River (including the Feather, Yuba, American, Cosumnes, and Mokelumne rivers), and Region 4 (Sacramento-San Joaquin Delta and mainstem San Joaquin River including the Merced, Tuolumne, and the Stanislaus rivers), to act as Habitat Restoration Coordinators (HRCs). The State HRCs will continue to play a role in the interagency team with the AFRP to coordinate, develop, and implement restoration actions consistent with the Final Restoration Plan. Costs include 6% FWS contract administration. (FRFR4833-08C3FR0).	FWS	0.00			\$293,273				\$293,273	
1.2.13	FWS Supervision Support	Provide coordination support for CVPIA planning, implementation, and reporting. (FRFR48330833FR0)	FWS	0.20			\$43,733				\$43,733	
							Sub-Total for Program Support, FY2013					
							Restoration Fund	Water and Related Resources	State Cash	State In-Kind	Total All Sources	
							<i>Subtotal Funding</i>	\$2,308,718	\$0	\$0	\$0	\$2,308,718
							<i>Reclamation</i>	\$0	\$0			\$0
							<i>Service</i>	\$2,308,718	\$0			\$2,308,718
							<i>CA DFG</i>			\$0	\$0	\$0
							<i>CA DWR</i>			\$0	\$0	\$0

1.3		Technical Support									
AWP Activity Number	Activity	Activity Name & Description	Agency		Program Performance Goal	FY2013 Projected Performance	3406 (b)(1) Requested Funding for Fiscal Year 2013				
			Name	Fractional FTE			Restoration Fund	Water and Related Resources	State Cash	State In-Kind	Total All Sources
1.3.1	NMFS Fish Passage & Fish Screen Engineering Support	Provide funding to NMFS for engineering support in FY14 for AFRP fish passage and screening projects in the Merced River, Calaveras River, Deer Creek, Cow Creek (Millville Diversion Dam), Cottonwood Creek, Antelope Creek, and the Yuba River. In FY2014, NMFS staff will provide 0.25 FTE to support the AFRP under this work plan and 0.75 FTE to support the Anadromous Fish Screen Program work plan . Activities could include performing necessary office and field work involving pre-construction site evaluation, and review of project alternatives, design and construction activities, performance tests, operations and maintenance plans, performing necessary field work for pre-construction site evaluations, construction inspections, and post-construction hydraulic evaluations, and set up short-term monitoring for facility approval and the long-term inspection methodology. (FRFR483308C3FR0)	BOR	0.25			\$56,223				\$56,223
							Sub-Total for Technical Support, FY2013				
							Restoration Fund	Water and Related Resources	State Cash	State In-Kind	Total All Sources
							\$56,223	\$0	\$0	\$0	\$56,223
							<i>Subtotal Funding</i>	\$56,223	\$0		\$56,223
							<i>Reclamation Service</i>	\$0	\$0		\$0
							<i>CA DFG</i>		\$0	\$0	\$0
							<i>CA DWR</i>		\$0	\$0	\$0

2.4		Environmental Compliance										
AWP Activity Number	Activity	Activity Name & Description	Agency		Program Performance Goal	FY2013 Projected Performance	3406 (b)(1) Requested Funding for Fiscal Year 2013					
			Name	Fractional FTE			Restoration Fund	Water and Related Resources	State Cash	State In-Kind	Total All Sources	
2.4.1	Stanislaus River Knights Ferry Floodplain Restoration Project	Stanislaus River Knights Ferry Floodplain Restoration Project will restore up to 1 acre of side-channel and floodplain habitat to benefit Chinook salmon and steelhead. This will fund the environmental compliance for NEPA, National Historic Preservation Act Section 106, ESA, Clean Water Act Section 404 and 401, and any applicable State or local permits. This project is a cooperative effort between the USFWS and the USCOE. Costs include 6% FWS contract administration. (FRFR4833-08C3FR0)	FWS	0.00	b1: Area of floodplain habitat restored (acres)	In Progress	\$22,260					\$22,260
2.4.2	South Fork Cottonwood Fish Passage Improvement Project	South Fork Cottonwood Fish Passage Improvement Project will repair fish passage barriers and allow fish to access suitable habitat. Species to benefit include CV steelhead, Late-Fall run Chinook, and Spring-run Chinook salmon. Phase 2 project will fund the permitting of the selected alternative to provide fish passage at the Hammer Diversion hydropower dam blocking five miles of high quality spawning and rearing habitat. Costs include 6% FWS contract administration. (FRFR4833-08C3FR0)	FWS	0.00	b1:River opened to fish passage (miles)	In Progress	\$33,708					\$33,708
2.4.3	Merced River Ranch Floodplain and Side-channel Restoration Project	Merced River Ranch Project will restore 6 acres of riparian floodplain and 1.23 miles of spawning habitat to benefit Fall Chinook and Steelhead. This activity funds the completion of the Reclamation Plan which develops the permitting framework for future restoration at the site. This project is a cooperative effort between the USFWS and the CDFG. This project addresses Final Restoration Plan Action 3 and Evaluation 2 in the Merced River. Costs include 6% FWS contract administration. (FRFR4833-08C3FR0)	FWS	0.00	b1: Area of floodplain habitat restored (acres)	6 acres	\$53,008					\$53,008
2.4.4	Mill Creek Fish Passage	Mill Creek Fish Passage Phase 2 funds environmental compliance to address fish passage at the Upper Dam and Ward Dam diversion structures in Mill Creek. This project will benefit Chinook salmon and steelhead and provide access to 44 miles of spawning habitat. This project is a cooperative effort between USFWS, CDFG, and Los Molinos Mutual Water Company. Costs include 6% FWS contract administration. (FRFR4833-08C3FR0)	FWS	0.00	b1:River opened to fish passage (miles)	In Progress	\$33,708					\$33,708

2.4		Environmental Compliance										
AWP Activity Number	Activity	Activity Name & Description	Agency		Program Performance Goal	FY2013 Projected Performance	3406 (b)(1) Requested Funding for Fiscal Year 2013					
			Name	Fractional FTE			Restoration Fund	Water and Related Resources	State Cash	State In-Kind	Total All Sources	
2.4.5	Antelope Creek Fish Passage Project	Antelope Creek Fish Passage Project at Edwards Dam (Phase 2: Permitting): The juvenile fish passage improvement will prevent out-migrating salmonids from becoming entrained in the two diversion canals at Edwards Diversion Dam. Although the diversions are screened, no bypass system was installed during construction due to site complexity. Funding will be awarded in 2013 to complete the environmental compliance. This project is a cooperative effort between the USFWS, CDFG, NMFS, Los Molinos Mutual Water Company, and the Edwards Ranch. Costs include 6% FWS contract administration. (FRFR4833-08C3FR0)	FWS	0.00	b1:River opened to fish passage (miles)	Progress towards improving juvenile fish passage to 32 miles	\$39,326					\$39,326
							Sub-Total for Environmental Compliance, FY2013					
							Restoration Fund	Water and Related Resources	State Cash	State In-Kind	Total All Sources	
							<i>Subtotal Funding</i>	\$182,010	\$0	\$0	\$0	\$182,010
							<i>Reclamation</i>	\$0	\$0			\$0
							<i>Service</i>	\$182,010	\$0			\$182,010
							<i>CA DFG</i>			\$0	\$0	\$0
							<i>CA DWR</i>			\$0	\$0	\$0

2.5		Design									
AWP Activity Number	Activity	Activity Name & Description	Agency		Program Performance Goal	FY2013 Projected Performance	3406 (b)(1) Requested Funding for Fiscal Year 2013				
			Name	Fractional FTE			Restoration Fund	Water and Related Resources	State Cash	State In-Kind	Total All Sources
2.5.1	Stanislaus River Knights Ferry Floodplain Restoration Project	Stanislaus River Knights Ferry Floodplain Restoration Project will restore up to 1 acre of side-channel, floodplain, and riparian habitat to benefit Chinook salmon and steelhead. This activity will provide funding to Cramer Fish Sciences for engineering design, HEC RAS hydrologic and bathymetric model, and Central Valley Flood Protection Board encroachment permit. This project is a cooperative effort between the USFWS and the USCOE. Costs include 6% FWS contract administration. (FRFR4833-08C3FR0)	FWS	0.00	b1: Area of floodplain habitat restored (acres)	In Progress	\$127,200				\$127,200
2.5.2	Stanislaus River Floodplain Restoration Project	Stanislaus River Floodplain Restoration Project at Buttonbush will restore up to 18 acres of floodplain habitat and approximately 2,800 feet of side channel habitat. This project will benefit steelhead and Chinook salmon. This activity will provide funding to Cramer Fish Sciences for additional engineering design, HEC RAS modeling, engineering certification, and pre-project monitoring. Costs include 6% FWS contract administration. (FRFR4833-08C3FR0)	FWS	0.00	b1: Area of floodplain habitat restored (acres)	In Progress	\$139,938				\$139,938
2.5.3	Antelope Creek Fish Passage Project	Antelope Creek Fish Passage Project at Edwards Dam (Phase 2: Design): The juvenile fish passage improvement will prevent out-migrating salmonids from becoming entrained in the two diversion canals at Edwards Diversion Dam. Although the diversions are screened, no fish bypass system was installed during construction due to site complexity. Funding will be awarded in 2013 to complete the final designs of the fish bypass that will keep juvenile salmonids from becoming stranded at the diversion. This project is a cooperative effort between the USFWS, CDFG, NMFS, Tehama County Resource Conservation District, Los Molinos Mutual Water Company, and the Edwards Ranch. Costs include 6% FWS contract administration. (FRFR4833-08C3FR0)	FWS	0.00	b1: River opened to fish passage (miles)	In Progress	\$39,326				\$39,326
							Sub-Total for Design, FY2013				
							Restoration Fund	Water and Related Resources	State Cash	State In-Kind	Total All Sources
							\$306,464	\$0	\$0	\$0	\$306,464
							<i>Reclamation</i>	\$0	\$0		\$0
							<i>Service</i>	\$306,464	\$0		\$306,464
							<i>CA DFG</i>			\$0	\$0
							<i>CA DWR</i>			\$0	\$0

2.6		Pre-Project Monitoring			3406 (b)(1) Requested Funding for Fiscal Year 2013						
AWP Activity Number	Activity	Activity Name & Description	Agency		Program Performance Goal	FY2013 Projected Performance	3406 (b)(1) Requested Funding for Fiscal Year 2013				
			Name	Fractional FTE			Restoration Fund	Water and Related Resources	State Cash	State In-Kind	Total All Sources
2.6.1	Stanislaus River Knights Ferry Floodplain Restoration Pre-project Monitoring	This project will restore up to 1 acre of side-channel and floodplain habitat to benefit Chinook salmon and steelhead. This activity funds topographic surveys and flow inundation analysis. Pre-project monitoring data that will be collected to characterize the pre-project habitat conditions including water depth and velocities, substrate size distribution, and biological data (i.e. macroinvertebrates, vegetation surveys, etc.) to be used for project permitting, design, and evaluation of project benefits. This project is a cooperative effort between the USFWS and the USCOE. Costs include 6% FWS contract administration. (FRFR4833-08C3FR0)	FWS	0.00	b1: Area of floodplain habitat restored (acres)	Progress towards 1 acre side channel & floodplain habitat restoration	\$84,800				\$84,800
2.6.2	South Fork Cottonwood Fish Passage Improvement Project	South Fork Cottonwood Fish Passage Improvement Project will repair a fish passage barrier blocking five miles of high quality spawning and rearing habitat. Species to benefit include steelhead, Fall- and Spring-run Chinook salmon. This activity will fund assessments of habitat conditions including water depths and velocities and collect biological baseline data on fish migration timing and passage at the Hammer Diversion hydropower dam. This project is a cooperative effort between the USFWS and CDFG. Costs include 6% FWS contract administration. (FRFR4833-08C3FR0) (See Table 3)	FWS	0.00	b1:River opened to fish passage (miles)	Progress towards opening 5 river miles	\$5,618				\$5,618
2.6.3	Mill Creek Fish Passage Project	Mill Creek Fish Passage Project Phase 2 funds the completion of the pre-project monitoring to address fish passage at diversion structures in Mill Creek. Water depths and velocities will be collected at the existing ladders and screens at the 2 diversions and the exposed graveyard siphon to develop design alternatives that will meet NMFS and CDFG fish passage criteria. This project will benefit Chinook salmon and steelhead and provide access to 44 miles of spawning habitat. This project is a cooperative effort between USFWS, CDFG, and Los Molinos Mutual Water Company. Costs include 6% FWS contract administration. (FRFR4833-08C3FR0)	FWS	0.00	b1:River opened to fish passage (miles)	Progress towards opening 44 river miles	\$5,618				\$5,618
2.6.4	Yuba River Narrows Channel Restoration Project	Sacramento FWS staffing costs to support work on the Yuba River restoration projects. This activity provides funds to characterize the pre-project habitat conditions including water depth and velocities, substrate size distribution, and biological data (i.e. macroinvertebrates) to be used for project permitting, design, and evaluation of project benefits; and the development of a River2D model for the Yuba River Narrows Channel Restoration Project. (FRFR48330833FR0)	FWS	0.05	b1:Spawning gravel placed (Cu. Yds.)	Progress towards 0.5 miles in-channel habitat restoration	\$10,000				\$10,000

2.6		Pre-Project Monitoring										
AWP Activity Number	Activity	Activity Name & Description	Agency		Program Performance Goal	FY2013 Projected Performance	3406 (b)(1) Requested Funding for Fiscal Year 2013					
			Name	Fractional FTE			Restoration Fund	Water and Related Resources	State Cash	State In-Kind	Total All Sources	
2.6.5	Yuba River Daguerre Alley Floodplain Restoration Project	Sacramento FWS staffing costs to support work on the Yuba River restoration projects . This activity funds pre-project surveys and the development of a River2D model for the Daguerre Alley Floodplain Restoration Project. (FRFR48330833FR0)	FWS	0.14	b1: Area of floodplain habitat restored (acres)	Progress towards 2.5 miles side channel restoration (area to be determined during design/build)	\$30,000				\$30,000	
							Sub-Total for Pre-Project Monitoring, FY2013					
							Restoration Fund	Water and Related Resources	State Cash	State In-Kind	Total All Sources	
							<i>Subtotal Funding</i>	\$136,036	\$0	\$0	\$0	\$136,036
							<i>Reclamation Service</i>	\$0	\$0		\$0	
							<i>CA DFG</i>	\$136,036	\$0		\$136,036	
							<i>CA DWR</i>			\$0	\$0	\$0

2.7		Construction/Implementation			3406 (b)(1) Requested Funding for Fiscal Year 2013						
AWP Activity Number	Activity	Activity Name & Description	Agency		Program Performance Goal	FY2013 Projected Performance	3406 (b)(1) Requested Funding for Fiscal Year 2013				
			Name	Fractional FTE			Restoration Fund	Water and Related Resources	State Cash	State In-Kind	Total All Sources
2.7.1	Cougar Tidal Wetland Restoration Project	Restore up to 85 acres of riparian and tidal shallow water habitat for Fall Chinook and Steelhead. The interagency project team has developed advanced conceptual plans to reconnect historic tidal sloughs to the mainstem Cosumnes River and return this site to a flooded tidal marsh/oak woodland complex. Final design, permitting and pre-project biological and physical survey activities funded in 2012 will continue throughout 2013, and FY 2013 funding will be obligated to Ducks Unlimited for implementation targeted for summer of 2014. This project is a collaborative effort between the USFWS, BLM, USACOE, CDWR, and Ducks Unlimited. Total project costs are estimated at \$800,000 and CVPIA has funded \$250,000 towards the implementation of this project. This project addresses Final Restoration Plan Sacramento-San Joaquin Delta Evaluations 4 and 6. Costs include 6% FWS contract administration. (FRFR4833-08C3FR0)	FWS	0.00	b1: Area of floodplain habitat restored (acres)	85 acres	\$53,000				\$53,000
2.7.2	Merced River Ranch Floodplain and Side-channel Restoration Project	Phase 2 will process and sort an additional 12,702 cubic yards of gravel in the North Side to complete project implementation which will restore 6 acres of riparian floodplain and 1.23 miles of spawning habitat to benefit Fall-run Chinook Salmon and Steelhead. This project is upstream of the CALFED ERP Merced River Robinson Ranch Salmon Habitat Enhancement Project (2001-C200) and compliments this multi-phased restoration of the Merced River. This project is a cooperative effort between the USFWS and CDFG. This project addresses Final Restoration Plan Action 3 and Evaluation 2 in the Merced River. Costs include 6% FWS contract administration. (FRFR4833-08C3FR0)	FWS	0.00	b1: Area of floodplain habitat restored (acres)	6 acres	\$286,800				\$286,800
2.7.3	Merced River Snelling Channel Restoration at Henderson Park	Phase 2 will fund implementation and restore up to 2 miles of in-channel habitat by restoring and replenishing gravel and reconfiguring "ponded" sections of the river to benefit Fall Chinook and Steelhead. This project is upstream of the CALFED ERP Merced River Robinson Ranch Salmon Habitat Enhancement Project (2001-C200) and compliments this multi-phased restoration of the Merced River. This project addresses Final Restoration Plan Action 3 and Evaluation 2 in the Merced River. Costs include 6% FWS contract administration. (FRFR4833-08C3FR0)	FWS	0.00	b1:Spawning gravel placed (Cu. Yds.)	Progress towards 2 miles in-channel habitat (gravel volumn to be determined during build)	\$418,307				\$418,307
2.7.4	Merced River Snelling Floodplain Restoration Project at Henderson Park	Phase 2 will fund implementation and restore up to 80 acres of riparian floodplain habitat and 2 stream miles for Fall Chinook and Steelhead. This project is upstream of the CALFED ERP Merced River Robinson Ranch Salmon Habitat Enhancement Project (2001-C200) and compliments this multi-phased restoration of the Merced River. This project addresses Final Restoration Plan Action 3 and Evaluation 2 in the Merced River. Costs include 6% FWS contract administration. (FRFR4833-08C3FR0)	FWS	0.00	b1: Area of floodplain habitat restored (acres)	Progress towards 80 acres of riparian floodplain restoration	\$396,179				\$396,179

2.7		Construction/Implementation										
AWP Activity Number	Activity	Activity Name & Description	Agency		Program Performance Goal	FY2013 Projected Performance	3406 (b)(1) Requested Funding for Fiscal Year 2013					
			Name	Fractional FTE			Restoration Fund	Water and Related Resources	State Cash	State In-Kind	Total All Sources	
2.7.5	Lower American River Floodplain Restoration	The U.S. Fish and Wildlife Service is funding the Sacramento Area Water Forum to conduct spawning and rearing habitat restoration in the lower American River. Six gravel augmentation sites and three side channels and floodplain restoration have been identified as suitable potential spawning habitat, including sites at Nimbus Basin, Upper Sailor Bar, Lower Sailor Bar, Upper Sunrise, and River Bend Park. This project is being co-implemented with CDFG, USACE, and the 3406 (b)(13) program which provided FY 2012 funding of \$260,000 for ongoing gravel augmentation. This project addresses Final Restoration Plan Action 5 in the American River. Costs include 6% FWS contract administration. (FRFR4833-08C3FR0)	FWS	0.00	b1:Spawning gravel placed (Cu. Yds.)	50,000 cu. yds.	\$159,000					\$159,000
							Sub-Total for Construction/Implementation, FY2013					
							Restoration Fund	Water and Related Resources	State Cash	State In-Kind	Total All Sources	
							<i>Subtotal Funding</i>	\$1,313,286	\$0	\$0	\$0	\$1,313,286
							<i>Reclamation Service</i>	\$0	\$0			\$0
							<i>CA DFG</i>	\$1,313,286	\$0			\$1,313,286
							<i>CA DWR</i>			\$0	\$0	\$0

2.8		Post-Project Monitoring										
AWP Activity Number	Activity	Activity Name & Description	Agency		Program Performance Goal	FY2013 Projected Performance	3406 (b)(1) Requested Funding for Fiscal Year 2013					
			Name	Fractional FTE			Restoration Fund	Water and Related Resources	State Cash	State In-Kind	Total All Sources	
2.8.1	Stanislaus River Floodplain and Side-channel Restoration Project at Lancaster Road	The Stanislaus River Lancaster Road floodplain and sidechannel restoration project was completed in 2012 and restored 640 feet of sidechannel and 2 acres of floodplain habitat. This activity funds post-project monitoring to evaluate implementation, effectiveness, and validation of the project. Monitoring activities include: photo point monitoring of vegetation (photographs), discharge and inundation (USGS and pressure transducers on site), groundwater (wells with pressure transducers), topography (ground survey), water temperature (data logger), water velocity/depth (flow meter), dissolved oxygen (D.O. meter), turbidity (turbidity meter), invertebrates (drift, benthic, and fallout sampling), fish use/diets (electrofishing, PIT tags and antennas, photonic dye marking, and gastric lavage), and fish growth (enclosure nets). Costs include 6% FWS contract administration. (FRFR4833-08C3FR0)	FWS	0.00	b1: Area of floodplain habitat restored (acres)	2 acres (Reported in 2012)	\$167,560					\$167,560
2.8.2	Yuba River Hammon Bar Riparian Habitat Restoration Post-project monitoring	The goal of the project is to evaluate site inundation frequency and the survival and growth of the pole cuttings as affected by elevation/distance to groundwater, and by location in either erosional or depositional areas. Results will be used to inform the installation of future riparian restoration projects so as to provide the greatest value to juvenile salmonid rearing habitat. However, this project also is intended to provide immediate benefits to rearing juvenile salmonids through the restoration of 5 acres of riparian habitat. Project partners include South Yuba River Citizens League, Americorps, Yuba County Water Agency, Pacific Gas & Electric, Bureau of Land Management, and Western Agregates. Costs include 6% FWS contract administration. (FRFR4833-08C3FR0)	FWS	0.00	b1: Area of floodplain habitat restored (acres)	5 acres (Reported in 2012)	\$28,620					\$28,620

2.8		Post-Project Monitoring				3406 (b)(1) Requested Funding for Fiscal Year 2013					
AWP Activity Number	Activity	Activity Name & Description	Agency		Program Performance Goal	FY2013 Projected Performance	Restoration Fund	Water and Related Resources	State Cash	State In-Kind	Total All Sources
			Name	Fractional FTE							
2.8.3	Merced River Ranch Floodplain and Side-channel Restoration Post-Project Monitoring	Merced River Ranch Project when complete will restore 6 acres of riparian floodplain and 1.23 miles of spawning habitat to benefit Fall Chinook and Steelhead. The monitoring program consists of three conceptual approaches to monitoring: implementation, effectiveness, and validation. The implementation monitoring will determine if the project was installed according to the design standards. Hydrology, topography/bathymetry, sediment budget and vegetation will be assessed. The effectiveness monitoring will determine if the project was effective in recovering habitat conditions suitable to target species. A range of physical and biological traits will be tracked before and after restoration to assess ecosystem function. The final part of the monitoring program will determine if floodplain restoration projects, like the one at MRR, recover productive habitat for salmonids and riparian vegetation. This validation monitoring includes validation experiments to assess ecosystem function for salmonids. This project is a cooperative effort between the USFWS and the CDFG. This project addresses Final Restoration Plan Action 3 and Evaluation 2 in the Merced River. Costs include 6% FWS contract administration. (FRFR4833-08C3FR0)	FWS	0.00	b1: Area of floodplain habitat restored (acres)	6 acres	\$67,141				\$67,141
2.8.4	Tehama Wildlife Area Fish Passage Project	Sacramento FWS staffing costs for topographic surveys for the Tehama Wildlife Area Fish Passage Project in Antelope Creek to evaluate that the crossing was built as designed.(FRFR48330833FR0).	FWS	0.05	b1:River opened to fish passage (miles)	Open 6.5 river miles (reported in 2012)	\$10,000				\$10,000
							Sub-Total for Post-Project Monitoring, FY2013				
							Restoration Fund	Water and Related Resources	State Cash	State In-Kind	Total All Sources
							\$273,321	\$0	\$0	\$0	\$273,321
							<i>Reclamation</i>	\$0	\$0		\$0
							<i>Service</i>	\$273,321	\$0		\$273,321
							<i>CA DFG</i>		\$0	\$0	\$0
							<i>CA DWR</i>		\$0	\$0	\$0

4.2		Research (Evaluations, Studies, Investigations)									
AWP Activity Number	Activity	Activity Name & Description	Agency		Program Performance Goal	FY2013 Projected Performance	3406 (b)(1) Requested Funding for Fiscal Year 2013				
			Name	Fractional FTE			Restoration Fund	Water and Related Resources	State Cash	State In-Kind	Total All Sources
4.2.1	San Joaquin River Sturgeon Acoustic Study	This study will implant acoustic transmitters in Acipenser spp. collected and released in the San Joaquin River upstream of Stockton, CA to evaluate distribution and habitat use. Transmitters will be monitored and tracked for up to 10 years. This study will inform the spatial and temporal distribution and the spawning locations of white sturgeon in the San Joaquin River, and refine our understanding of habitat preferences of this important species. This will help us identify the flows needed to support migration, spawning, incubation and rearing of white and green sturgeon. (FRFR48330833FR0).	FWS	0.49	b1: # of white sturgeon	Fish distribution and population information to provide progress towards fish doubling goal in future projects.	\$116,698				\$116,698
4.2.2	San Joaquin River Sturgeon Habitat Assessment	This assessment will fund the third year of sampling for sturgeon eggs and collect physical habitat measurements of the San Joaquin River including multibeam bathymetry surveys, hydraulic mapping, and bed sediment characterization. A final report will be published at the end of 2013 that will guide future restoration efforts for the species. This will help us identify the flows needed to support migration, spawning, incubation and rearing of white and green sturgeon. (FRFR48330833FR0).	FWS	0.39	b1: # of white sturgeon	Fish distribution and population information to provide progress towards fish doubling goal in future projects.	\$92,111				\$92,111
4.2.3	USGS Habitat Mapping	San Joaquin River Sturgeon Habitat Assessment will collect and map bathymetric, velocity, and substrate data to estimate various habitat types within the study reaches. The objective of this assessment is to identify the locations where sturgeon are spawning and quantify the available habitat. This will help us identify the flows needed to support migration, spawning, incubation and rearing of white and green sturgeon and help AFRP focus future restoration actions for these species in the San Joaquin River. Costs include 6% FWS contract administration. (FRFR4833-08C3FR0)	FWS	0.00	b1: # of white sturgeon	Fish distribution and population information to provide progress towards fish doubling goal in future projects.	\$63,600				\$63,600

4.2		Research (Evaluations, Studies, Investigations)										
AWP Activity Number	Activity	Activity Name & Description	Agency		Program Performance Goal	FY2013 Projected Performance	3406 (b)(1) Requested Funding for Fiscal Year 2013					
			Name	Fractional FTE			Restoration Fund	Water and Related Resources	State Cash	State In-Kind	Total All Sources	
4.2.4	Mill and Deer Creeks Wild Juvenile Chinook Acoustic Tagging Investigations	Juvenile spring- and fall-run Chinook salmon will be implanted with acoustic transmitters to evaluate the effects of water operations, flow, and temperature on juvenile survival and movement patterns within the Sacramento River and Delta. This activity provides funding for Year 2 of a 3-year study with the NMFS Southwest Science Center. Cost share \$1.7 million from ERP, NMFS, UC Davis, and UC Santa Cruz and \$450,000 from CVPIA. Costs include 6% FWS contract administration. (FRFR4833-08C3FR0)	FWS	0.00	b1:# Spring-run Chinook Nat Prod	Fish distribution and population information to provide progress towards fish doubling goal in future projects.	\$125,080					\$125,080
							Subtotal for Research (Evaluations, Studies, Investigations), FY2013					
							Restoration Fund	Water and Related Resources	State Cash	State In-Kind	Total All Sources	
							<i>Subtotal Funding</i>	\$397,489	\$0	\$0	\$0	\$397,489
							<i>Reclamation Service</i>	\$0	\$0			\$0
							<i>CA DFG</i>	\$397,489	\$0			\$397,489
							<i>CA DWR</i>			\$0	\$0	\$0

4.3		Modeling										
AWP Activity Number	Activity	Activity Name & Description	Agency		Program Performance Goal	FY2013 Projected Performance	3406 (b)(1) Requested Funding for Fiscal Year 2013					
			Name	Fractional FTE			Restoration Fund	Water and Related Resources	State Cash	State In-Kind	Total All Sources	
4.3.1	Stanislaus River Floodplain Model	Stanislaus River floodplain restoration projects - This activity will fund Buttonbush LIDAR groundtruthing, identifying likely restoration projects using results of floodplain modeling, and the development of a floodplain juvenile production model. (FRFR48330833FR0)	FWS	0.09	b1: Area of floodplain habitat restored (acres)	Habitat information to provide progress towards fish doubling goal in future projects.	\$20,000				\$20,000	
4.3.2	Cottonwood Creek Habitat Assessment	Cottonwood Creek Habitat Assessment - This activity will fund for additional PHABSIM modeling transects on Cottonwood Creek and the South Fork Cottonwood. (FRFR48330833FR0)	FWS	0.18	b1: Area of floodplain habitat restored (acres)	Habitat information to provide progress towards fish doubling goal in future projects.	\$40,000				\$40,000	
4.3.3	Green Sturgeon PHABSIM	Map the bathymetry and velocities of green sturgeon spawning locations in the Sacramento River and develop Habitat Suitability Curves for PHABSIM models. (FRFR48330833FR0)	FWS	0.05	b1: # of green sturgeon	Fish distribution and population information to provide progress towards fish doubling goal in future projects.	\$10,000				\$10,000	
4.3.4	Yuba River Hammon Bar Habitat Modeling	Model the amount of juvenile salmonid rearing habitat before and after pole cutting installation. Results will be used to inform the installation of future riparian restoration projects so as to provide the greatest value to juvenile salmonid rearing habitat. (FRFR48330833FR0)	FWS	0.05	b1: Area of floodplain habitat restored	Reported in 2012	\$10,000				\$10,000	
							Sub-Total for Modeling, FY2013					
							Restoration Fund	Water and Related Resources	State Cash	State In-Kind	Total All Sources	
							<i>Subtotal Funding</i>	\$80,000	\$0	\$0	\$0	\$80,000
							<i>Reclamation Service</i>	\$0	\$0		\$0	
							<i>CA DFG</i>	\$80,000	\$0		\$80,000	
							<i>CA DWR</i>			\$0	\$0	
									\$0	\$0	\$0	

Table 2 – Intentionally left blank

Table 3. Monitoring

Table 3 – Proposed Monitoring Activity	
Project Description:	Stanislaus River Knights Ferry Pre-project Monitoring. This project will restore up to 1 acre of side-channel and floodplain habitat to benefit Chinook salmon and steelhead. This project is a cooperative effort between the USFWS and the USCOE. This activity funds topographic surveys and flow inundation analysis. Costs include 6% FWS contract administration.
FY 2012 Project Complete?	Pre-project monitoring will be completed prior to project construction.
CVPIA annual work plan subtask number:	FY13 AFRP AWP 2.6.1
Scope of the monitoring effort:	Between the covered bridge and Sonora Road bridge upstream of the town of Knights Ferry.
Product/deliverable:	Electronic data files and reports.
Cost:	\$84,800
Questions posed:	What are the topography and flow characteristics of the pre-project site? What is the composition of the substrate? What species are present pre-project?
Objectives:	Refine topographic and flow data, collect substrate data, and collect biological data to be used for project permitting, design, and evaluation of project benefits.
Results – expected or actual:	Topographic data, substrate data, biological data.
Data collection methods:	Total station, pits with pebble counts, visual inventory, snorkel survey, standard macroinvertebrate sampling, and flow transects.
Data management:	Data will be stored as GIS, database, and/or excel files.
Assessment:	We are assessing the physical and biological characteristics of the site prior to project implementation.
Use of information in future decision making:	Necessary for permitting (biological inventory, topography, flow) and design (topography, substrate composition, flow) and evaluation (topography, flow, biological data) of project.

Table 3 – Proposed Monitoring Activity

Project Description:	South Fork Cottonwood Fish Passage Improvement Project (Pre-project monitoring)
FY 2013 Project Complete?	No
CVPIA annual work plan subtask number:	FY13 AFRP AWP 2.6.2
Scope of the monitoring effort:	Conduct velocity and topographic survey of the South Fork Cottonwood hydropower dam to evaluate fish passage impediments.
Product/deliverable:	topographic survey
Cost:	\$5,618
Questions posed:	Does the South Fork Cottonwood Hydroproject meet NMFS or CDFG fish passage specifications?
Objectives:	Evaluate site to determine pre-project conditions.
Results – expected or actual:	Develop designs that will meet NMFS and CDFG fish passage criteria.
Data collection methods:	Topographic survey using survey-grade RTK GPS.
Data management:	Data will be stored as GIS, database, and/or excel files.
Assessment:	We are assessing the physical and biological characteristics of the site prior to project implementation.
Use of information in future decision making:	Topographic survey provides information that will be used to develop design criteria.

Table 3 – Proposed Monitoring Activity

Project Description:	Mill Creek Fish Passage Project Phase 2 (Pre-project monitoring)
FY 2013 Project Complete?	No
CVPIA annual work plan subtask number:	FY13 AFRP AWP 2.6.3
Scope of the monitoring effort:	Conduct velocity and topographic survey of the Mill Creek diversion dams to evaluate fish passage impediments.
Product/deliverable:	topographic survey
Cost:	\$5,618
Questions posed:	Do the Mill Creek diversion dams meet NMFS or CDFG fish passage specifications?
Objectives:	Evaluate site to determine pre-project conditions.
Results – expected or actual:	Develop designs that will meet NMFS and CDFG fish passage and screen criteria.
Data collection methods:	Topographic survey using survey-grade RTK GPS.
Data management:	Data will be stored as GIS, database, and/or excel files.
Assessment:	We are assessing the physical and biological characteristics of the site prior to project implementation.
Use of information in future decision making:	Topographic survey provides information that will be used to develop design criteria.

Table 3 – Proposed Monitoring Activity

Project Description:	Yuba River Narrows Channel Restoration pre-project monitoring (topographic surveys and habitat assessment)
FY 2013 Project Complete?	No
CVPIA annual work plan subtask number:	FY13 AFRP AWP 2.6.4
Scope of the monitoring effort:	Conduct topographic survey and habitat assessment of the Yuba River Narrows Reach
Product/deliverable:	River2D Model and topographic survey
Cost:	\$10,000
Questions posed:	What is the current habitat quality of the Narrows Reach?
Objectives:	Characterize project site and calculate the pre-project salmonid habitat quality.
Results – expected or actual:	Comparison of pre-project plan to actual construction.
Data collection methods:	Topographic survey using survey-grade RTK GPS.
Data management:	GIS shapefile, Mark Gard, US Fish and Wildlife Service, 2800 Cottage Way, Sacramento, CA 95825. Mark_gard@fws.gov . (916) 414-6589
Assessment:	We are assessing the physical and biological characteristics of the site prior to project implementation.
Use of information in future decision making:	Topographic survey and River2D model provides information that could be used in future assessments.

Table 3 – Proposed Monitoring Activity

Project Description:	Yuba River Daguerre Alley Floodplain Restoration pre-project monitoring (topographic surveys and habitat assessment)
FY 2013 Project Complete?	No
CVPIA annual work plan subtask number:	FY13 AFRP AWP 2.6.5
Scope of the monitoring effort:	Conduct topographic survey and habitat assessment of the Yuba River Daguerre Alley Reach
Product/deliverable:	River2D Model and topographic survey
Cost:	\$30,000
Questions posed:	What is the current habitat quality of the Daguerre Alley Reach?
Objectives:	Characterize project site and calculate the pre-project salmonid habitat quality.
Results – expected or actual:	Comparison of pre-project plan to actual construction.
Data collection methods:	Topographic survey using survey-grade RTK GPS.
Data management:	GIS shapefile, Mark Gard, US Fish and Wildlife Service, 2800 Cottage Way, Sacramento, CA 95825. Mark_gard@fws.gov . (916) 414-6589
Assessment:	We are assessing the physical and biological characteristics of the site prior to project implementation.
Use of information in future decision making:	Topographic survey and River2D model provides information that could be used in future assessments.

Table 3 – Proposed Monitoring Activity

Project Description:	Stanislaus River Floodplain and Side-channel Restoration Project at Lancaster Rd (Post Project Monitoring and Evaluation)
FY 2013 Project Complete?	Yes
CVPIA annual work plan subtask number:	FY13 AFRP AWP subtask 2.8.1
Scope of the monitoring effort:	Implementation, Effectiveness, Validation.
Product/deliverable:	Monitoring Report
Cost:	\$167,560 (2 nd year of monitoring)
Questions posed:	<p>The primary question to be answered by the implementation monitoring is: was the project installed as designed?</p> <p>The primary question to be answered by the effectiveness monitoring is: was the project effective at meeting restoration objectives?</p> <p>The primary question to be answered by the validation monitoring is: are the basic assumptions behind the project’s conceptual model valid (i.e., does the project contribute to increased productivity for juvenile salmonid populations in the Stanislaus River)?</p>
Objectives:	Assess the project using the three tiered approach described above.
Results – expected or actual:	Data and analysis
Data collection methods:	Photo point monitoring of vegetation (photographs), discharge and inundation (USGS and pressure transducers on site), groundwater (wells with pressure transducers), topography (ground survey), water temperature (data logger), water velocity/depth (flow meter), dissolved oxygen (D.O. meter), turbidity (turbidity meter), invertebrates (drift, benthic, and fallout sampling), fish use/diets (electrofishing, PIT tags and antennas, photonic dye marking, and gastric lavage), growth (enclosure nets).
Data management:	Data recorded electronically in a database or spreadsheet.
Assessment:	The monitoring will assess implementation, effectiveness and validation of the project.
Use of information in future decision making:	Results will allow for improvement of future projects via adaptive management.

Table 3 – Proposed Monitoring Activity	
Project Description:	Yuba River Hammon Bar Riparian Habitat Restoration Project—involves monitoring growth and survival of planted cottonwood and willow (three species) pole cuttings over 2 years on a 5-acre site and evaluating site inundation frequency.
FY 2013 Project Complete?	No
CVPIA annual work plan subtask number:	FY 13 AFRP AWP 2.8.2
Scope of the monitoring effort:	Survey up to five acres of restored riparian habitat for 3 years
Product/deliverable:	Annual Monitoring Report (2013)
Cost:	\$28,620 per year
Questions posed:	Does plant survival and growth in the restored area vary by species, depth-to-groundwater, or elevation? Do the plantings increase the habitat suitability of the area for rearing juvenile salmonids?
Objectives:	1. Structural Objectives: Evaluate planting success (survivorship, growth and vigor) by species of cutting, condition of cutting and in response to two key environmental conditions: depth to groundwater and elevation. 2. Functional Objectives: Evaluate ecosystem benefits with emphasis on changes to the quantity and quality of fish habitat. Several categories of function will be considered, including riparian cover, composition, stem density and interaction with flow.
Results – expected or actual:	Year 1 plantings (1.25 acres) showed vigorous growth by all four species as of March 2012. Cottonwood survival was as low as 50% in some pods, but in general plant survival was 80-90%. Unanticipated benefits of the plantings included the trapping of both instream woody material and fine sediment when the site was inundated in early March.
Data collection methods:	Visual and physical assessment of plants by trained staff and volunteers will document plant survivorship, growth, and vigor. Snorkel surveys to assess fish presence/absence during inundation will be completed. Value as fish habitat will be assessed through modeling the effect of added cover and roughness on habitat suitability.
Data management:	Data will be maintained in a computer spreadsheet.
Assessment:	Target Success Criteria: 1. 70% of plants surviving at end of first growing season 2. 60% of plants surviving at end of second growing season 3. 55% of plants survive at end of third growing season 4. Annual increase of 10% plant cover 5. Fewer than 10 planted hardwood dead in a 30ft radius Value as fish habitat will be assessed through modeling the effect of added cover and roughness on habitat suitability, and through evaluating expected inundation frequency.
Use of information in future decision making:	The goal of the project is to evaluate site inundation frequency and the survival and growth of the pole cuttings as affected by elevation/distance to groundwater, and by location in either erosional or depositional areas. Results will be used to inform the installation of future riparian restoration projects so as to provide the greatest value to juvenile salmonid rearing habitat.

Table 3 – Proposed Monitoring Activity

Project Description:	Merced River Ranch Floodplain and Side-channel Restoration (Post Project Monitoring and Evaluation)
FY 2013 Project Complete?	Yes
CVPIA annual work plan subtask number:	FY13 AFRP AWP subtask 2.8.3
Scope of the monitoring effort:	Implementation, Effectiveness, Validation.
Product/deliverable:	Monitoring Report
Cost:	\$67,141 (1 st year of monitoring)
Questions posed:	<p>The primary question to be answered by the implementation monitoring is: was the project installed as designed?</p> <p>The primary question to be answered by the effectiveness monitoring is: was the project effective at meeting restoration objectives?</p> <p>The primary question to be answered by the validation monitoring is: are the basic assumptions behind the project’s conceptual model valid (i.e., does the project contribute to increased productivity for juvenile salmonid populations in the Merced River)?</p>
Objectives:	Assess the project using the three tiered approach described above.
Results – expected or actual:	Data and analysis
Data collection methods:	The implementation monitoring will determine if the project was installed according to the design standards. Hydrology, topography/bathymetry, sediment budget and vegetation will be assessed. The effectiveness monitoring will determine if the project was effective in recovering habitat conditions suitable to target species. A range of physical and biological traits will be tracked before and after restoration to assess ecosystem function. The final part of the monitoring program will determine if floodplain restoration projects, like the one at MRR, recover productive habitat for salmonids and riparian vegetation. This validation monitoring includes validation experiments to assess ecosystem function for salmonids.
Data management:	Data recorded electronically in a database or spreadsheet.
Assessment:	The monitoring will assess implementation, effectiveness and validation of the project.
Use of information in future decision making:	Results will allow for improvement of future projects via adaptive management.

Table 3 – Proposed Monitoring Activity

Project Description:	Tehama Wildlife Area Fish Passage Project in Antelope Creek post-project monitoring (topographic survey)
FY 2013 Project Complete?	Yes
CVPIA annual work plan subtask number:	FY13 AFRP AWP 2.8.4
Scope of the monitoring effort:	Conduct as-built topographic survey of Antelope Creek Bridge project site
Product/deliverable:	As-built topographic survey
Cost:	\$10,000
Questions posed:	Was the project constructed to specifications?
Objectives:	Determine if the project was constructed to specifications.
Results – expected or actual:	Comparison of plan to actual construction.
Data collection methods:	Topographic survey using survey-grade RTK GPS.
Data management:	GIS shapefile, Mark Gard, US Fish and Wildlife Service, 2800 Cottage Way, Sacramento, CA 95825. Mark_gard@fws.gov . (916) 414-6589
Assessment:	We are assessing the physical and biological characteristics of the site prior to project implementation.
Use of information in future decision making:	Topographic survey provides information that could be used in future assessments.

Table 3 – Proposed Monitoring Activity	
Project Description:	San Joaquin River Sturgeon Acoustic Study – implant acoustic transmitters in <i>Acipenser</i> spp. in the San Joaquin River basin to evaluate distribution and habitat use.
FY 2013 Project Complete?	No
CVPIA annual work plan subtask number:	FY13 AFRP AWP 4.2.1
Scope of the monitoring effort:	San Joaquin, Merced, Tuolumne, and Stanislaus rivers
Product/deliverable:	Annual technical reports describing spatial and temporal distribution and habitat use of <i>Acipenser</i> spp. throughout San Joaquin River basin.
Cost:	\$116,698
Questions posed:	<ol style="list-style-type: none"> 1) Are white sturgeon or green sturgeon present in the San Joaquin River or its tributaries during their life cycle? 2) What areas and habitat types do white sturgeon or green sturgeon use and how do they use them (e.g., spawning, holding, rearing)? 3) What is the timing and duration of movements of white sturgeon and green sturgeon? 4) How do movements relate to river discharge, temperature, and other environmental factors? 5) What factors inhibit accessibility of white sturgeon and green sturgeon to suitable habitat (e.g., flow regime, thermal or physical barriers)?
Objectives:	<ol style="list-style-type: none"> 1) Identify sturgeon holding and spawning habitat 2) Characterize distribution and evaluate migratory pathways in the San Joaquin River and Delta.
Results – expected or actual:	Ten white sturgeon have been implanted with acoustic transmitters to date. Plan to tag up to twenty <i>Acipenser</i> spp. each year to characterize distribution, movements, and habitat use.
Data collection methods:	A combination of sonar and video surveys, angler and warden reports, and other local knowledge will be used to identify additional sampling locations. Trammel, gill, and hoop nets, long lines, and angling equipment will be deployed to capture sturgeon. Acoustic transmitters will be implanted in captured sturgeon and tracking will be accomplished using a combination of stationary receivers and mobile tracking hydrophones.
Data management:	Electronic database operated by California Fish Tracking Consortium and/or Hydra.
Assessment:	Will follow methods described in McKenzie, J. R., B. Parsons, A. C. Seitz, R. K. Kopf, M. Mesa, and Q. Phelps, editors. 2012. Advances in fish tagging and marking technology. American Fisheries Society, Symposium 76, Bethesda, Maryland.
Use of information in future decision making:	To identify habitat restoration actions that would provide primary benefits to white sturgeon and green sturgeon and secondary benefits to other native aquatic species, including anadromous salmonids. Additionally, preliminary information suggests a strong correlation between increasing spring flows (pulse flow releases from tributaries) and upstream migration and subsequent widespread spawning of white sturgeon in the San Joaquin River. This information will help determine springtime instream flow needs that would meet agency goals for increasing out-migrating juvenile salmonid survival as well as attracting sturgeon to migrate upstream and spawn.

Table 3 – Proposed Monitoring Activity	
Project Description:	San Joaquin River Sturgeon Habitat Assessment – combine collection of sturgeon eggs with physical measurements of the San Joaquin River including multibeam bathymetry surveys, hydraulic mapping, and bed sediment characterization.
FY 2013 Project Complete?	No
CVPIA annual work plan subtask number:	FY13 AFRP AWP 4.2.2 and 4.2.3
Scope of the monitoring effort:	San Joaquin River system and Delta
Product/deliverable:	Digital database with raw data files and final reports that provide analysis of the data.
Cost:	\$155,711
Questions posed:	<ol style="list-style-type: none"> 1) Are green sturgeon spawning in the San Joaquin River system? 2) Do white sturgeon spawn in the San Joaquin River every year, regardless of water year type? 3) Do spawning locations vary depending upon river stage? 4) Do spawning locations share similar habitat characteristics (e.g., depth, velocity, substrate type)? 5) What is the spatial and temporal distribution of sturgeon in the San Joaquin River basin? 6) Are there specific habitat characteristics (e.g., depth, velocity, substrate type) that would help identify additional spawning locations?
Objectives:	To document sturgeon spawning activity in the San Joaquin River basin and identify and evaluate similar habitat throughout the system for spawning activity. Integration of the bathymetric, velocity, and substrate data will allow for qualitative and quantitative estimates of various habitat types within the study reaches.
Results – expected or actual:	There are final annual reports for 2011 activities for both main components of this monitoring effort (egg sampling and physical habitat measurements); 2012 reports will be available in December 2012. Digital files of raw data and final reports documenting and interpreting the results of the monitoring activities will be available at the conclusion of the work.
Data collection methods:	Egg collection mats will be used to assess spawning activity. Collected eggs will be identified to species and be subject to genetic testing. Multibeam sonar will be used, along with RTK-GPS for positioning, to map the detailed bathymetry of the river bed and substrate type. Measurements of water flow characteristics (e.g., flow, velocity) will be collected using an Acoustic Doppler Current Profiler. Further, underwater video and photography will be used, along with physical grab samples, to characterize the substrate types of the river.
Data management:	Digital files with raw data will be archived by the AFRP in a database. A final report documenting the results of the project will be available on the AFRP website.
Assessment:	Sturgeon spawning habitat in the San Joaquin River will be evaluated. Environmental characteristics of sturgeon spawning habitat will be described.
Use of information in future decision making:	Identifying sturgeon spawning habitat will help AFRP focus future restoration actions for these species in the San Joaquin River. Green sturgeon is listed as threatened under the ESA and identifying spawning locations will assist AFRP and other agencies with recovery and doubling efforts.

Table 3 – Proposed Monitoring Activity

Project Description:	Mill and Deer Creeks: Wild Juvenile Chinook Acoustic Tagging Investigations
FY 2013 Project Complete?	No; three year study (this will fund Year 2).
CVPIA annual work plan subtask number:	FY13 AWP Action 4.2.4
Scope of the monitoring effort:	Spring-run Chinook watersheds, with a focus on Mill, Deer, and possible Antelope Creek
Product/deliverable:	Annual report.
Cost:	\$125,080
Questions posed:	How do native migratory fishes navigate through the San Francisco estuary? What factors affect their migratory behavior? What are the management implications? How do habitat attributes such as geometry, water flow, temperature, turbidity, contaminants, presence of predators, and food quantity and quality affect abundance and distribution of native fishes in the estuary? How do connectivity between different habitat types and geographical extent and arrangement of habitats affect abundance and distribution of native fishes in the San Francisco Estuary?
Objectives:	Goal: Address juvenile migratory salmon needs in order to improve the fishery. Objective: Collecting fish movement and behavior data via acoustic tagging.
Results – expected or actual:	Expected; more accurate and specific information to make effective management decisions.
Data collection methods:	Acoustic tagging and tracking; mapping, habitat data collection.
Data management:	Digital files with raw data will be archived by the AFRP in an Excel and relational databases. All drawings, maps, etc. will be delivered and maintained by AFRP. A final report will be available on the AFRP website.
Assessment:	See above
Use of information in future decision making:	The data will enable researchers to evaluate effects of natural and anthropogenic changes in flow and related water project operations on their survival and movement patterns within the Sacramento River and Delta, and then ultimately allow managers to more effectively manage flows for the benefit of juvenile salmonids.