Central Valley Project Improvement Act

Public Law 102-575

Annual Report

Fiscal Year 2011

U.S. Department of the Interior
Bureau of Reclamation
U.S. Fish and Wildlife Service

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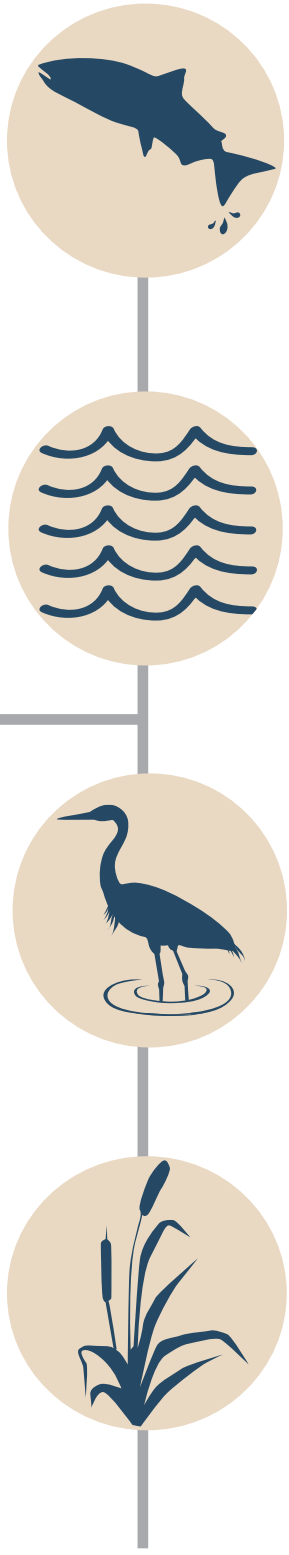
Cover photographs:

Top: Contra Costa Fish Screen. Photo courtesy of USBR.

Middle: American bittern, Sacramento National Wildlife Refuge. Photo courtesy of U.S. Fish and Wildlife Service.

Bottom: Cottonwood Creek Anderson-Cottonwood irrigation District Siphon, post-treatment. Photo courtesy of U.S. Fish and Wildlife Service.



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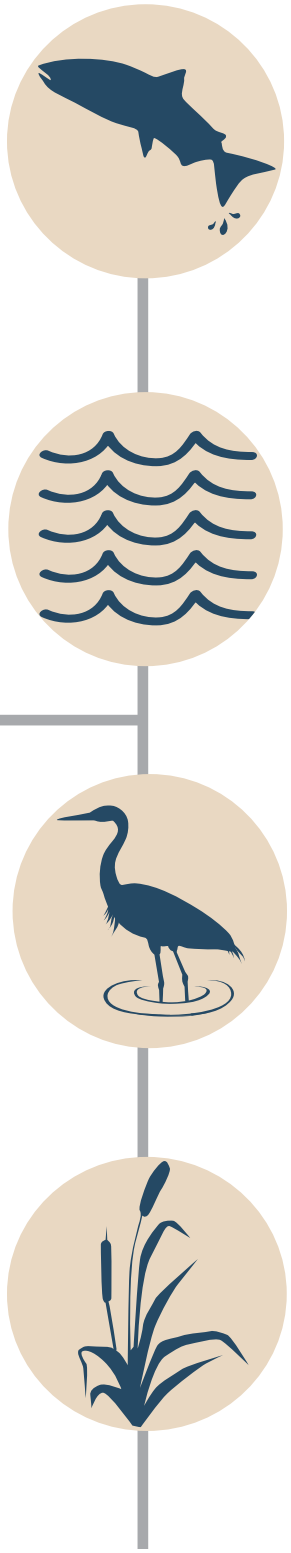


Executive Summary

Executive Summary

PURPOSE

This fiscal year (FY) 2011 CVPIA Annual Accomplishments Report summarizes the actions authorized under the Central Valley Project Improvement Act (CVPIA or Act) of 1992 and highlights FY 2011 accomplishments (October 1, 2010 - September 30, 2011). Section 3408 (f) of the Act directs the Secretary of Interior to submit an annual report describing all significant actions taken toward achievement of the intent and purposes of Title 34. Goals of the Act, CVPIA background, program funding and recent developments are presented in the Introduction in Chapter 1. Program performance measures, 2011 accomplishments, and funding obligations for Sections 3404, 3405, 3406 and 3408 CVPIA Program activities are presented in Chapters 2, 3, 4, and 5 by resource area (Fisheries, Water Operations, Refuges, and Other Resources). Appendix A shows the current Programs and their status toward completion of goals. The relevant Sections of the Act are provided for reference in Appendix D.

Mallard at Gray Lodge WA

BACKGROUND

Central Valley Project Improvement Act of 1992

On October 30, 1992, Public Law 102-575, the Reclamation Projects Authorization and Adjustment Act of 1992, was signed into law by the President. This legislation included Title 34, the Central Valley Project Improvement Act (CVPIA or Act). The CVPIA amends previous authorizations of the CVP to include fish and wildlife protection, restoration, and mitigation as project purposes having equal priority with irrigation and domestic uses, and fish and wildlife enhancement as a project purpose equal to power generation. The Department of the Interior, Bureau of Reclamation (Reclamation) and Fish and Wildlife Service (Service), in collaboration with State and local governments, Tribes, non-governmental organizations, and stakeholders, implement activities to meet the Act's purposes. The CVPIA also contributes to the State's interim and long-term efforts to protect the San Francisco Bay/Sacramento-San Joaquin River Delta Estuary.

2011 Water Year

The Water Year type is a designation that is based on hydrologic indices for the Sacramento and San Joaquin Valleys. Water Year type is either wet, above

normal, below normal, dry or critical. Water year type is determined by precipitation and is therefore indicative of local and regional conditions that influence climate, snowpack and runoff. Water Year 2011 was classified as a wet year and when coupled with the above normal year in 2010, the abundance of water was a relief to the drought experienced from 2007 through 2009.

CVPIA Programs have seen varying effects from the hydrology of 2010 and 2011. Biologically, the increased flows benefited aquatic species. For example, increases in outflow from the delta serve to trigger the migration of fish upstream. Preliminary, Chinook salmon returns through Central Valley streams appear to be on a positive, increasing trend since 2010.

However, the same water was a benefit to fish had minor negative effects to construction projects. Heavy rains encountered in November/December 2010 and high flows in March 2011 flooded the work area and slowed construction at the Red Bluff Fish Passage Improvement Project.

Overall and looking forward, this improved water condition is encouraging for the 2012 Water Year since the CVP will enter the next water year with improved reservoir carryover storage.

CVPIA GOALS AND FY 2011 ACCOMPLISHMENTS

The current focus of the CVPIA Program is on fish and wildlife restoration, water management, and conservation activities, authorized in Sections 3406 and 3408 of the Act. Additionally, Sections 3404 and 3405 focus on water transfers and contract renewals, and the management of these activities are related to the resource goals. These goals fit within four broad resource areas: fisheries, water operations, refuges and other. Figure ES-1 shows the active CVPIA programs that contribute to each resource area as well as those provisions that are complete or inactive.

Presented below are the Program goals by resource area along with 2011 accomplishments. These summaries offer a snapshot of the work accomplished in FY 2011. Chapters 2, 3, 4 and 5 of this report provide more information on the accomplishments of each program.

A synopsis of the programs targets, status to date and 2011 accomplishments are presented in Appendix A.

Two ongoing programs, Flow Standards and Objectives and Short Pulse Flows, are incorporated into the operations of overarching programs such as Cleark Creek and Flow Fluctuations.

Fisheries Resource Area Goals

Central Valley

The Act directs Interior to, "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...." The target established by this section of the Act is known as the "fish-doubling goal", which pertains to Chinook salmon, rainbow trout (steelhead), striped bass, American shad, white sturgeon and green sturgeon; species believed to have been impacted by CVP construction and operation. Further, the AFRP's 2001 Final Restoration Plan (Plan) identified 289 actions and evaluations that were determined to be reasonable given numerous technical, legal and implementation considerations. When the Plan's actions are implemented in concert, they provide for comprehensive restoration that improves freshwater habitat for Chinook salmon and other anadromous fish species.

In addition to the anadromous fish "doubling goal", the CVPIA Program uses the suite of structural and non-structural restoration actions from the Plan to measure progress. For example, at Red Bluff Diversion Dam, a new fish screen and pumping plant will be constructed. On Clear Creek, channel rehabilitation projects are occurring. And within the Sacramento, Stanislaus and American rivers, spawning gravel is being placed. These actions, through various fisheries programs, all contribute to the reasonable efforts identified to ensure sustainable natural production of anadromous fish within the Central Valley rivers and streams.

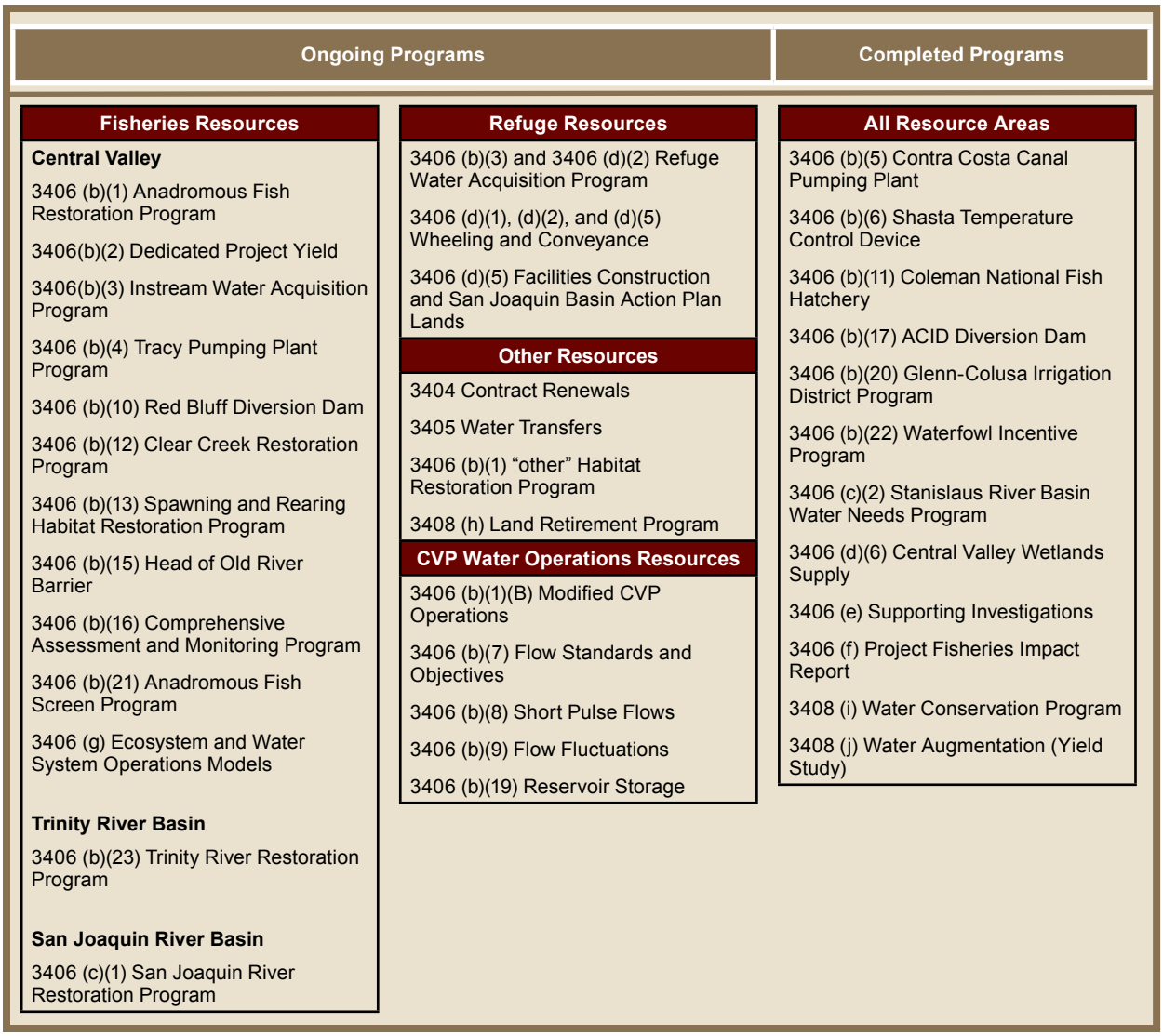


Figure ES-1: Ongoing Programs by Resource Area and Completed Programs

While the fisheries programs are currently administered individually, the Science Based Management Framework approach discussed below under Recent Developments aims to coordinate, integrate and prioritize CVPIA efforts across geographic areas.

2011 Accomplishments

Anadromous Fish Restoration Program (AFRP), 3406 (b)(1)

Sacramento Basin

The AFRP construction projects conducted in the Sacramento basin in 2011 included a riverine enhancement on the American River; an Antelope Creek project to improve passage to 13 miles of spawning and holding habitat; and a fish screen and ladder project at the Eagle Canyon site.

The AFRP collected data and conducted habitat assessments on various riverine systems in the Sacramento basin in 2011. A temperature assessment report was conducted on Dry Creek, a tributary to Bear River; surveys were conducted on Cottonwood Creek for the Nonnative Invasive Plant Management and Control Project; flow and turbidity data were collected for the Cottonwood Creek Geomorphological Analysis Project; habitat surveys above a barrier in Cow Creek were completed for fall-run Chinook and steelhead, and design alternatives were developed with stakeholders; monitoring activities and reports for the green sturgeon were conducted on the Feather and Yuba

Shasta Dam

Rivers; environmental documents were developed for the Hammon Bar project on the Yuba River; and fish passage monitoring continued on the lower Yuba River.

The Program also provided funding for a fish passage barrier assessment for Cow Creek and for the Mill Creek fish passage assessment and restoration project.

San Joaquin Basin

The AFRP construction projects conducted in the San Joaquin basin in 2011 included the Budiselich Flashboard Dam boulder weir retrofit project on the Calaveras River; the placement of approximately 28,000 cubic yards of material for floodplain and rearing habitat at the Merced River Ranch site; the placement of 6,557 tons of spawning gravel for the Mokelumne River Spawning Habitat Improvement Project; spring pulse flows of 43,000 acre feet (AF) in the Mokelumne River to assist outmigrating juvenile salmon and steelhead through a joint settlement agreement with East Bay Municipal Utility District; the installation of VEMCO acoustic receivers in the San Joaquin River along with annual white sturgeon population assessments; the restoration of the Lancaster Road side channel in the Stanislaus River; and the Bobcat Flat Restoration Project to restore spawning, rearing and floodplain habitats in the Tuolumne River.

The AFRP collected data and conducted reports on various riverine systems in the San Joaquin basin in 2011. Studies were conducted in the Cosumnes, Merced, Lower Tuolumne, San Joaquin and Stanislaus Rivers on a variety of fish activities including fish collection and migration, flow management and technical project planning.

The Program also provided funding to develop final designs, planning, and permitting to re-connect sloughs and floodplains within the Cosumnes River Preserve. The Service is a co-implementing agency at the Preserve.




Dedicated 800,000 acre-feet (AF) Project Yield, 3406 (b)(2)

The full 800,000 AF of (b)(2) water was available for fish actions in water year 2011. And 348,800 AF was used. (b)(2) water was used on Clear Creek to augment base case flow and short pulse flows; on the Sacramento River to maintain 3,800 cfs flows; on the Stanislaus River to augment base case flows; and at CVP Jones Pumping Plant to reduce export flows.

Water Acquisition Program – Instream Water (Instream WAP), 3406 (b)(3) and (g)

The Instream WAP acquired 38,500 AF in the Merced, Lower San Joaquin, and Stanislaus Rivers in support of the San Joaquin River Agreement and Vernalis Adaptive Management Plan.

Tracy (Jones) Pumping Plant, 3406 (b)(4)

The Program continued to fund actions at the Tracy Fish Collection Facility. At the Tracy Pumping Plant, engineering and biological assessments were conducted to improve the louver cleaner system and improve fish protection by reducing fish predation at the Tracy Fish Collection Facility. The Program also conducted studies to improve fish capture and reintroduction capabilities.

Contra Costa Program (CCP), 3406 (b)(5)

The CCP finished the third and final construction phase of the 320-foot fish screen at Rock Slough. This was accomplished with funding from multiple sources, including American Recovery and Reinvestment Act (ARRA) funds. This project is discussed in more detail below in Recent Developments.

Red Bluff Diversion Dam (RBDD), 3406 (b)(10)

The RBDD Program permanently opened the Red Bluff Diversion Dam gates, lowering Lake Red Bluff to river channel levels and substantially improving the long-term availability of fish to pass upstream and downstream of the Red Bluff Diversion Dam. The Program continued sampling and studies on green sturgeon. Additionally, construction on the pumping plant and fish screen continued and is on schedule to deliver water to the Tehama Colusa Canal in FY 2012. This was accomplished with funding from multiple sources, including American Recovery and Reinvestment Act (ARRA) funds. This project is discussed in more detail below in Recent Developments.

Clear Creek Restoration Program (CCRP), 3406 (b)(12)

On Clear Creek, more than 21,000 square feet of spawning habitat was created by gravel injections at five sites during 2011: below Whiskeytown Dam; below Dog Gulch Creek; above Peltier Bridge; at Paige Bar (below Peltier Bridge); and below NEED Camp (Guardian Rock site). Base flows of 200 cfs were provided between October 1 and May 31 and pulse flows for spring-run Chinook were also provided. Water temperatures to maintain fish life cycles were partially met 77% of the time. Required instream dredging prevented the program from fully needing instream water temperature requirements. Two Instream Flow Methodology Reports (IFIMs) were completed, bringing the total IFIMs complete for Clear Creek to 14.

Spawning and Rearing Habitat Restoration Program, 3406 (b)(13)

The Program created or improved spawning habitat by placing 5,000 tons of gravel in the Sacramento River; 5,000 tons in the Stanislaus River; and 20,770 tons in the American River. Fish and water quality monitoring were also conducted to evaluate the effectiveness of the completed gravel injection projects.

Comprehensive Assessment and Monitoring Program (CAMP), 3406 (b)(16)

CAMP continued to support fisheries provisions through data acquisition, management and synthesis. Camp produced reports for the AFRP and produced a GIS-based tool to provide geospatial features related to CVPIA projects. CAMP acquired new data to quantify fish escapement on Cow and Cottonwood Creeks through video camera recordings. The program marked and tagged fish at hatcheries to estimate natural and hatchery production.

Anadromous Fish Screen Program (AFSP), 3406 (b)(21)

Construction on 4 fish screens was completed at the Sutter Mutual Portuguese Bend, Oji Brothers Farms, Windswept Land & Livestock; and the Patterson Fish Screen on the San Joaquin River. Construction

continued on the American Basin (Natomas Mutual) Fish Screen Project (Sankey Diversion) with completion expected in FY 2013. Design, environmental compliance and permitting activities for the Yuba City and the Reclamation District 2035 Fish Screen projects continued in 2011 with construction commencement anticipated in FY 2012 and FY 2013, respectively.

Ecosystem and Water Systems Operation Models , 3406 (g)

The models program modified the DSM2 model for low-lift pump operations at Old River temporary barriers; completed Version 1.0 of inSALMO, and extended the Sacramento River Water Quality Model from Knights Landing to Freeport; and continued development of the CalLite 2.0 water management model and user interface. CalLite 2.0 is expected to be available in FY 2012.

Trinity River Basin

The CVPIA includes provisions to authorize activities for the Trinity River Restoration Program (TRRP); Section 3406 (b)(23) for delivering flows and 3406 (b)(1) for river restoration. The goal of the TRRP is to restore and sustain natural production of anadromous fish populations downstream of Lewiston Dam to pre-dam levels, and to facilitate dependent Tribal, commercial, and sport fisheries' full participation in the benefits of restoration via enhanced harvest opportunities. This will be accomplished through restoring habitats for the anadromous fishery resources by implementing variable annual instream flows, rehabilitating the channel, and managing sediment, as stipulated in the December 2000, Record of Decision (ROD), for the Trinity River Mainstem Fishery Restoration Final Environmental Impact Statement/Environmental Impact Report (EIS/EIR).

Trinity River Restoration Program, 3406 (b)(1) "Other" and (b)(23) 2011 Accomplishments

The TRRP contributed to improving fisheries in FY 2011 by managing flows, rehabilitating river channels and monitoring fish. The Program operated peak flows to allow an 11,600 cfs release to facilitate geomorphic processes within the channel. The Program completed Phase 2 of the Wheel Gulch channel rehabilitation project and added 5,300 cubic yards of course gravel to the river. Additionally, a significant funding obligation ($4 million) went towards stream assessments and fish monitoring for spawning habitat development.

San Joaquin River Basin

The CVPIA includes a provision to authorize activities for the San Joaquin River Restoration Program (SJRRP) under Section 3406 (c)(1) of the Act. Implementation activities, including planning and environmental studies are authorized also in the San Joaquin River Restoration Settlement (SJRRP) Act, included in the Omnibus Public Land Management Act of 2009. The SJRRP carries out activities to restore and maintain fish populations in "good condition" on the mainstem of the San Joaquin River while reducing or avoiding adverse water supply impacts to Friant Division long-term contractors. Specific actions to achieve these goals include reintroduction of spring-run Chinook salmon, restoration flow releases and recirculation of restoration flows back to Friant Division contractors. The SJRRP Act established the San Joaquin River Restoration Fund ($16.5 million obligated in FY 2011) and authorizes the use of up to $2 million a year from the Central Valley Project Restoration Fund under the Section 3406 (c)(1).

San Joaquin River Restoration Program, 3406 (c)(1) 2011 Accomplishments

The San Joaquin River Restoration Program's projects in 2011 included the Invasive Vegetation Management and Control activities; the Annual Technical Report; and Annual Monitoring and Analysis Plan contributing toward the goals of reintroducing fish and maintaining fish populations in good condition.

CVP Water Operations Resource Area Goals

The CVPIA includes several programs in Section 3406 (b) that are designed to contribute to the biological resources by supplying optimal project water to resource locations in flow quantity, velocity and timing. Programs supporting this initiative include Section 3406 (b)(1)(B), Modified CVP Operations;




and 3406 (b)(9)/(b)(19), Flow Fluctuations and Reservoir Storage. Two ongoing programs, Flow Standards and Objectives and Short Pulse Flows are incorporated into the operations of overarching programs such as Cleark Creek and Flow Fluctuations.

The Modified CVP Operations Program determines the instream flow needs in CVP streams by Instream Flow Incremental Methodology (IFIM) studies that focus solely on CVP streams: American, Sacramento, and Stanislaus rivers and Clear Creek. This habitat-based model was developed by the Service to assess instream flow needs for aquatic resources, including anadromous fish. The IFIM studies inform project managers how to vary CVP flows modifications depending on hydrology and biological conditions.

The Flow Fluctuations and Reservoir Storage Program seeks to maintain carryover water storage and deliver appropriately timed flows and flows of adequate quality to support fisheries restoration and meet other project purposes.

Modified CVP Operations, 3406 (b)(1)(B)

In FY 2011, the Program conducted Instream Flow Incremental Methodology (IFIM) studies in Clear Creek and the Stanislaus River. Both studies are expected to be completed in FY 2012.

Results of completed studies were used to modify flows on both Clear Creek and the Sacramento River to improve conditions for fish habitat.

Flow Fluctuations and Reservoir Storage (FFP), 3406 (b)(9) and (19)

The FFP conducted salmon and steelhead surveys on the American River. The Program also collaborated with other members of the Stanislaus Operations Group to provide recommendations for achieving minimum instream flows and temperature objectives. Carryover targets at Shasta and Trinity Reservoirs were met in FY 2011.

Refuges Resources Area Goals

The CVPIA includes several provisions in Section 3406 (d) that are designed to contribute to the maintenance, restoration and enhancements of wetlands and waterfowl habitat. The Act directs Interior to: provide, either directly or through contractual agreements with other appropriate parties, firm water supplies of suitable quality to maintain and improve wetland habitat areas on 19 federal, state and private lands, collectively referred to as "refuges." The Refuge Water Supply Program (RWSP) goal is to provide 555,515 AF of water annually, comprised of 422,251 AF of Level 2 water which also includes 26,007 AF of replacement water; and 133,264 AF of Incremental Level 4 water to the refuges, as required by the Act. Full Level 4 water is the sum of Level 2 and Incremental Level 4 water.

In addition and in response to findings and recommendations of an independent scientific panel, a long-term strategy for achieving full Level 4 water supply reliability was drafted in 2011. The goal of this strategy is provide an approach, which includes completing construction of needed conveyance infrastructure and long-term measures for achieving full Level 4 reliability for all CVPIA designated refuges. In 2012, it is planned to further refine this strategy in cooperation with stakeholders including refuge agencies and managers and water users interest groups, and begin development of an implementation plan.

2011 Accomplishments

Water Acquisitions Program – Refuge Water (Refuge WAP), 3406 (b)(3)(d)(2)

The Refuge WAP purchased 81,811 AF of water and acquired 22,511 AF through various other sources. The Program continued to fund Grasslands Water District's Water Quality Monitoring Program in the Grasslands Ecological Area. The Program also completed construction of 2 wells at Volta Wildlife Area; construction was funded through the American Recovery and Reinvestment Act.

Refuge Water Conveyance, 3406 (d)(1),(2) and (5)

In FY 2011, the Refuge Water Conveyance Program delivered 367,592 acre-feet of Level 2 water, including 26,007 AF of replacement water and 101,854 acre-feet of Incremental Level 4 water. A total of 55,343 AF of this water was from non-CVP diverse sources. For the first time, full allocation of Level 4 water was supplied to 11 of 14 South of Delta wildlife refuges with sufficient conveyance capabilities.

Refuge Facilities Construction and San Joaquin Basin Action Plan Lands (SJBAPL), 3406 (d)(5)

The SJBAPL Program funded repairs to the East Bear Pumping Plant. Construction of the Gray Lodge/ Pixley Groundwater Well Project began in 2011 consisting of 2 wells at Pixley NWR and 3 wells at Gray Lodge WA. These projects will provide for Level 2 water supplies.

Other Resources Area Goals

The fourth focus of the CVPIA restoration initiatives is directed at terrestrial habitat and species; water quality and conservation; and contract renewals and transfers. Provisions supporting this initiative include Section 3406 (b)(1)"other," Habitat Restoration Program (HRP); Section 3408 (h), Land Retirement Program (LRP); and Sections 3404 and 3405, Contract Renewals and Water Transfers.

The HRP focuses on protecting native habitats that have been directly and indirectly affected by the CVP's construction and operation. This is accomplished through the purchase of fee title or conservation easements on lands where threats are significant and restoring lands to native habitat, research, captive breeding and outreach activities. The HRP contributes to the protection and/or restoration of the 2.7 million acres of habitat affected by the construction and operation of the CVP.

The LRP goals include the purchase and retirement of land from agricultural production to improve water quality and provide for terrestrial habitat restoration. By ceasing irrigation of agricultural lands, the LRP reduces the volume of agricultural drainage produced, improving water quality and providing the opportunity to restore wildlife habitat. Specifically, the goal of the LRP is to retire 15,000 acres of agricultural lands by 2014 for the Land Retirement Demonstration Project and to restore up to 400 acres of that land annually.

The Contract Renewals Program is authorized under the CVPIA, Section 3404 (c) to renew repayment and water service contracts for the delivery of water from the CVP. In conjunction, the Water Transfers Program under CVPIA, Section 3405, authorizes Interior to approve the transfer of individual's and district's CVP water to other users within the state for any purpose recognized as beneficial under state law, subject to certain terms and conditions.

2011 Accomplishments

Habitat Restoration Program, 3406 (b)(1) "Other"

The HRP contributed to the protection of 5,404 acres of land through conservation easement acquisitions of 2,407 acres of vernal pool, grassland, and riparian habitats at the Peek Ranch in Tehama County; and 2,997 acres of vernal pool, grassland, and other habitats at the Kelsey Ranch in Merced. Additionally, the restoration of about 28 acres of alkali scrub and 101 acres of riparian woodland vegetation at the Panorama Vista Preserve in Kern County; and 492 acres of serpentine grassland and associated habitats at Santa Teresa County Park in Santa Clara County occurred in 2011. The program also provided funds for research, captive breeding of critically endangered Lange's metalmark butterfly, and outreach activities.

Land Retirement Program, 3408 (h)

The LRP restored approximately 260 acres of land from irrigated agricultural production at the Atwell Island Land Retirement Demonstration Project (LRDP) site and converted it to native upland habitat (leaving 750 acres left to reach the targeted goal of 15,000 acres). Additionally, 39,463 AF of agricultural drainage water was reduced due to the removal of irrigation on LRDP lands.

Contract Renewals and Water Transfers, 3404 (c) and 3405

To date, 88 long term renewal contracts and 27 interim-renewal contracts have been executed within the various divisions of the CVP. There are 4 contracts that have completed negotiation for a long term contract, and 1 currently in long term negotiations. In addition, 132 long term contracts have been renewed with the Sacramento River Water Right Settlement contractors and 1 is pending renewal upon expiration in July 2020.

Reclamation approved the transfer of 898,123 AF of CVP water in FY 2011. The majority of transfers stayed within current use from agricultural

Table ES-1: FY 2011 Funding Obligations by Program Activity (rounded)

Section	Activity		Water & Related Funds	Restoration Funds	State Funds	Bay Delta Funds	ARRA Funds	Total Funds
3405(a)	Water Transfer Program		0	0	0	166,420	0	166,420
3406(b)(1)	Anadromous Fish Restoration Program		0	6,191,326	0	2,648,919	0	8,840,245
3406(b)(1)	"other" – Habitat Restoration Program		0	1,698,730	0	4,151,986	0	5,850,716
3406(b)(1)	"other" – Trinity River Restoration Program		8,655,938	988,819	0	0	41,296	9,686,053
3406(b)(2)	Dedicated Project Yield		0	697,827	0	0	0	697,827
3406(b)(3)	Water Acquisition Program -Instream Water (includes 3408(g) [VAMP])	Instream water	0	711,230	0	0	0	711,230
		VAMP	0	6,087,395	1,404,887	0	0	7,492,282
		Level 4	250,000	12,616,343	0	0	0	12,866,343
3406(b)(4)	Tracy (Jones) Pumping Plant Program	Tracy (Jones) Pumping Plant[1]	2,173,487	(1,343)	0	0	0	2,172,144
		Two Gates	0	0	0	13,162	0	13,162
3406(b)(5)	Contra Costa Pumping Plant No. 1		13,396	0	0	4,622	2,435,970	2,453,988
3406(b)(9)	Flow Fluctuations		0	35,691	0	0	0	35,691
3406(b)(10)	Red Bluff Diversion Dam		22,267,909	0	2,704,647	0	7,289,444	32,262,000
3406(b)(12)	Clear Creek Restoration Program		280,793	679,838	0	0	0	960,631
3406(b)(13)	Spawning Gravel		0	899,951	0	0	0	899,951
3406(b)(16)	Comprehensive Assessment and Monitoring Program		0	1,740,768	0	0	0	1,740,768
3406(b)(20)	Glenn Colusa Irrigation District		36,288	0	0	0	0	36,288
3406(b)(21)	Anadromous Fish Screen Program		349,200	3,877,085	0	2,000,000	0	6,226,285
3406(b)(23)	Trinity River Restoration		3,503,949	0	0	127	0	3,504,076
3406(c)(1)	San Joaquin River Comprehensive Plan		0	717,821	0	0	0	717,821
3406(d)(1)	Refuge Water Supply		Level 2 conveyance included in (d)(5)					
3406(d)(2)	Refuge Water Supply		Level 4 acquisition included in (b)(3)					
3406(d)(5)	Refuge Facilities Construction Program	Construction	0	541,900	0	0	586,351	1,128,251
		Wheeling	3,115,000	10,294,003	0	70,065	0	13,479,068
3406(d)(5)	San Joaquin Basin Action Plan		95,294	16,680	0	0	0	111,974
3406(g)	Models		0	603,607	0	0	0	603,607
3408(h)	Land Retirement Program		62,456	483,660	0	0	0	546,116
3410	CVPIA Administration		726,203	0	0	0	0	726,203
	TOTAL FUNDING OBLIGATED		**41,529,913**	**48,881,331**	**4,109,534**	**9,055,301**	**10,353,061**	**113,929,140**

1 A negative amount represents a recovery of a prior year obligation.

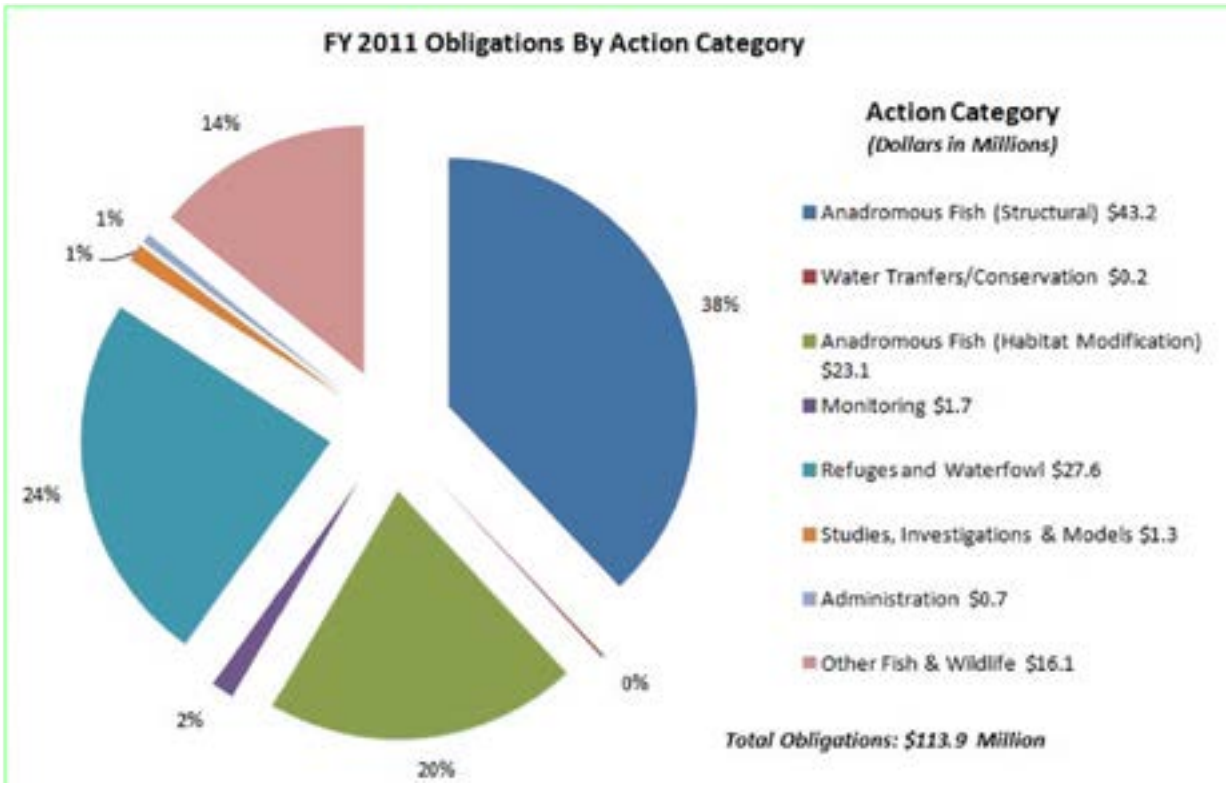


Figure ES-2: FY 2011 Financial Obligations By Action Category

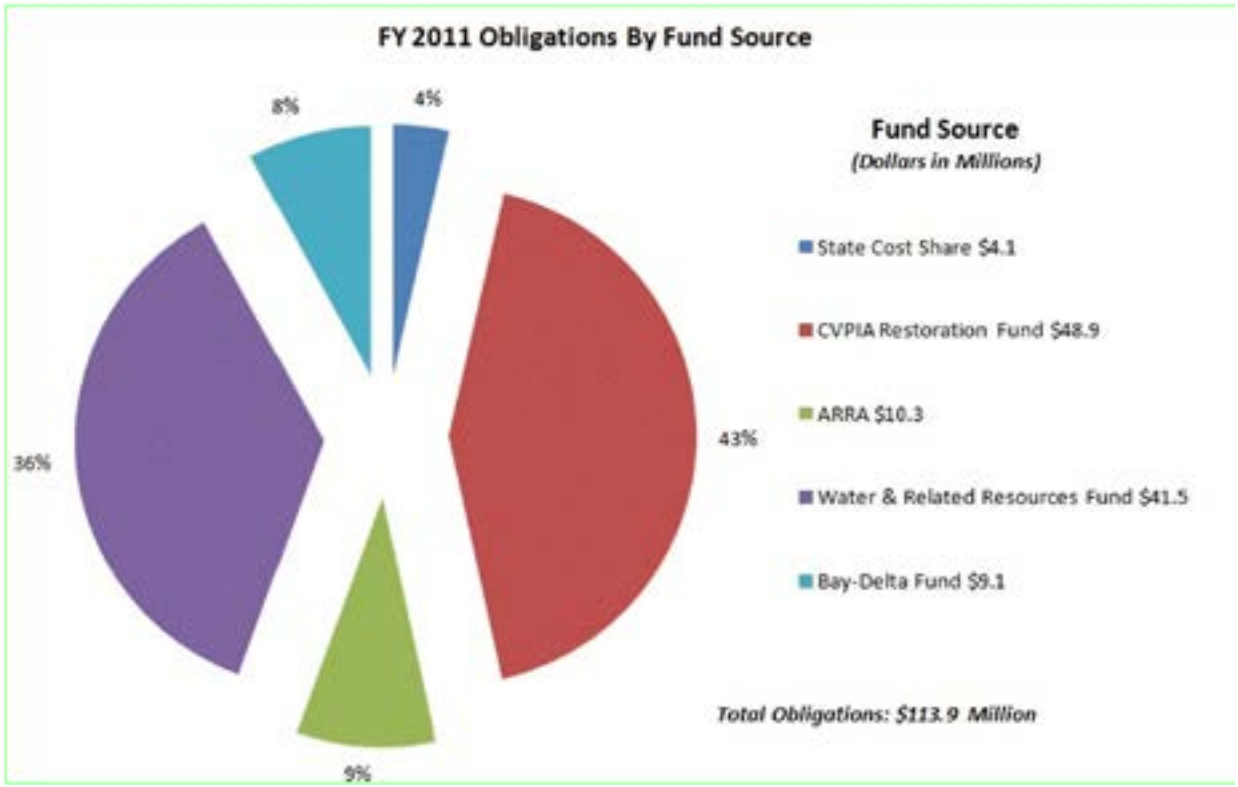


Figure ES-3: FY 2011 Financial Obligations By Fund Source

to agricultural and the second largest transfer classification was from agricultural to municipal and industrial use.

FUNDING

Since FY 1993 Congress appropriated Restoration Fund and Water & Related Resources funds to the CVPIA Program. In addition, the program has been funded in part through other sources including State cost-share funds, Bay-Delta funds and the American Recovery and Reinvestment Act (ARRA) funding. From these combined sources, a total of $1.4 billion has been funded by CVPIA over the past 18 years.

FY 2011

As shown in Table ES-1, a total of $113.9 million was obligated on CVPIA projects from a combination of funding sources: Restoration Funds, Water and Related Resources, ARRA funds, Bay-Delta funds, and state cost share funds. Obligations by program activity and fund source are shown in Figures ES-2 and ES-3.

State of California

Cost-share

Section 3406 of the CVPIA requires that the U.S. enter into a cost-sharing agreement with the State for CVPIA implementation. On June 27, 1994, the State and the U.S. entered into the Sharing of Costs Agreement for Mitigation Projects and Improvements (SCAMPI). Initially under SCAMPI the State's maximum amount payable was $50 million through the agreements expiration in December 31, 2008.

Amendment No. 1 to SCAMPI, executed in June 1998, specified that the maximum amount payable to the U.S. by the State under the CVPIA cost-share was $93 million, the amount of funding provided by Proposition 204. Amendment No. 2 to SCAMPI, executed in August 2001, increased the maximum amount payable by the State pursuant to the cost-share provisions of CVPIA to $162,110,000. Amendment No. 3 to SCAMPI, executed in December 2008, resulted in an extension of SCAMPI for an additional three years to December 31, 2011. Amendment No. 4 to SCAMPI, executed in February 2010, increased the maximum amount payable by the State pursuant to the cost-share provisions of CVPIA to $167,610,000 for the Red Bluff Diversion Dam Task Order. Amendment No. 5 to SCAMPI, executed in 2011, increased the maximum amount payable to the U.S. by the State to $169,014,887 for the Vernalis Adaptive Management Plan (VAMP) Task Order Agreement. Amendment No. 6, also executed in 2011, increased the maximum amount payable to the U.S. by the State to $175,514,887 towards the cost of the Fish Passage Improvement Project at the Red Bluff Diversion Dam.

In 2011, the State, Reclamation and the Service continued coordinating annual work plans in order to modify SCAMPI through Amendment No. 7 to specify the maximum amount payable to the U.S. by the State for FY 2012 through FY 2014. Task Orders will document how the contributions will be made, either via cash or in-kind services, for various activities including Gravel Placement, Anadromous Fish Restoration Program, Models, Clear Creek Restoration Program, Comprehensive Assessment and Monitoring Program, and Refuges Program. These Task Orders and Amendment No. 7 are expected to be in place mid FY 2012.

State Water Package

In 2010, the State legislature developed a measure known as the Safe, Clean, and Reliable Drinking Water Supply Act. The purpose of the law is to protect water quality and ensure safe, clean drinking water; meet the water supply needs of California residents, farms, businesses; expand water conservation and recycling; restore fish and wildlife habitat; reduce polluted runoff that contaminates rivers, streams, beaches, and bays; and protect the safety of water supplies threatened by earthquakes and other natural disasters. The bond was originally slated to appear on the November 2, 2010, ballot as Proposition 18. However, on August 9, 2010, the California State Legislature decided to postpone the vote on the measure until the November 4, 2014, ballot.

RECENT DEVELOPMENTS

Independent Reviews for Refuges and Fisheries

Refuges

In 2008 and 2009, the Refuge Water Supply Program was reviewed and the panel's recommendations are presented in a report entitled, "Undelivered Water: Fulfilling the CVPIA Promise to Central Valley Refuges", dated November 3, 2009. The report found that even though the reliability of Level 2 water deliveries improved since 2002, Level 4 water supplies had fallen short of CVPIA mandate and prevented optimal performance of the Refuges.

In response to the panel's recommendations, the Refuge WSP has taken several steps: entered into an agreement with the Service and the National Fish and Wildlife Foundation to explore avenues to improve the effectiveness of the water acquisitions, including those for Incremental Level 4; assessed ways to increase the priority for pumping, conveyance and storage of Incremental Level 4 water supplies in CVP facilities; continued planning for external conveyance construction; and investigated storage options in existing or new groundwater banks.

Fisheries

In 2007, as part of the Office of Management and Budget (OMB) Program Assessment and Rating Tool (PART) process, the CVPIA Program conducted two independent reviews to evaluate efficiency and effectiveness toward meeting the Act's goals. A Fisheries Independent Review panel assessed the implementation of the Central Valley fisheries activities (i.e. fish doubling). The panel's recommendations can be found in, "Listen to the River – An Independent Report on the CVPIA Fisheries Program" dated December 2008, which calls for a science-based adaptive management approach, increased focus on the Bay-Delta and increased flows for fish. Since the panel's recommendations were released, the fifteen separate authorities that contribute to the "fish doubling" goal have been working together to implement improvements and to develop a fisheries resource area plan. This plan will articulate a reorganization strategy that places an emphasis on managing the fisheries related provisions as one program, rather than as individual program activities. This new structure will enable the program to articulate an overarching vision; utilize a science-based management framework to address problems at a system level; report accomplishments

Salmon




by watershed; and improve transparency by communicating the coordination and decision-making that occurs within the program.

To address the panel's recommendations, the Department of the Interior (DOI) is developing an improved science-based decision making process update for fisheries.

To coordinate CVPIA implementation to these other fish protection and restoration efforts, DOI will develop an overarching strategy that accommodates the species' needs under the ESA and obligations under CVPIA using insights gained through the Bay Delta Conservation Plan planning process, Interagency Ecological Program research investigations, and other recovery efforts in the Central Valley. The revised strategy will facilitate future decisions using a scientific framework that connects restoration actions to environmental and population responses across watersheds. The recommendations in the Independent Review of the CVPIA Fisheries Program and the Act's goals will guide the development of the revised strategy in light of the current regulatory and ecosystem conditions.

Specifically, the initial steps include developing the science-based decision process and producing an updated Implementation Plan. Key tasks include (1) revising objectives for the CVPIA, (2) development of system-wide model, (3) development of performance indices and monitoring efforts, and (4) scientific review. It is expected that the entire decision making process with system-wide model, objectives and a recommendation for a supporting organizational structure will be complete by the end of FY 2013. This will enable FY 2014 project review to take full advantage of the new process.

Operations Criteria And Plan (OCAP) And Biological Opinions In The Delta

On December 15, 2008, the Service issued its Biological Opinion (BiOp) analyzing the effects of the long-term coordinated operations of the CVP and SWP on the threatened delta smelt (2008 FWS OCAP BiOp). On June 4, 2009, NMFS issued its BiOp analyzing the effects of the coordinated operations of the CVP and SWP on threatened and endangered salmonids and other listed species (2009 NMFS OCAP BiOp). In each BiOp, the consulting agency (Service or NMFS) concluded that the coordinated operations of the CVP and SWP are likely to jeopardize the continued existence of the listed species and to adversely modify critical habitat. Consequently, each BiOp included a reasonable and prudent alternative (RPA), developed by the fish agencies and intended to protect the listed species and habitat. Both BiOps were challenged in Federal District Court. On December 14, 2010, the District Court found the 2008 FWS OCAP BiOp to be arbitrary, capricious and unlawful, remanding the BiOp to the Service for further consideration. On September 20, 2011, the District Court similarly concluded that the 2009 NMFS OCAP BiOp was arbitrary, capricious, and unlawful, remanding it to NMFS for further consideration. The District Court did not vacate the two BiOps, so Reclamation and DWR continue to operate under them until the Service and NMFS issue new BiOps.

In FY 2011, several key activities contributed to meeting the RPA requirements. Examples include the implementation of a side-channel and floodplain restoration on the Stanislaus River by the Anadromous Fish Restoration Program. The Spawning and Rearing Habitat Restoration Program placed 5,000 tons of gravel in Goodwin Canyon on the Stanislaus River to increase and improve spawning habitat. And the Comprehensive Assessment and Monitoring Program used Rotary Screw Traps to monitor the production of juvenile Chinook salmon on the Stanislaus River, with the goal of assessing the effectiveness of habitat restoration in that watershed.

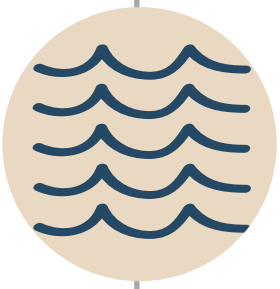
Completion of Contra Costa

On September 19, 2011, Secretary of the Interior Ken Salazar and Bureau of Reclamation Commissioner Michael Connor joined state, local and tribal officials to dedicate the Rock Slough Fish Screen project at the Contra Costa Canal Pumping Plant Number One. The fish screen, constructed through a partnership between Reclamation and the Contra Costa Water District, will help ensure a sustainable water supply, while protecting sensitive fish species and the ecosystem they inhabit. Completion of the project also helps fulfill requirements of the Central Valley

Project Improvement Act, Section 3406(b)(5), and the 2008 U.S. Fish and Wildlife Service's Los Vaqueros Biological Opinion for the threatened Delta smelt. The fish screen project, which is substantially complete, is expected to be fully operational in November 2011.

Red Bluff Fish Passage

On September 1, 2011, Reclamation permanently opened the Red Bluff Diversion Dam gates, lowering Lake Red Bluff to river channel levels and substantially improving the long-term availability of fish to pass upstream and downstream of the Red Bluff Diversion Dam. The National Oceanic and Atmospheric Administration Fisheries Service's Biological Opinion requires that the gates are opened no later than Sept. 1 to help migration of winter-run and spring-run Chinook salmon and green sturgeon past the dam site. Construction on the pumping plant and fish screens continues and the new plant is anticipated to come on line in FY2012.



Chapter 1

Introduction

Chapter 1 - Introduction

PURPOSE

This fiscal year (FY) 2011 CVPIA Annual Accomplishments Report summarizes the actions authorized under the Central Valley Project Improvement Act (CVPIA or Act) of 1992 and highlights FY 2011 accomplishments (October 1, 2010 - September 30, 2011). Section 3408 (f) of the Act directs the Secretary of Interior to submit an annual report describing all significant actions taken toward achievement of the intent and purposes of Title 34. Accomplishments, funding obligations and recent developments for Section 3406 and 3408 CVPIA Program activities are presented in Chapters 2, 3, 4, and 5 by resource area (Fisheries, Water Operations, Refuges, and Other Resources). The relevant Sections of the Act are provided for reference in Appendix B.

BACKGROUND

Central Valley Project Improvement Act of 1992

In 1992, the 102nd Congress passed, and the President signed, the multi-purpose water legislation known as the CVPIA. Officially designated as Title 34 of Public Law 102-575, this landmark piece of legislation amends previous authorizations of the California Central Valley Project (CVP) to include fish and wildlife protection, restoration, enhancement, and mitigation as project purposes having equal priority with irrigations and domestic water supply uses, and power generation.

The purpose of the CVPIA is expressed in six broad statements found in Section 3402 of the Act:

- To protect, restore, and enhance fish, wildlife, and associated habitats in the Central Valley and Trinity River basins of California;
- To address impacts of the CVP on fish, wildlife, and associated habitats; To improve the CVP's operational flexibility;
- To increase water-related benefits provided by the CVP to the state through expanded use of voluntary water transfers and improved water conservation;
- To contribute to the state's interim and long-term efforts to protect the San Francisco Bay/ Sacramento-San Joaquin Delta Estuary;
- To achieve a reasonable balance among competing demands for use of CVP water, including the requirements of fish and wildlife, agricultural, municipal and industrial, and power contractors.

The Secretary of the Department of Interior (Interior) assigned primary responsibility for implementing CVPIA's many provisions to Reclamation and the Service, both agencies of Interior. Reclamation and the Service coordinate with other federal agencies, tribes, the State of California (State), and numerous partners and stakeholders during each fiscal year to plan and implement activities.

CVPIA Background

For 75 years, California has depended on the CVP for a large part of its water needs, particularly for agriculture. With a climate typified by extremely variable precipitation, both temporally and regionally, the State relies heavily on dams and reservoirs to balance and manage its water resources, and on an extensive distribution system to convey water supplies for regional needs. Much of the State's water originates in the north and is conveyed southward, primarily through the Sacramento River system (see Figure 1). Some water is diverted along the way, with the remainder flowing into the Sacramento-San Joaquin River Delta, where CVP water co-mingles

Figure 1: Central Valley Project (CVP) System

with other supplies such as those of the State Water Project (SWP). A portion of the water entering the delta is pumped south; the majority discharges to the San Francisco Bay and the Pacific Ocean. The CVP today comprises 18 dams and reservoirs (water storage capacity of 9 million acre-feet), 11 power plants, 500 miles of canals and aqueducts, three fish hatcheries, and associated facilities including pumping plants and power lines. The ecosystems of the Central Valley, Delta Estuary, San Francisco Bay, and Trinity River are affected by water diversions–particularly in drought years–so much so that the courts have intervened to ensure that adequate fresh water enters these ecosystems. Compliance with the Endangered Species Act (ESA) and water quality mandates requires water releases from CVP dams to regulate water temperatures, salinity and instream flows, and limits water diversions to protect ESA-listed fish from the effects of pumping water at the Tracy (Jones) Pumping Plant in the Delta. These factors have greatly increased the competition for existing water supplies and have focused scrutiny on the ways that water resources are being used. Environmental conditions have changed greatly since the CVP was authorized in 1935. Population growth and development have increased farm, urban, and industrial water demands. Concurrently, populations of fish and wildlife have declined, resulting in some species being listed as endangered or threatened due to severe habitat loss. In response, a new imperative for resource management and ecological stewardship has evolved.

2011 Water Year

The Water Year type is a designation that is based on hydrologic indices for the Sacramento and San Joaquin Valleys. Water Year type is either wet, above normal, below normal, dry or critical. Water year type is determined by precipitation and is therefore indicative of local and regional conditions that influence climate, snowpack and runoff. Water Year 2011 was classified as a wet year and when coupled with the above normal year in 2010, the abundance of water was a relief to the drought experienced from 2007 through 2009.

CVPIA Programs have seen varying effects from the hydrology of 2010 and 2011. Biologically, the increased flows benefited aquatic species. For example, increases in outflow from the delta serve to trigger the migration of fish upstream. Preliminary, Chinook salmon returns through Central Valley streams appear to be on a positive, increasing trend since 2010.

However, the same water was a benefit to fish had minor negative effects to construction projects. Heavy rains encountered in November/December 2010 and high flows in March 2011 flooded the work area and slowed construction at the Red Bluff Fish Passage Improvement Project.

Overall and looking forward, this improved water condition is encouraging for the 2012 Water Year since the CVP will enter the next water year with improved reservoir carryover storage.

CVPIA GOALS

The current focus of the CVPIA Program is on fish and wildlife restoration, water management, and conservation activities, authorized in Sections 3406 and 3408 of the Act. These goals fit within three broad resource areas: Fisheries, Refuges and Other Resources. Figure 2 shows the active CVPIA provisions that contribute to each resource area as well as those provisions that are completed or inactive. Additional information on the completed projects and how they have contributed to the CVPIA restoration efforts may be found online at http://www.usbr.gov/mp/cvpia/index.html. Contract renewals (Section 3404) and water transfers (Section 3405) goals are also important CVPIA goals and are mentioned here, but are not the focus of this report since they are not funded with the CVPIA Restoration Fund; their goals and accomplishments are briefly discussed in the Other Resources Chapter.

A synopsis of the programs targets, status to date and 2011 accomplishments are presented in Appendix A.

Two ongoing programs, Flow Standards and Objectives and Short Pulse Flows, are incorporated into the operations of overarching programs such as Cleark Creek and Flow Fluctuations.

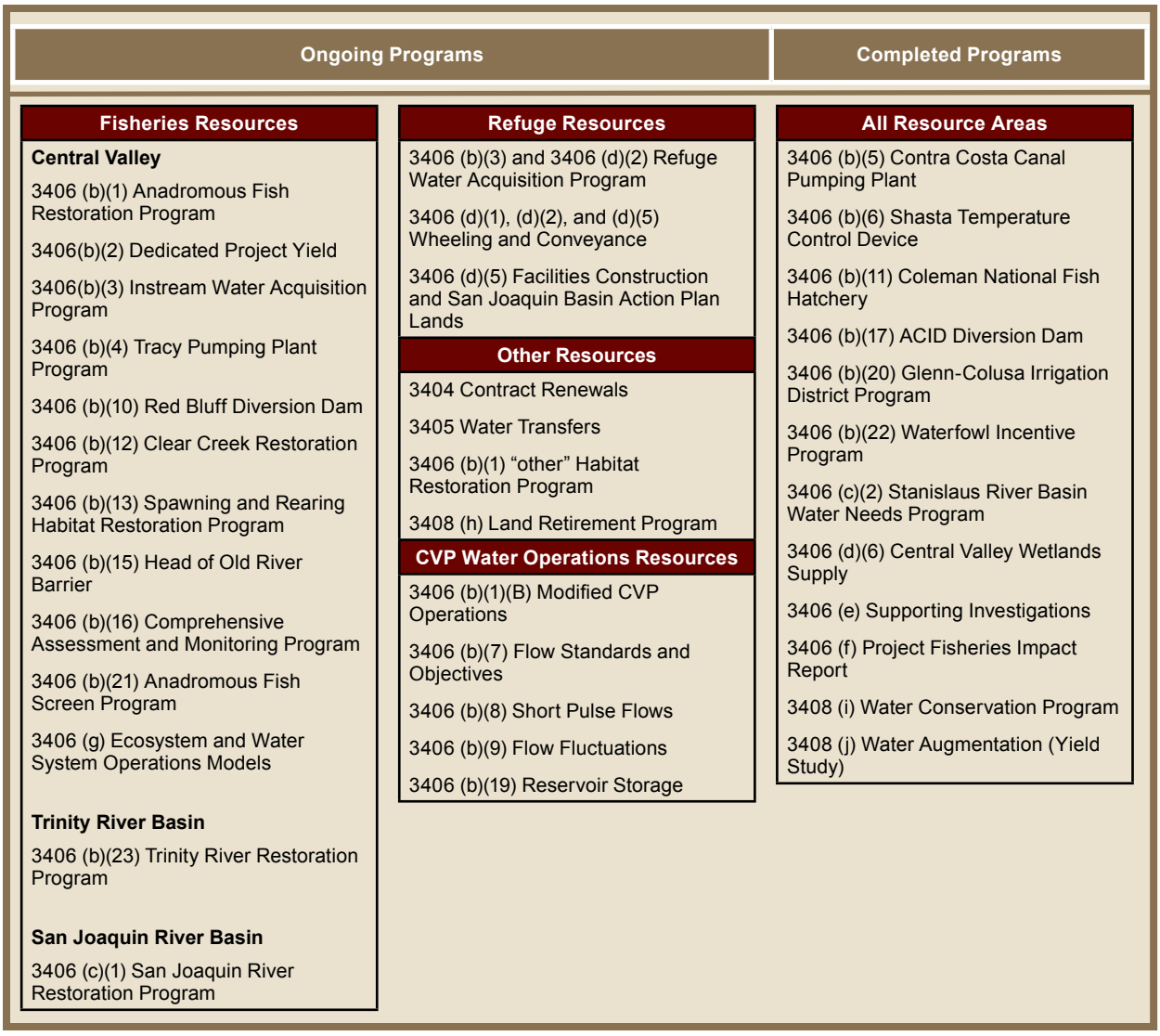


Figure 2: Ongoing Programs by Resource Area and Completed Programs

Fisheries Resource Area

Central Valley

The Act directs Interior to, "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...." The target established by this portion of the Act is known as the "fish-doubling goal", which pertains to Chinook salmon, Rainbow trout (steelhead), striped bass, American shad, white sturgeon and green sturgeon; species believed to have been impacted by CVP construction and operation. Section 3406 (b)(1), which authorizes the Anadromous Fish Restoration Program (AFRP), is wholly devoted to the purpose of fish doubling. The AFRP's 2001 Final Restoration Plan (Plan) identified 289 actions and evaluations that were determined to be reasonable given numerous technical, legal and implementation considerations. The Plan's actions and evaluations are covered in the October 1999 Central Valley Project Improvement Act Final Programmatic Environmental Impact Statement. When the Plan's actions are implemented in concert, they provide for comprehensive restoration that improves freshwater habitat for Chinook salmon and other anadromous fish species.

In addition to the anadromous fish "doubling goal", the CVPIA Program uses the suite of structural and non-structural restoration actions from the Plan to measure progress. Progress toward "fish doubling"

goal and the restoration actions, as well as other CVPIA provisions that support the Central Valley fisheries goals, and take part in implementing the Plan's actions and evaluations are discussed in Chapter 2.

Trinity River Basin

The CVPIA includes provisions to authorize activities for the Trinity River Restoration Program (TRRP); Section 3406 (b)(23) for delivering flows and 3406 (b)(1) for river restoration. The Trinity River is the Klamath River's largest tributary and is geographically separate from the Central Valley and the Sacramento River. However, substantial water from the Trinity River has historically been exported through a trans-basin diversion to support water needs in the Central Valley. The goal of the TRRP is to restore and sustain natural production of anadromous fish populations downstream of Lewiston Dam to pre-dam levels, to facilitate dependent tribal, commercial, and sport fisheries' full participation in the benefits of restoration via enhanced harvest opportunities. This will be accomplished through restoring habitats for the anadromous fishery resources by implementing variable annual instream flows, rehabilitating the channel, and managing sediment. The TRRP carries out actions that are stipulated in the Record of Decision (ROD), signed on December 19, 2000, the Trinity River Mainstem Fishery Restoration Final Environmental Impact Statement/Environmental Impact Report (EIS/EIR), completed in October 2000.

San Joaquin River Basin

The San Joaquin River Restoration Program (SJRRP) carries out activities to restore and maintain fish populations in "good condition" on the mainstem of the San Joaquin River while reducing or avoiding adverse water supply impacts to Friant Division long-term contractors. Specific actions to achieve these goals include reintroduction of spring-run Chinook salmon, restoration flow releases and recirculation of restoration flows back to Friant Division contractors. The SJRRP is being planned and implemented because of the Natural Resources Defense Council, et al., v. Kirk Rodgers, et al. Stipulation of SJRRP Settlement (Settlement). Implementation of the Settlement, including planning, environmental studies and other activities necessary to achieve the Settlement's Restoration and Water Management goals are authorized in the San Joaquin River Restoration Settlement (SJRRP) Act, included in the Omnibus Public Land Management Act of 2009. The Act, which authorizes and directs the Secretary to fully implement the Settlement, was signed by the President on March 30, 2009, and became Public Law 111-11. The Act established the San Joaquin River Restoration Fund (SJRR Fund) and authorizes the use of up to $2 million a year from the Central Valley Project Restoration Fund under the Section 3406 (c)(1).

While the fisheries sections are currently administered individually, the Science Based Management Framework approach discussed below under Recent Developments aims to coordinate, integrate and prioritize CVPIA efforts across geographic areas.

CVP Water Operations Resource Area Goals

The CVPIA includes several provisions in Section 3406 (b) that are designed to contribute to the biological resources by supplying optimal project water to resource locations in flow quantity, velocity and timing. Provisions supporting this initiative include Section 3406 (b)(1)(B), Modified CVP Operations; and 3406 (b)(9)/(b)(19), Flow Fluctuations and Reservoir Storage.

Refuges Resources Area

The CVPIA includes several provisions in Section 3406 (d) that are designed to contribute to the maintenance, restoration and enhancements of wetlands and waterfowl habitat. The Act directs Interior to: provide, either directly or through contractual agreements with other appropriate parties, firm water supplies of suitable quality to maintain and improve wetland habitat areas on 19 federal, state and private lands, collectively referred to as "refuges." The Refuge Water Supply Program (RWSP) goal is to provide 555,515 AF of water annually, including 422,251 AF of Level 2 water; 26,007 AF of replacement water; and 133,264 AF of Incremental Level 4 water to the refuges, as required by the Act.

Based upon a wet year hydrology, Reclamation committed in 2011 to provide full Level 4 water (Level 2 plus Incremental Level 4) to South-of-Delta refuges capable of receiving such water. This is the first year

this has been achieved since enactment of CVPIA in 1992.

Other Resources Area

The third focus of the CVPIA restoration initiatives is directed at terrestrial habitat and species; and water quality and conservation. Provisions supporting this initiative include the Section 3406 (b)(1)"other" Habitat Restoration Program (HRP), which focuses on protecting native habitats that have been directly and indirectly affected by the CVP's construction and operation. This is accomplished through the purchase of fee title or conservation easements on lands where threats are significant and restoring lands to native habitat, research, captive breeding and outreach activities. The HRP contributes to the protection and/or restoration of the 2.7 million acres of habitat affected by the construction and operation of the CVP.

The Land Retirement Program (LRP), Section 3408 (h), goals include the purchase and retirement of land from agricultural production to improve water quality and provide for terrestrial habitat restoration. By ceasing irrigation of agricultural lands, the LRP reduces the volume of agricultural drainage produced, improving water quality and providing the opportunity to restore wildlife habitat. Specifically, the goal of the LRP is to retire 15,000 acres of agricultural lands by 2014 for the Land Retirement Demonstration Project and to restore up to 400 acres of that land annually.

FUNDING

CVPIA fish, wildlife, and improved water management and conservation actions are implemented through a variety of agreements that are held with partners including other federal and State agencies, tribes and local organizations. Reclamation and the Service use interagency agreements, memoranda of understanding, grants and cooperative agreements to partner with entities that have the authority, interest, ability, expertise and/or resources to implement CVPIA restoration actions.

The CVPIA Program utilizes multiple funding sources: CVP Restoration Fund (RF), Water and Related Resources (W&RR), Bay-Delta Fund, American

Friant Dam

Recovery and Reinvestment Act Fund (ARRA), and the State of California (State). The Act specifies funding for each provision should either be reimbursable, non-reimbursable, from the State; or a combination of these sources. The RF, established by Section 3407(d) of the CVPIA, is an account in the Treasury of the United States (U.S.) and consists largely of revenue generated by fees levied on CVP water and power users. The total maximum annual RF appropriation authorized by CVPIA is $50 million (1992 price levels). Of this, $30 million (1992 price level) is the maximum amount (payment ceiling) that is authorized to be assessed and collected from the water and power users. The $30 million payment ceiling is calculated on a 3-year rolling average, which results in a cyclical funding pattern when collections are limited by the water deliveries and appropriations are limited by Congress. The annual appropriation bill from Congress provides budget authority based on estimated collections, and the obligation of these funds can only occur after the collections are made.

Funding Obligations to Date

Since FY 1993, Congress appropriated RF and W&RR funds to the CVPIA Program. In addition, funds have

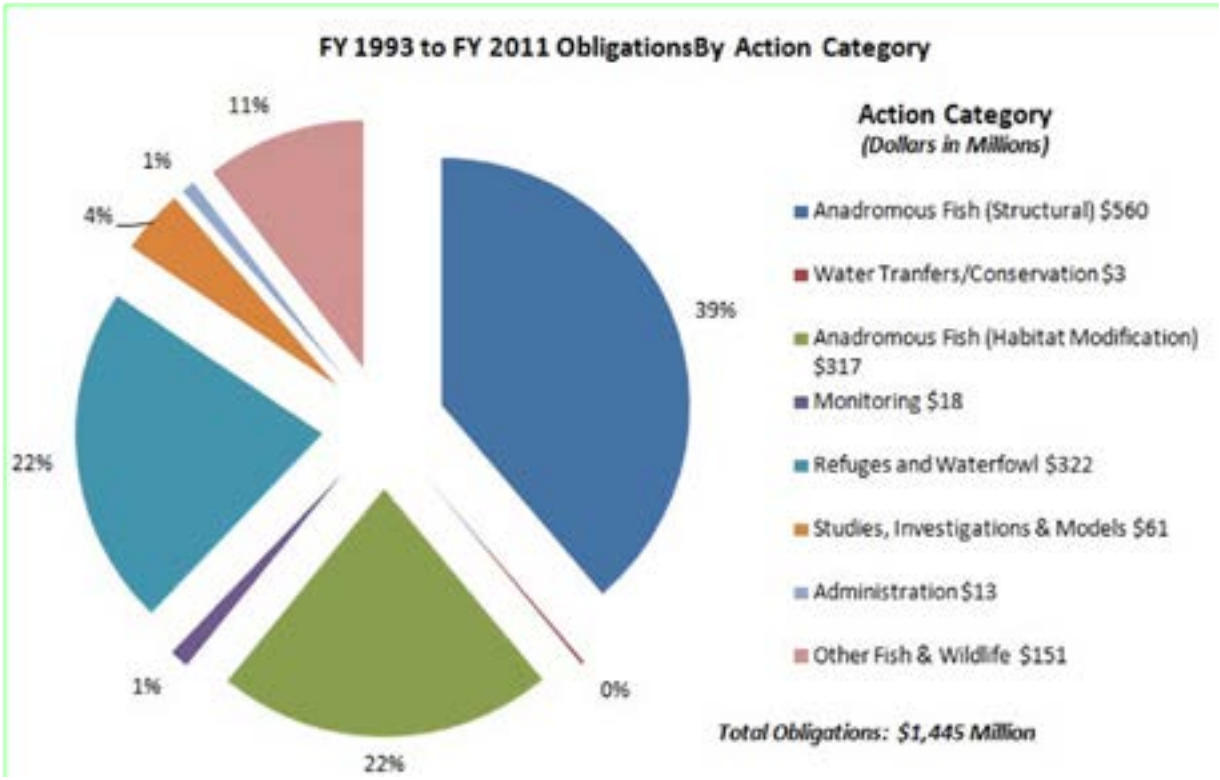


Figure 3: Program Financial Obligations By Action Category to Date

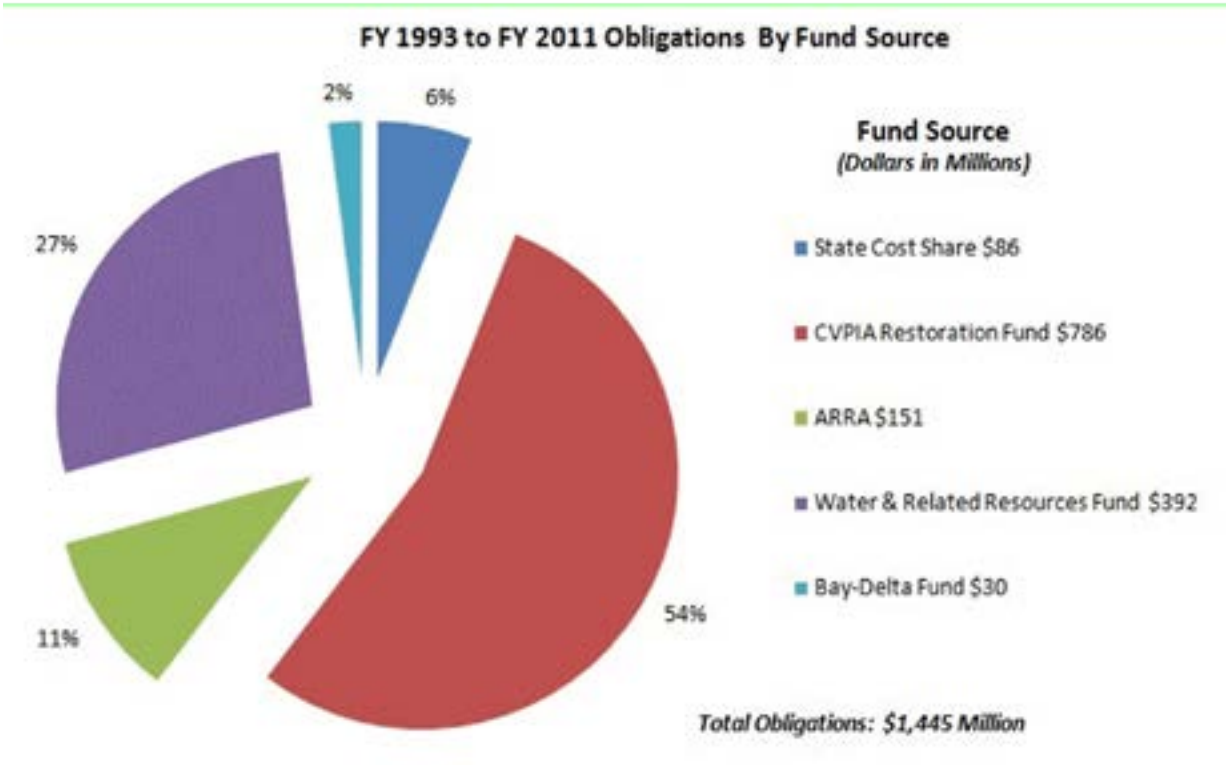


Figure 4: Program Financial Obligations By Fund Source to Date

been obligated from State cost-share funds, Bay-Delta funds and the American Recovery and Reinvestment Act (ARRA) funding. From these combined sources, a total of $1.4 billion has been obligated by the CVPIA Program over the past 18 years, as shown in Figures 3 and 4.

Total obligations to date include funding for the CVPIA program management and administration function. As shown in Figure 3, since FY 1993 a total of $13.3 million has been obligated for this critical oversight function. The CVPIA administration program provides financial management and reporting, long-term planning and establishes program priorities, and coordinates development of annual work plans.

Revisions to FY 2010 Report

Program Administration funding was omitted from the FY 2010 report, but has been included in this report. Funding obligations to date have also been revised to report an additional $6.5 million that was obligated in FY 2010 from ARRA funds to construct groundwater wells at the Gray Lodge and Volta Wildlife Areas, and an additional $1.8 million obligated in FY 2010 for land acquisition related to the Fish Passage Improvement Program at the Red Bluff Diversion Dam.

FY 2011

For FY 2011, $49.9 million was appropriated to the Restoration Fund. Total payments to the Restoration fund were $51.2 million. The difference between appropriations and payments in the amount of $1.3 million remains in a treasury account until appropriated for use.

As shown in Figures 5 and 6, a total of $113.9 million was obligated on CVPIA projects from a combination of funding sources: Restoration Funds ($48.9 million), Water and Related Resources ($41.5 million), ARRA funds ($10.4 million), state cost share funds ($4.1 million), and Bay-Delta funds ($9.0 million). See Table 1 for a breakdown of funding for each CVPIA Program activity in FY 2011.

American Recovery and Reinvestment Act (Arra) Funding

ARRA's funding in FY 2011 enhanced the CVPIA Program's capabilities to restore fisheries and wildlife refuges. To date, approximately $151 million has been awarded to Reclamation for CVPIA Program activities. In FY 2011, ARRA funds were obligated for the following: Contra Costa Canal Pumping Plant Program, 3406 (b)(5), obligated $2.4 million to complete construction on the Contra Costa Canal fish screen; Red Bluff Diversion Dam Program, 3406 (b)(10), obligated $7.3 million to continue construction on the permanent pumping plant for the fish passage project, which is scheduled to be complete in FY 2012; and the RWSP obligated $0.6 million to complete construction of groundwater wells at the Pixley National Wildlife Refuge, the Gray Lodge State Wildlife Area, and the Volta State Wildlife Area. ARRA funding for future years will continue to be reduced over previous years.

State of California

Cost-share

Section 3406 of the CVPIA requires that the U.S. enter into a cost-sharing agreement with the State for CVPIA implementation. On June 27, 1994, the State and the U.S. entered into the Sharing of Costs Agreement for Mitigation Projects and Improvements (SCAMPI). Initially under SCAMPI the State's maximum amount payable was $50 million through the agreements expiration in December 31, 2008.

Amendment No. 1 to SCAMPI, executed in June 1998, specified that the maximum amount payable to the U.S. by the State under the CVPIA cost-share was $93 million, the amount of funding provided by Proposition 204. Amendment No. 2 to SCAMPI, executed in August 2001, increased the maximum amount payable by the State pursuant to the cost-share provisions of CVPIA to $162,110,000. Amendment No. 3 to SCAMPI, executed in December 2008, resulted in an extension of SCAMPI for an additional three years to December 31, 2011. Amendment No. 4 to SCAMPI, executed in February 2010, increased the maximum amount payable by the State pursuant to the cost-share provisions of CVPIA to $167,610,000 for the Red Bluff Diversion Dam Task Order. Amendment No. 5 to SCAMPI, executed in 2011, increased the maximum amount payable to the U.S. by the State to $169,014,887 for the Vernalis Adaptive Management Plan (VAMP) Task Order Agreement. Amendment No. 6, also executed in 2011, increased the maximum amount payable to the

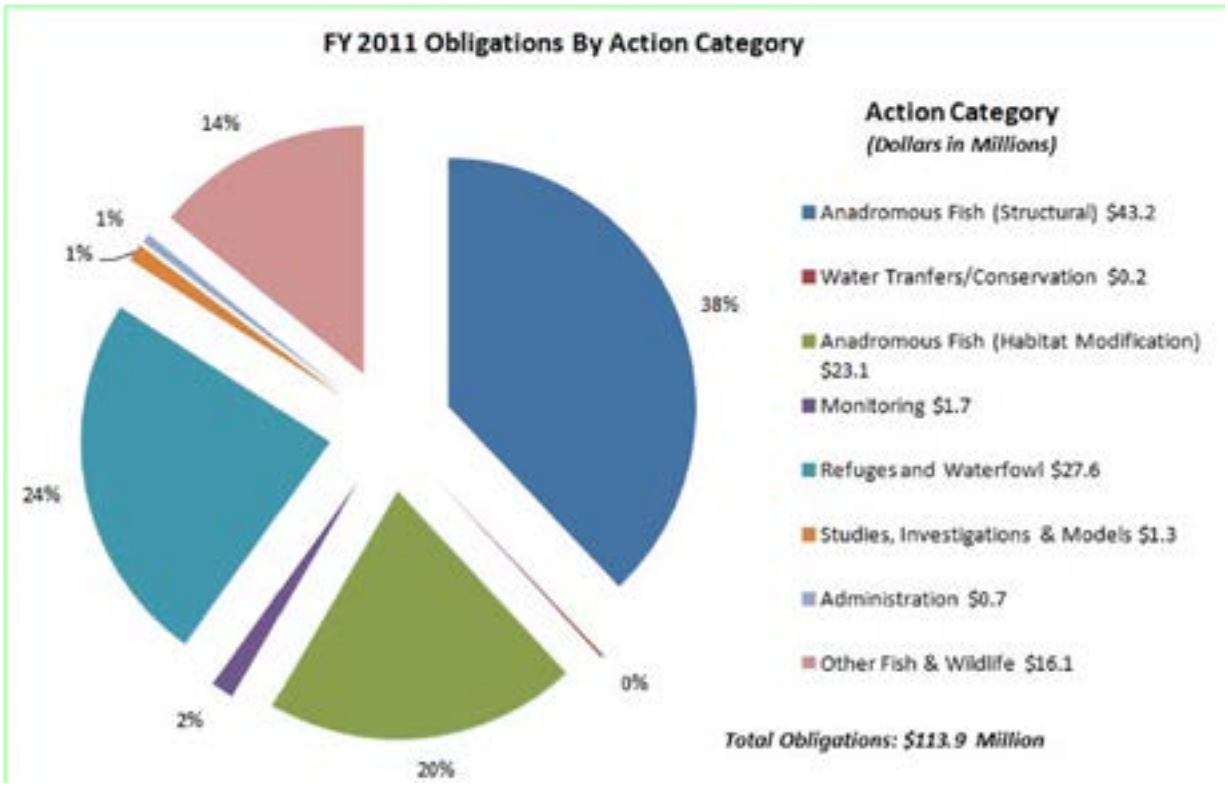


Figure 5: FY 2011 Financial Obligations By Action Category

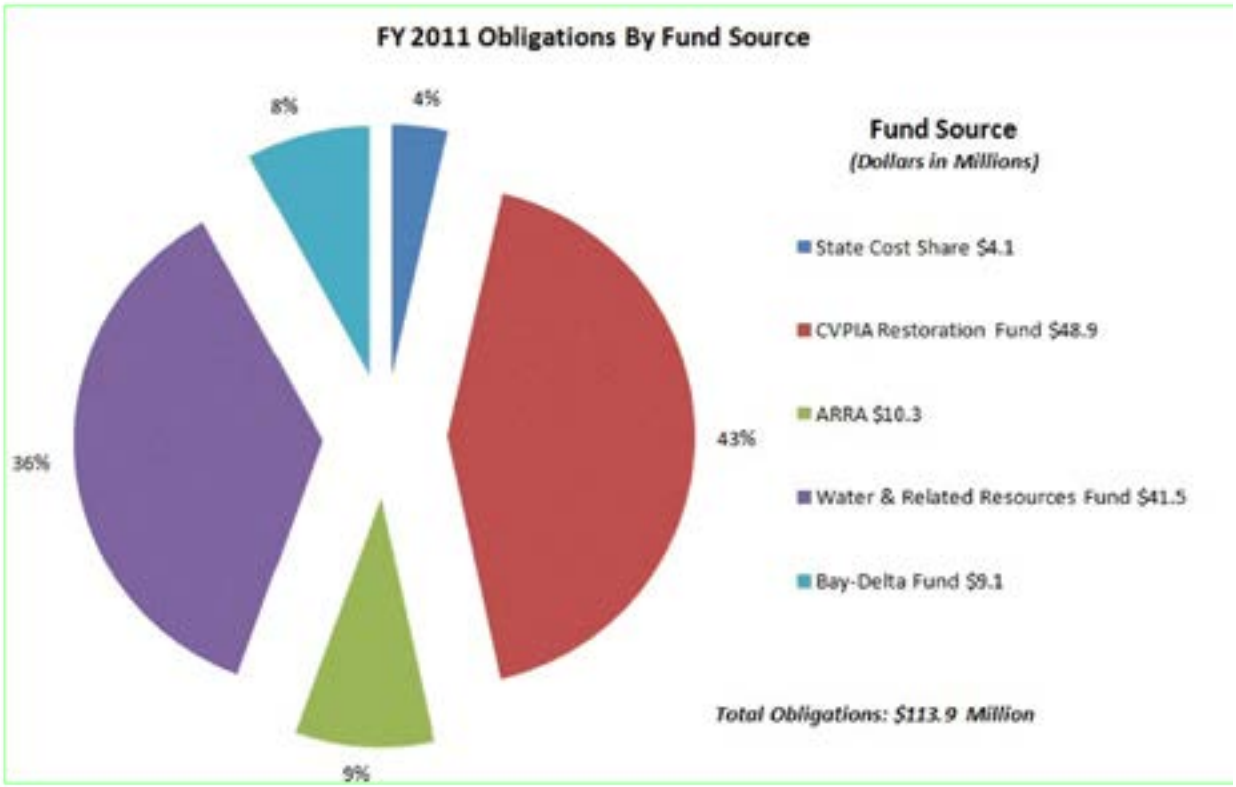


Figure 6: FY 2011 Financial Obligations By Fund Source

Table 1: FY 2011 Funding Obligations by Program Activity (rounded)

Section	Activity		Water & Related Funds	Restoration Funds	State Funds	Bay Delta Funds	ARRA Funds	Total Funds
3405(a)	Water Transfer Program		0	0	0	166,420	0	166,420
3406(b)(1)	Anadromous Fish Restoration Program		0	6,191,326	0	2,648,919	0	8,840,245
3406(b)(1)	"other" – Habitat Restoration Program		0	1,698,730	0	4,151,986	0	5,850,716
3406(b)(1)	"other" – Trinity River Restoration Program		8,655,938	988,819	0	0	41,296	9,686,053
3406(b)(2)	Dedicated Project Yield		0	697,827	0	0	0	697,827
3406(b)(3)	Water Acquisition Program -Instream Water (includes 3408(g) [VAMP])	Instream water	0	711,230	0	0	0	711,230
		VAMP	0	6,087,395	1,404,887	0	0	7,492,282
		Level 4	250,000	12,616,343	0	0	0	12,866,343
3406(b)(4)	Tracy (Jones) Pumping Plant Program	Tracy (Jones) Pumping Plant[1]	2,173,487	(1,343)	0	0	0	2,172,144
		Two Gates	0	0	0	13,162	0	13,162
3406(b)(5)	Contra Costa Pumping Plant No. 1		13,396	0	0	4,622	2,435,970	2,453,988
3406(b)(9)	Flow Fluctuations		0	35,691	0	0	0	35,691
3406(b)(10)	Red Bluff Diversion Dam		22,267,909	0	2,704,647	0	7,289,444	32,262,000
3406(b)(12)	Clear Creek Restoration Program		280,793	679,838	0	0	0	960,631
3406(b)(13)	Spawning Gravel		0	899,951	0	0	0	899,951
3406(b)(16)	Comprehensive Assessment and Monitoring Program		0	1,740,768	0	0	0	1,740,768
3406(b)(20)	Glenn Colusa Irrigation District		36,288	0	0	0	0	36,288
3406(b)(21)	Anadromous Fish Screen Program		349,200	3,877,085	0	2,000,000	0	6,226,285
3406(b)(23)	Trinity River Restoration		3,503,949	0	0	127	0	3,504,076
3406(c)(1)	San Joaquin River Comprehensive Plan		0	717,821	0	0	0	717,821
3406(d)(1)	Refuge Water Supply		Level 2 conveyance included in (d)(5)					
3406(d)(2)	Refuge Water Supply		Level 4 acquisition included in (b)(3)					
3406(d)(5)	Refuge Facilities Construction Program	Construction	0	541,900	0	0	586,351	1,128,251
		Wheeling	3,115,000	10,294,003	0	70,065	0	13,479,068
3406(d)(5)	San Joaquin Basin Action Plan		95,294	16,680	0	0	0	111,974
3406(g)	Models		0	603,607	0	0	0	603,607
3408(h)	Land Retirement Program		62,456	483,660	0	0	0	546,116
3410	CVPIA Administration		726,203	0	0	0	0	726,203
	TOTAL FUNDING OBLIGATED		**41,529,913**	**48,881,331**	**4,109,534**	**9,055,301**	**10,353,061**	**113,929,140**

1 A negative amount represents a recovery of a prior year obligation.

U.S. by the State to $175,514,887 towards the cost of the Fish Passage Improvement Project at the Red Bluff Diversion Dam.

In 2011, the State, Reclamation and the Service continued coordinating annual work plans in order to modify SCAMPI through Amendment No. 7 to specify the maximum amount payable to the U.S. by the State for FY 2012 through FY 2014. Task Orders will document how the contributions will be made, either via cash or in-kind services, for various activities including Gravel Placement, Anadromous Fish Restoration Program, Models, Clear Creek Restoration Program, Comprehensive Assessment and Monitoring Program, and Refuges Program. These Task Orders and Amendment No. 7 are expected to be in place mid FY 2012.

State Water Package

In FY 2010, the State legislature developed a measure known as the Safe, Clean, and Reliable Drinking Water Supply Act. The purpose of the law is to protect water quality and ensure safe, clean drinking water; meet the water supply needs of California residents, farms, businesses; expand water conservation and recycling; restore fish and wildlife habitat; reduce polluted runoff that contaminates rivers, streams, beaches, and bays; and protect the safety of water supplies threatened by earthquakes and other natural disasters. It includes State issuance of bonds totaling $11.140 billion paid from existing State funds. The measure contains funding for CVPIA Program activities such as Central Valley wildlife refuge water and construction of fish passage improvements at Red Bluff Diversion Dam. The bond was originally slated to appear on the November 2, 2010, ballot as Proposition 18. However, on August 9, 2010, the California State Legislature decided to postpone the vote on the measure until the November 4, 2014, ballot.

As a result of the State Water Package, the State appropriated $28 million in funding from Proposition 50, to fund the Two-Gates Fish Protection Demonstration Program. However, the independent review of the Two Gates Demonstration Project found additional data is needed to assess its effectiveness in achieving its objectives. Once the data are obtained and assessed, a determination on whether the project should move forward will be made. Reclamation is working with DWR and the State Water Project contractors to develop additional actions that could be implemented in addition to and/or as alternatives to the Two-Gates Project.

RECENT DEVELOPMENTS

Since 1993, the CVPIA Program has steadily progressed in completing specific actions called for by Congress to meet the goals of CVPIA. The Program has also grown in complexity in response to key changes that have affected the operation of Central Valley Project (CVP), vulnerable status of key anadromous fish species, development of a better understanding of species life cycle needs, and the emergence of new scientific tools. Several developments in FY 2011 affected the planning and implementation including progress on the Science Based Management Framework, OCAP and the Biological Opinions in the Bay-Delta, State cost-share funding, the State Water Package, the Bay Delta Conservation Plan, and changing environmental factors. Also, as a result of continued program implementation, the Contra Costa Canal Pumping Plant project was completed in 2011 as was the permanent operational change of the Red Bluff Diversion Dam gates.

Independent Reviews for Refuges and Fisheries

Refuges

In 2008 and 2009, the Refuge Water Supply Program (Refuge WSP) was reviewed and the panel's recommendations are presented in a report entitled, "Undelivered Water: Fulfilling the CVPIA Promise to Central Valley Refuges", dated November 3, 2009. The report found that even though the reliability of Level 2 water deliveries improved since 2002, Level 4 water supplies had fallen short of CVPIA mandate and prevented optimal performance of the Refuges. In response to the panel's recommendations, the Refuge WSP has taken several steps: entered into an agreement with the Service and the National Fish and Wildlife Foundation to explore avenues to improve the effectiveness of the water acquisitions, including those for Incremental Level 4; assessed ways to

Bridge and Siphon under Red Bank Creek complete in FY-2011. Looking from Sacramento River upstream along Red Bank Creek.

increase the priority for pumping, conveyance and storage of Incremental Level 4 water supplies in CVP facilities; continued planning for external conveyance construction; and investigated storage options in existing or new groundwater banks.

Fisheries

In 2007, as part of the Office of Management and Budget (OMB) Program Assessment and Rating Tool (PART) process, the CVPIA Program conducted two independent reviews to evaluate efficiency and effectiveness toward meeting the Act's goals. A Fisheries Independent Review panel assessed the implementation of the Central Valley fisheries activities (i.e. fish doubling). The panel's recommendations can be found in, "Listen to the River – An Independent Report on the CVPIA Fisheries Program" dated December 2008, which calls for a science-based adaptive management approach, increased focus on the Bay-Delta and increased flows for fish. Since the panel's recommendations were released, the fifteen separate authorities that contribute to the "fish doubling" goal have been working together to implement improvements and to develop a fisheries resource area plan. This plan will articulate a reorganization strategy that places an emphasis on managing the fisheries related provisions as one program, rather than as individual program activities. This new structure will enable the program to articulate an overarching vision; utilize a science-based management framework to address problems at a system level; report accomplishments by watershed; and improve transparency by communicating the coordination and decision-making that occurs within the program.

To address the panels recommendations, the Department of the Interior (DOI) is developing an improved science-based decision making process update for fisheries.

To coordinate CVPIA implementation to these other fish protection and restoration efforts, DOI will develop an overarching strategy that accommodates the species' needs under the ESA and obligations under CVPIA using insights gained through the Bay Delta Conservation Plan planning process, Interagency Ecological Program research

A local population of Tipton kangaroo rats has benefitted from Land Retirement at the Atwell Island Site. The Tipton kangaroo rat is a federal and state listed species.

investigations, and other recovery efforts in the Central Valley. The revised strategy will facilitate future decisions using a scientific framework that connects restoration actions to environmental and population responses across watersheds. The recommendations in the Independent Review of the CVPIA Fisheries Program and the Act's goals will guide the development of the revised strategy in light of the current regulatory and ecosystem conditions.

Specifically, the initial steps include developing the science-based decision process and producing an updated Implementation Plan. Key tasks include (1) revising objectives for the CVPIA, (2) development of system-wide model, (3) development of performance indices and monitoring efforts, and (4) scientific review. It is expected that the entire decision making process with system-wide model, objectives and a recommendation for a supporting organizational structure will be complete by the end of FY 2013. This will enable FY 2014 project review to take full advantage of the new process.

Operations Criteria and Plan (OCAP) and Biological Opinions In the Delta

On December 15, 2008, the Service issued its Biological Opinion (BiOp) analyzing the effects of the long-term coordinated operations of the CVP and SWP on the threatened delta smelt (2008 FWS OCAP BiOp). On June 4, 2009, NMFS issued its BiOp analyzing the effects of the coordinated operations of the CVP and SWP on threatened and endangered salmonids and other listed species (2009 NMFS OCAP BiOp). In each BiOp, the consulting agency (Service or NMFS) concluded that the coordinated operations of the CVP and SWP are likely to jeopardize the continued existence of the listed species and to adversely modify critical habitat. Consequently, each BiOp included a reasonable and prudent alternative (RPA), developed by the fish agencies and intended to protect the listed species and habitat. Both BiOps were challenged in Federal District Court. On December 14, 2010, the District Court found the 2008 FWS OCAP BiOp to be arbitrary, capricious and unlawful, remanding

the BiOp to the Service for further consideration. On September 20, 2011, the District Court similarly concluded that the 2009 NMFS OCAP BiOp was arbitrary, capricious, and unlawful, remanding it to NMFS for further consideration. The District Court did not vacate the two BiOps, so Reclamation and DWR continue to operate under them until the Service and NMFS issue new BiOps.

In FY 2011, several key activities contributed to meeting the RPA requirements. Examples include the implementation of a side-channel and floodplain restoration on the Stanislaus River by the Anadromous Fish Restoration Program. The Spawning and Rearing Habitat Restoration Program placed 5,000 tons of gravel in Goodwin Canyon on the Stanislaus River to increase and improve spawning habitat. And the Comprehensive Assessment and Monitoring Program used Rotary Screw Traps to monitor the production of juvenile Chinook salmon on the Stanislaus River, with the goal of assessing the effectiveness of habitat restoration in that watershed.

In FY 2011, a key activity that contributed to meeting the RPA requirements was the implementation of side-channel and floodplain restoration on the Stanislaus River. This project strives to restore freshwater migratory habitat for juvenile steelhead by increasing floodplain connectivity and reducing predation risk during migration (Section 3406 (b) (1)).

Completion of Contra Costa

On September 19, 2011, Secretary of the Interior Ken Salazar and Bureau of Reclamation Commissioner Michael Connor joined state, local and tribal officials to dedicate the Rock Slough Fish Screen project at the Contra Costa Canal Pumping Plant Number One. The fish screen, constructed through a partnership between Reclamation and the Contra Costa Water District, will help ensure a sustainable water supply and a strong economy for California, while protecting sensitive fish species and the ecosystem they inhabit. Completion of the project also helps fulfill requirements of the Central Valley Project Improvement Act, Section 3406(b)(5), and the 2008 U.S. Fish and Wildlife Service's Los Vaqueros Biological Opinion for the threatened Delta smelt.

The Rock Slough project, which was awarded $25.6 million in ARRA funds, completes the screening of the last of CCWD's four Delta intakes for protection of resident and migratory fish species, including the threatened Delta smelt and other threatened and endangered fish species that might otherwise be drawn in from the Delta.

The fish screen project, which is substantially complete, is expected to be fully operational in November 2011.

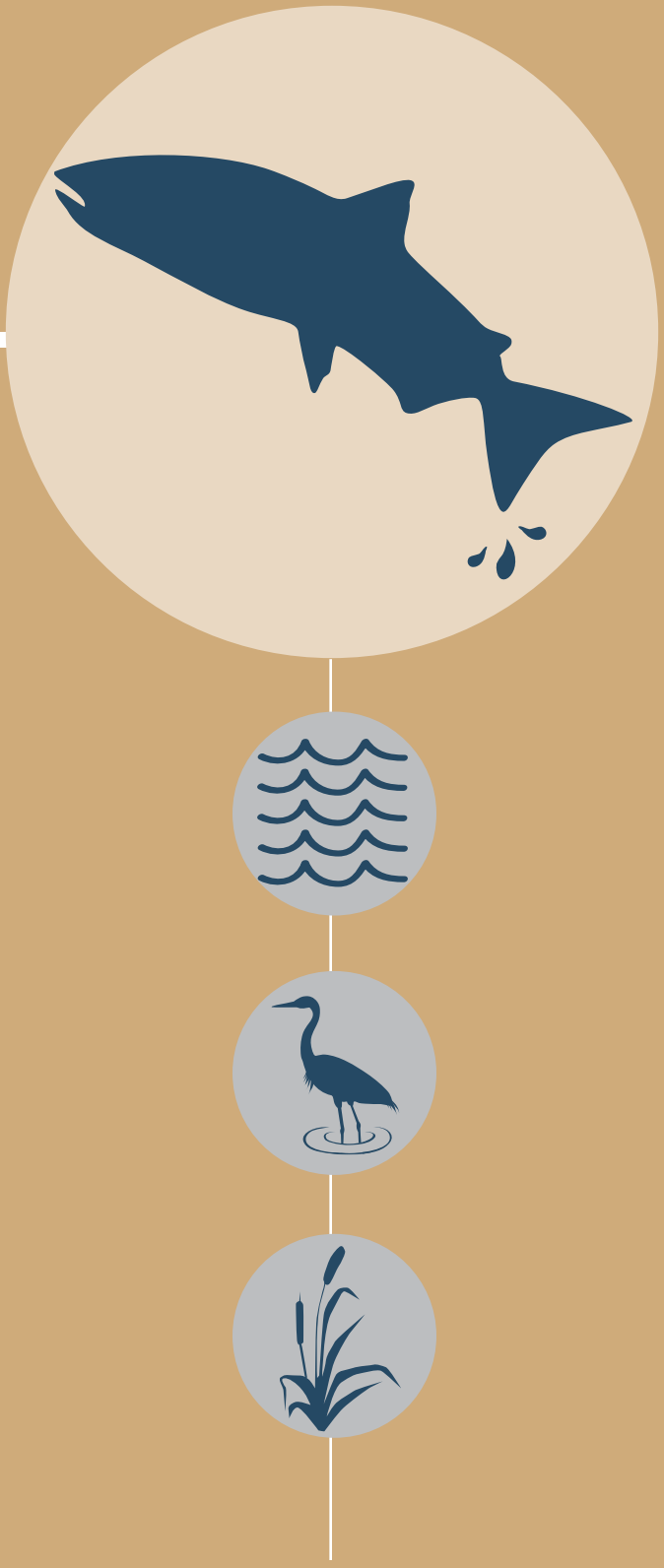
Red Bluff Fish Passage

The overall goal of CVPIA Section 3406 (b)(10), Red Bluff Fish Passage, is to substantially improve the long-term availability of fish to pass upstream and downstream of the Red Bluff Diversion Dam. A major milestone was accomplished towards this end when on September 1, 2011, Reclamation permanently opened the Diversion Dam gates and lowered Lake Red Bluff to river channel levels. Thus, Reclamation is now able to comply with the National Oceanic and Atmospheric Administration Fisheries Service's Biological Opinion that requires the gates are opened no later than Sept. 1 to help migration of winter-run and spring-run Chinook salmon and green sturgeon past the dam site.

Construction on the pumping plant and fish screens continues and the new plant is anticipated to come on line in FY2012.

Chapter 2

FISHERIES RESOURCE AREA



Anadromous Fish Restoration Program

3406 (b)(1)

The Anadromous Fish Restoration Program (AFRP) is the overarching program to address anadromous fish doubling in the Central Valley. Natural production of anadromous fish is an outcome based goal of the CVPIA Program. The Act specifically directs Interior to:

"... 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..."

Central Valley rivers and streams were defined in the January 9, 2001, Final Restoration Plan for the AFRP as all rivers, streams, creeks, sloughs and other watercourses, regardless of volume and frequency of flow, that drain into the Sacramento River basin, the San Joaquin River basin downstream of Mendota Pool, or the Sacramento-San Joaquin Delta upstream of Chipps Island and the 22 main rivers and streams are specifically called out within Appendix B of that document.

The anadromous fish production targets pertain to Chinook salmon, steelhead, striped bass, American shad, white sturgeon, and green sturgeon, which are believed to have been affected by CVP construction and operation.

Subsequent to CVPIA's passage, the AFRP developed a series of planning reports that culminated in the Final AFRP Restoration Plan (Final Restoration Plan) (FRP) in 2001. As acknowledged in the CVPIA Record of Decision (ROD), the Final Restoration Plan guides the implementation of the actions and evaluations which were developed to address the doubling goal. The 289 actions and evaluations in the Final Restoration Plan are categorized by six programmatic-level objectives:

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

The actions and evaluations identified in the Final Restoration Plan are annotated within the following text by number.

PERFORMANCE MEASURES

The AFRP goal is to at least double the natural production of anadromous fish from the baseline average established during 1967–1991, and to maintain that population on a long-term, sustainable basis. Table 2 below lists the doubling target by species. The AFRP implements actions that will contribute to the doubling of the natural production of anadromous fish populations. To achieve the fish-doubling goal, the AFRP has identified 289 actions and evaluations that support Fisheries restoration (Table 3). The CVPIA Program Activity Review Report identified 128 Restoration Plan high and medium

Table 2: Yearly Estimates of Natural Production of Anadromous Fish and the Average Natural Production by Species within Central Valley River and Streams, 1992-2010

						Chinook Salmon Run			
Year	Steelhead[a]	American Shad[b]	Striped Bass[c]	Green Sturgeon[d]	White Sturgeon[e]	Fall	Late Fall	Winter	Spring
Baseline	6,546	2,129	1,252,259	983	5,571	374,049	34,192	54,439	34,374
Doubling Target	13,000	4,300	2,500,000	2,000	11,000	750,000	68,000	110,000	68,000
1992	4,086	2,010	777,293			193,447	27,576	3,144	4,440
1993		5,153	656,506	68	692	320,533	2,369	1,024	4,157
1994		1,318	599,770		6,392	385,842	1,047	505	7,720
1995		6,803				714,930	764	4,182	36,474
1996		4,260	1,043,239			490,236	447	2,112	6,213
1997		2,591		1,306	11,689	604,049	1,344	2,010	3,866
1998		4,134	1,356,412	470	8,971	278,730	82,190	5,613	49,172
1999		715				403,023	17,243	5,439	11,130
2000		764	1,591,419			661,554	19,894	2,657	11,583
2001		761		7,098	5,129	530,504	27,717	9,916	18,401
2002		1,914	945,878	1,688	2,775	542,633	56,662	9,195	19,839
2003		9,342	829,111			528,336	9,106	10,882	13,269
2004		947	1,312,452			512,629	21,244	14,763	21,530
2005		1,741	1,017,116	2,557	2,898	397,755	20,838	21,511	26,099
2006		2,303		3,144	6,991	227,985	15,600	19,712	11,659
2007		551	1,019,511	1,530	10,559	107,253	30,509	4,142	13,138
2008		271	938,965	1,330	6,257	39,778	4,806	2,555	4,489
2009		624	922,622	10,272	6,258	30,604	4,350	4,070	2,492
2010		683	684,486			102,821	5,577	1,552	2,064
Average	N/A	2,468	978,199	2,948	6,237	372,344	18,383	6,578	14,091
% of Goal	N/A	57%	39%	147%	57%	50%	27%	6%	21%

a Insufficient data are available to estimate natural production of steelhead in the Central Valley other than upstream of Red Bluff Diversion Dam. Operational changes at Red Bluff Diversion Dam after 1994 preclude the ability to collect comparable post-baseline data for this taxon.

b Mid-water trawl index for young-of-the-year American shad in the Sacramento-San Joaquin River Delta and San Pablo and Suisun bays, 1992-2010.

c Estimated abundance of adult striped bass in the Central Valley's anadromous waters, 1992-2010. Estimates for 2007, 2008, 2009, and 2010 are preliminary and subject to change. Years with missing data is due to CDFG survey frequency which is based upon funding.

d Estimated abundance of green sturgeon >40 inches in total length, 1992-2009. Estimates for 2006, 2007, 2008, and 2009 are preliminary and subject to change. Years with missing data is due to CDFG survey frequency which is based upon funding.

e Estimated abundance of 15-year-old white sturgeon, 1992-2009. Estimates for 2006, 2007, 2008, and 2009 are preliminary and subject to change.

Table 3: Summary of Progress Towards Completing 289 Final Restoration Plan Actions and Evaluations by Watershed, FY 1992-2011

Watershed	Total actions and evaluations in Final Restoration Plan	Actions and evaluations completed to date	Actions and evaluations addressed in 2011[2]	% of actions and evaluations completed to date
American River	13	2		15
Antelope Creek	2	0		0
Battle Creek	12	8		67
Bear Creek	2	0		0
Bear River	8	0		0
Big Chico Creek	10	3		30
Butte Creek	39	32		82
Calaveras River	6	0	1	0
Central Valley-Wide	15	1		7
Clear Creek	7	5		71
Colusa Basin Drain	2	0		0
Cosumnes River	9	2	1	18
Cottonwood Creek	5	1	1	20
Cow Creek	4	0		0
Deer Creek	5	0		0
Elder Creek	2	0		0
Feather River	12	0		0
Merced River	8	0		0
Mill Creek	5	1		20
Miscellaneous Small Tributaries	1	0		0
Mokelumne River	13	1		8
Ocean	3	0		0
Paynes Creek	2	0		0
Upper Mainstem Sacramento River	22	8	1	36
Sacramento-San Joaquin Delta	29	0		0
Mainstem San Joaquin River	13	0	1	0
Stanislaus River	9	1	1	11
Stoney Creek	1	0		0
Thomes Creek	6	2		33
Tuolumne River	10	0	1	0
Yuba River	14	0		0
All Watersheds[1]	**289**	**67**	**7**	**23**

[1] Actions to be implemented CVP-wide via tools identified in AFRP Final Restoration Plan.

[2] Actions and evaluations addressed in 2011 have not yet been completed.

Table 4: Summary of Progress Towards 128 High and Medium Priority Actions Final Restoration Plan with End Points (53 Structural, 75 Non-Structural), FY 2011 and 1992-2011

Watershed	53 Structural Actions		75 Non-structural Actions	
	Number of structural actions completed in FY 2011*	Number of structural actions completed since 1992	Number of non-structural actions completed in FY 2011*	Number of non-structural actions completed since 1992
American River		1		1
Battle Creek		3		2
Big Chico Creek		1		1
Butte Creek		13		17
Clear Creek		1		
Cosumnes River				1
Cottonwood Creek	1	1		
Mill Creek		1		
Stanislaus River				1
Thomes Creek				2
All Watersheds		**21**		**25**

* NOTE: Although non-structural actions were not completed in FY 2011, work continued on 17 watersheds throughout the Central Valley.

priority actions that are "time certain",structural (53) and non-structural actions (75) (Table 4).

FY 2011 ACCOMPLISHMENTS

The AFRP obligated $6,192,000 from the Restoration Fund and $2,648,919 from Bay Delta Funds in FY 2011. The AFRP continued progress toward the following actions and evaluations in the Sacramento and San Joaquin watersheds to enhance passage and habitat, and reduce loss of fish. Table 2 shows the average natural production by species since 1992. Fish count data is presented up to 2010. The 2011 data is not available until June 2012, but will be posted in the 2011 CAMP annual report

The Central Valley Chinook salmon (all races) natural production average from 1992-2010 was 410,790 fish which dropped below the 1967-1991 baseline average Chinook salmon production of 411,297 as a result of the low returns of fall run fish in 2010 that totaled 102,821 fish (Table 2). Average Chinook salmon natural production for the period 1992-2010 has exceeded the watershed doubling goal target on Clear, Butte, and Battle Creeks and is just below the goal on the Mokelumne River (Table 5). 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 from the last four years (2007-2010). Spring-run numbers have trended upwards since 1991, but production was reduced in 2008, 2009, and 2010. Fall-run natural production has decreased to the baseline levels due to the recent stock collapse observed in 2007-2010. Late fall-run production had increased greatly since the low period (1993-1997) but continued to decline in 2010.

Table 2 shows the 1992-2010 average natural production and the annual natural production estimates by species since 1992 and Table 5 shows the 1992–2010 average natural production numbers of Chinook salmon in each watershed compared to the AFRP doubling goal targets. Insufficient data are available to estimate natural production of steelhead in the Central Valley other than upstream of Red Bluff Diversion Dam. Operational changes at Red Bluff Diversion Dam after 1994 preclude the ability to collect comparable post-baseline data for this taxon. Monitoring data for white sturgeon in San Pablo and Suisun bays are available for eleven years between

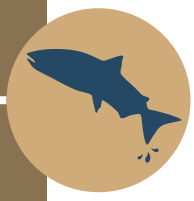


Table 5: Average Natural Production of Anadromous Fish in Each Watershed Compared to the Anadromous Fish Restoration Program Doubling Goal Targets, 1992-2010

Watershed	Species	Doubling Goal Target	1992-2010 Average Natural Production Numbers	Percent of Target
American River*	Fall-Run	160,000	109,438	68.4
Antelope Creek	Fall-Run	720	0	0
Battle Creek*	Fall-Run	10,000	17,953	179.5
Bear River	Fall-Run	450	N/A	N/A
Big Chico Creek	Fall-Run	800	N/A	N/A
Butte Creek	Fall-Run	1,500	2,459	163.9
Clear Creek	Fall-Run	7,100	10,890	153.4
Cosumnes River	Fall-Run	3,300	793	24.0
Cottonwood Creek	Fall-Run	5,900	1,548	26.2
Cow Creek	Fall-Run	4,600	1,825	39.7
Deer Creek	Fall-Run	1,500	849	56.6
Feather River*	Fall-Run	170,000	93,423	55.0
Merced River*	Fall-Run	18,000	6,838	38.0
Mill Creek	Fall-Run	4,200	1,908	45.4
Miscellaneous Creeks	Fall-Run	1,100	78	7.1
Mokelumne River*	Fall-Run	9,300	7,990	85.9
Paynes Creek	Fall-Run	330	N/A	N/A
Sacramento River	Fall-Run	230,000	75,404	32.8
Stanislaus River	Fall-Run	22,000	5,325	24.2
Tuolumne River	Fall-Run	38,000	7,181	18.9
Yuba River	Fall-Run	66,000	32,693	49.5
Central Valley Wide	Fall-Run	750,000	372,244	49.6
Battle Creek*	Late-fall-Run	550	676	122.9
Sacramento River	Late-fall-Run	68,000	18,691	27.5
Central Valley Wide	Late-fall-Run	68,000	18,383	27.0
Butte Creek	Spring-Run	2,000	10,013	500.7
Deer Creek	Spring-Run	6,500	2,100	32.3
Mill Creek	Spring-Run	4,400	1,229	27.9
Sacramento River	Spring-Run	59,000	749	1.3
Central Valley Wide	Spring-Run	68,000	14,091	20.7
Calaveras River	Winter-Run	2,200	0	0
Sacramento River*	Winter-Run	110,000	6,578	6.0
Central Valley Wide	Winter-Run	110,000	6,578	6.0
TOTAL	**All races**	**990,000**	**411,297**	**41.6**

1992 and 2009. In the seven years when 15-year-old white sturgeon abundance estimates are considered to be final and not subject to revision (i.e., between 1993 and 2005), the AFRP production target for this species was met once. In the four years when white sturgeon estimates are considered to be provisional (i.e., 2006, 2007, 2008, and 2009), the AFRP production target for 15-year-old white sturgeon was not met. Monitoring data for green sturgeon >40 inches (total length) in San Pablo and Suisun bays are available for ten years between 1992 and 2009. In the six years when green sturgeon abundance estimates are considered to be final and not subject to revision (i.e., between 1993 and 2005), the AFRP production target for this species was met twice. In the four years when green sturgeon estimates are considered to be provisional (i.e., 2006, 2007, 2008, and 2009), the AFRP production target for this species was also met twice. The midwater trawl index for juvenile American shad in the Sacramento-San Joaquin River Delta and San Pablo and Suisun bays suggests the AFRP production target for this species was met in three of 19 years between 1992 and 2010. The 2010 midwater trawl index for this species (683) increased slightly from 2009 (624), but the 2010 index was markedly below the 1967-1991 baseline average of 2,129 shad and the AFRP production target of 4,300 shad. Monitoring of legal-size striped bass in the Central Valley's anadromous waters occurred in 14 years between 1992 and 2010. In the 10 years when legal-size striped bass abundance estimates are considered to be final and not subject to revision (i.e., between 1992 and 2005), the AFRP production target for this species was never met. In four years when legal-size striped bass abundance estimates are considered to be provisional (2007,2008, 2009, and 2010), the AFRP production target for this species was also not met.

About 23% of all Restoration Plan actions and evaluations (289) have been completed in the 1992 to 2011 time period (Table 3). Of the 128 time certain high and medium priority actions, forty-six (36%) have been completed since 1992 and one structural action was completed in 2011 (Table 4). Although non-structural actions were not completed in FY 2011, work continued on 17 watersheds throughout the Central Valley. The AFRP continued progress toward the following actions and evaluations in the Sacramento and San Joaquin watersheds to enhance passage and habitat, and reduce loss of fish.

Accomplishments in the Sacramento Basin

American River - Spawning and side channel habitat that were restored in 2010 were enhanced in 2011 to improve the project design (FRP Action 5). Due to high flows, alternative scenarios have been developed to allow the installation of 3,000 to 8,000 cubic yards of gravel for spawning and 2,000 cubic yards of cobble to enhance flow into the side channel. Additionally, culled orchard trees are being purchased for installation in 2012 as instream woody habitat to improve the growth and survival of rearing juvenile fish.

Antelope Creek – The Juvenile Fish Passage Improvement Project at Edwards Diversion Dam (FRP Action 1) will prevent out-migrating salmonids from becoming entrained in the two diversion canals. In 2011, the Tehama County Resource Conservation District completed an alternatives analysis for juvenile fish passage. Alternative selection and construction is expected to begin in 2012.

The Antelope Creek Crossing Repair Project in the Tehama Wildlife Area (FRP Action 1) will remove a road crossing that is a barrier to spring- and fall-run Chinook salmon during dry years. Construction began in 2011 and will be complete in 2012. Once completed, the project will improve passage to 13 miles of spawning and holding habitat.

Battle Creek –The fish screen and ladder construction at the Eagle Canyon and North Battle Creek Feeder sites was completed in 2011. Construction of the Inskip powerhouse tailrace connector and bypass began in 2011 and is planned to be completed by late 2012. Once current and planned 2012 contracts are completed, the project will improve flows and passage to 10 miles of spawning habitat (FRP Actions 2,6, and 7). This project is being funded by CALFED, USBR, and PG&E.

Bear River – AFRP completed a report in 2011 assessing the temperature data collected in 2010 at six locations in Dry Creek, a tributary to the Bear

River. Results suggest temperatures may be too warm in some locations to support over-summering steelhead, but future work may involve investigation of temperature refugia. Beale Air Force Base staff found an adult Chinook salmon in lower Dry Creek. Habitat restoration targeting fall-run Chinook salmon which typically do not over-summer may be warranted.

Big Chico Creek–In FY 2011, the Sierra Nevada Brewing Company pledged $200,000 towards the Iron Canyon Fish Ladder Project (FRP Action 2) and NMFS issued the Biological Opinion. Completion of the new passage facility will provide access to an estimated 8 miles of quality spring run Chinook salmon habitat.

Cottonwood Creek –The Anderson-Cottonwood Irrigation District (ACID) siphon had become exposed once again in Cottonwood Creek and posed a passage problem for adult salmonids. Construction of the Cottonwood Creek ACID Siphon Project (FRP Action 2) to alleviate this barrier was completed in November 2010. This project improved access to 30 miles of spawning habitat for fall- and spring run Chinook salmon and Central Valley steelhead.

Surveys were conducted in 2011 to assist with the National Environmental Policy Act (NEPA) effects analysis on the Nonnative Invasive Plant Management and Control Project (FRP Action 5) within the riparian corridor of Cottonwood Creek. Project implementation is anticipated to begin in 2012.

The Cottonwood Creek Geomorphological Analysis Project (FRP Action 1) was funded in FY09 to develop a sediment budget and assist in determining the cause of streambed instability. The study is to include analyses of geomorphological data from 1939 to present; quantify spatial and temporal characteristics of sediment supply, storage, and transport in the system; and to identify the effects of sediment transport dynamics on perceived channel and watershed changes. In 2011, additional funds were added for continued flow and turbidity data collection on current sites/gages and for new collection sites to be monitored during the 2011/2012 water year.

Cow Creek – In 2011, a habitat survey above a barrier in Cow Creek was completed for fall-run Chinook salmon and steelhead. Meetings with stakeholders to develop design alternatives for a fishway were also initiated. While design issues continue to be worked out, environmental compliance documents for NEPA and CEQA are anticipated to be completed by 2012. This project will open up 10 miles of historic habitat to fall-run Chinook salmon and steelhead (Action 3).

FY11 funds were also awarded to complete a riparian habitat assessment and determine riparian restoration priorities (Action 4).

An anadromous fish passage barrier assessment was funded on July 2011. This assessment will inventory, classify, map, and prioritize barriers for remediation to restore access to 85 miles of anadromous fish habitat. The project will create a database and GIS layers for agencies and stakeholders to use in addressing passage and screening issues related to man-made barriers and diversions.

Feather River – Monitoring activities targeting North American green sturgeon, which is listed as threatened under the Endangered Species Act, continued in the Feather and Yuba rivers in FY11. Future work may include additional video surveys and egg collection to verify spawning. Reports on sturgeon habitat surveys/ detection methodology and the 2011 observations were finalized.

Mill Creek – In July 2011, the Mill Creek fish passage assessment and restoration project was awarded (Evaluation 1). This project will assess and design any required remediation to improve fish passage for juvenile and adult salmonids at the two diversion dams and exposed siphon in the lower Mill Creek watershed. FY11 funds were also awarded to complete a riparian habitat assessment and determine riparian restoration priorities (FRP Action 4).

Yuba River –Environmental documents were developed in 2011 to restore a 5-acre riparian site located on Hammon Bar (Evaluation 4). The project will plant cottonwood and willow pole cuttings within the Yuba River floodplain. This pilot project is intended to flood periodically under moderate flows and thus provide juvenile salmonids with improved rearing habitat.

Vaki Riverwatcher systems continue to be operated on the north and south fish ladders at Daguerre Point Dam

in the lower Yuba River. The collection of fish passage data continues to improve understanding about the timing, abundance, population trends, and response to changing flow and temperature conditions of adult spring and fall-run Chinook salmon and steelhead. Data collected on steelhead has become much more reliable due to the installation of newer/improved equipment. Reports assessing the 2007-08 and 2008-09 data were finalized.

Accomplishments in the San Joaquin Basin

Calaveras River – The Budiselich Flashboard Dam boulder weir retrofit was completed this year and construction initiated on September 7th, 2011 and completed on October 1, 2011. This project restored access to about 10 miles of habitat (FRP Action 3).

Cosumnes River – Post-project monitoring for the Cosumnes River Passage Improvement Project was completed for 2011 and will continue in 2012. This project improved fish passage at Rooney Dam and restored access to about 10 miles of habitat (Evaluation 2).

Additionally, AFRP provided FY11 funding to develop final designs, planning, and permitting to re-connect sloughs and floodplains within the Cosumnes River Preserve. One site, Cougar Wetlands, has been surveyed and a conceptual design to restore 80-85 acres within three historic sloughs in the Delta has been developed (Delta Evaluations 4 and 6).

Merced River – AFRP staff developed a new agreement for rotary screw trap monitoring of outmigrant juvenile salmon. Outreach, planning, designs, and permitting for three different floodplain and channel restoration projects (FRP Action 3) were initiated in 2010 and continued through 2011. The flow parameters, topographic surveys, benthic macro-invertebrate sampling, and substrate quality assessments were completed for all three floodplain and channel restoration projects this year. Construction activities on the Merced River Ranch Project included placement of approximately 28,000 cubic yards of material for floodplain and rearing habitat. Once completed, the Merced River Ranch Floodplain Enhancement Project will restore up to 6 acres of riparian floodplain and 1.23 miles of spawning habitat.

The AFRP continued to participate in the FERC proceedings for the Merced Falls (P-2467) and Merced River Hydroelectric (P-2179) Projects (Actions 1 and 2; Evaluations 1 and 3). AFRP participated in multiple relicensing meetings in FY 11. Staff provided study proposals for a steelhead population assessment, egg viability/survival, and provided detailed comments on study plans for channel armoring, IFIM, and egg viability. AFRP is actively participating in the Merced River Technical Advisory Committee and developing ongoing partnerships with numerous stakeholders in the watershed.

Mokelumne River – AFRP purchased and placed 6,557 tons of spawning gravel for the Mokelumne River Spawning Habitat Improvement Project (FRP Actions 2 and 7). This project area is rigorously characterized and monitored each year for spawning use, bed form and function and provides a foundation project for the Spawning Habitat Integrated Rehabilitation Approach (SHIRA). The final report will be available after the project is completed in 2012.

In FY2011, AFRP staff worked with the EBMUD and other signatories of the Lower Mokelumne Joint Settlement Agreement to adaptively manage the system and coordinate fall pulse flows (40,000 acre feet) with Delta Cross Channel (DCC) operations in an effort to improve adult Chinook salmon returns (Delta Evaluation 5). In 2011, high water conditions allowed for spring pulse flows of 43,000 acre feet that was provided to assist outmigrating juvenile salmon and steelhead (Action 1 and Evaluation 1).

San Joaquin River – AFRP staff partnered with the California Department of Fish and Game (CDFG) to install VEMCO acoustic receivers in the San Joaquin River and continue an annual white sturgeon population assessment. Also, the AFRP documented spawning of white sturgeon in the San Joaquin River and partnered with USGS to map habitat-related physical characteristics along the San Joaquin River.

Stanislaus River – FY 2011 accomplishments included the collection of both juvenile and adult passage data via rotary screw trapping (juveniles) and

a fish counting weir (adults) operated in partnership with Tri-Dam. Phase 2 of a Chinook salmon migration study was completed this year. AFRP is partnering with CDFG and Cramer Fish Sciences to implant acoustic transmitters in O. mykiss captured in screw traps or other sampling activities to evaluate outmigration and survival. These studies assist with evaluating benefits resulting from habitat restoration actions. The final permitting was completed in 2011for Honolulu Bar and Lancaster Road floodplain and side-channel enhancement projects (FRP Action 2). Construction at Lancaster Road was completed, and Honolulu Bar was delayed by high-water conditions until next summer. These projects were designed to increase juvenile salmonid rearing habitat and decrease predation. The Lancaster Road Project restored 640 feet of riparian side channel habitat. The Honolulu Bar Project will restore 2.47 acres of riparian floodplain, create 0.7 acres of new floodplain, add 8,100 cubic yards of clean spawning gravel to the river, and restore 485 feet of side-channel habitat.

Tuolumne River – The Bobcat Flat Restoration Project continued to restore spawning, rearing and floodplain habitats in the Tuolumne River (FRP Action 2). All environmental compliance requirements were completed in FY 2011. Avian and reptile surveys were completed this year. Phase 2 of the Bobcat Flat Restoration Project was implemented and involved recontouring 8 acres of highly disturbed floodplain in order to restore about 1.6 miles of fall run Chinook salmon and Central Valley steelhead spawning and rearing habitat.

Stanislaus River Side Channel Restoration Project at Lancaster Road, Post Construction.

Trinity River Restoration Program

3406 (b)(1) "Other" & (b)(23)

The Trinity River Restoration Program (TRRP) is dedicated to the improvement of anadromous fishery resources in the Trinity River Basin. The program uses two authorities: CVPIA section 3406 (b)(1) "other" for river restoration and CVPIA section 3406 (b)(23) for delivering flows.

The Trinity River Mainstem Fishery Restoration Final Environmental Impact Statement (FEIS) completed in October 2000, and the Record of Decision (ROD), signed on December 19, 2000, established a comprehensive science-based adaptive management program to restore the fishery resources of the Trinity River. The 2009 Master Environmental Impact Report (Master EIR) on channel rehabilitation and sediment management for remaining phase 1 and phase 2 sites established the regulatory requirements for implementing physical river work required by the ROD.

The program is based upon the goal of restoring the naturally produced anadromous fishery resources of the Trinity River by restoring the attributes of a healthy, alluvial river system through implementing variable annual instream flows, physical channel rehabilitation, sediment management, watershed rehabilitation and floodplain infrastructure improvements. Together, these actions will increase habitats for all life stages of anadromous salmonids, increase juvenile production and lead to increased spawning escapement and harvest opportunities of dependent fisheries. Since the ROD was signed, the TRRP has focused its physical restoration activities—such as gravel placement and channel rehabilitation activities—on the upper 40 miles[1] of the Trinity River between Lewiston Dam and the confluence with the North Fork of the Trinity River. Other restoration activities such as flow releases and sediment transportation benefit the entire riverine system.

Wheel Gulch restoration site.

PERFORMANCE MEASURES

The overall success of the program is gauged by naturally produced spawner escapement numbers relative to the goal (target) set for each species, and contributions to dependent tribal and non-tribal fisheries. Annual targets are found in Table 6. To achieve this overall goal, the program implements actions in several key areas that support the establishment of a healthy riverine system. Actions include scheduling annual flow of water, placement of coarse sediment, reduction of fine sediment delivery from watersheds by implementing watershed rehabilitation activities and physical channel restoration projects.

1 "ISSUE PAPER FOR THE TRINITY MANAGEMENT COUNCIL, Is there a Causal Link Between Restoration Activities in the South Fork Trinity River and other Tributaries and the Trinity River Diversion of the CVP." This issue paper discusses the reasoning behind focusing restoration activities on the upper forty miles of the Trinity River.

Table 6: FY 2010 Salmonid Production, Natural vs. Hatchery

	Naturally Produced Adult Spawner Escapement[2]				Trinity River Hatchery Produced– Adult Spawner Escapement[3]			
	Fall chinook[4]	Spring Chinook[5]	Fall Steelhead[6]	Coho[7]	Fall Chinook[4]	Spring Chinook[5]	Fall Steelhead[6]	Coho[7]
Target	62,000	6,000	40,000	1,400	9,000	3,000	10,000	2,100
2010	20,876	4,477	3,811	817	8,953	3,880	4,640	5,852
Average	14,188	5,483	4,170	1,890	18,827	9,285	12,556	12,282

[1] Data compiled by DFG. Means are from 1992 to 2010 unless otherwise noted.

[2] Estimates of naturally-produced adult salmonid spawner escapement for combined natural and hatchery spawning areas.

[3] Estimates of hatchery-produced adult salmonid spawner escapement for combined natural and hatchery spawning areas.

[4] Fall Chinook estimates upstream of Willow Creek weir 1992 - 2010. Trinity River Basin estimate for 2001 - 2010 (assumes no straying of hatchery produced spawner escapement downstream of Willow Creek weir).

[5] Spring Chinook estimates upstream of Junction City weir combined with dive counts for the South Fork Trinity River and miscellaneous tributaries. Data were not collected in 1995 due to funding constraints.

[6] Fall-run steelhead estimates upstream of Willow Creek weir for all years of data collected. Does not include summer- or winter-run steelhead estimates. Data were not collected from 1997 to 2001 due to funding constraints.

[7] Coho estimates upstream of Willow Creek weir for all years after 1997

Flows – The program releases between 369,000 and 815,000 AF each year, in accordance with the ROD. The annual volume target and peak flow varies according to the water year type.

Placement of coarse sediment – The program may place up to 10,000 CY, on average, of coarse sediment annually.

Fine sediment delivery and storage – The program aims to reduce fine sediment delivery from tributary watersheds by 10,000 to 20,000 CY annually. Additionally, the goal for fine sediment management is to transport as much or more fine sediment downstream as is delivered to the upper river from tributary watersheds to reduce in-channel storage.

Channel rehabilitation – The goal of the channel rehabilitation component of the program is to restore functioning alluvial river attributes and increase salmonid freshwater habitat. The ROD calls for 44 bank rehabilitation projects and 3 side channels, which combine to make 47 sites. Channel restoration progress is currently measured by the number of completed sites. The final measure of the success of channel rehabilitation projects will be their effectiveness of promoting a dynamic alluvial river in conjunction with high flows and coarse sediment augmentation to increase salmonid habitat and restore the Trinity River fishery resources. This is being evaluated through the Program's adaptive management process.

Other - In addition to the action oriented performance measures listed above, the TRRP has developed performance measure documents that provide information pertaining to key metrics that are used to evaluate status and trends of these parameters. These Include: Temperature Target Performance; Chinook and Coho Salmon Rearing Habitat; Abundance of Naturally Produced Juvenile Chinook Salmon; Spawning Escapement of Naturally Produced Salmonids; Proportion of Natural Origin Salmonids Contributing to Total In-River Run; Distribution of Natural-Origin Chinook Salmon Spawners; Abundance Patterns Over Time of Riverine Birds; Abundance Patterns Over Time for Riparian Birds,; and Comparison of Turtles on the South Fork Trinity and Mainstem Trinity. These documents can be found at: www.trrp.net/?page_id=490

FY 2011 ACCOMPLISHMENTS

In FY 2011, the Trinity River Restoration Program obligated $3,503,949 from the Water & Related Resources Fund (b)(23), $8,655,938 from the Water & Related Resources Fund (b)(1) "other", Restoration Funds of $988,819, and American Recovery and Reinvestment Act (ARRA) funding was $41,296.

Flows – Water volume peak flow was modified to an 11,600 cfs release to facilitate geomorphic processes, especially at newly constructed channel rehabilitation sites. The ROD prescribed peak flow for a wet water year is 8,500 cfs (see Table 7 for ROD flows).

Course Gravel and Channel Rehabilitation – As shown in Table 8, the program added 5,300 CY of coarse gravel to the river during high flows this year and completed the first of its phase 2 channel rehabilitation projects at Wheel Gulch (see Table 9). Watershed projects implemented in FY 2011 will keep approximately 9,600 CY of fine sediment out of the mainstem. In addition, the condition of the bed indicates that more fine sediment was transported downstream than came into the upper 40 miles of the Trinity River. The program also continued planning and engineering for the next four channel rehabilitation projects.

Monitoring and Assessment – approximately $4 million was obligated in FY 2011 to include stream gaging, sediment transport, course and fine sediment budgets, smolt outmigration population size and timing, adult spawning escapement separated by natural and hatchery, sport and tribal harvest, system wide habitat assessment, evaluation of habitat produced through construction, riparian vegetation recruitment and encroachment and system wide bird abundance . Results from salmon production monitoring is below in Table 6.

Table 7: Annual ROD Flows and Peak Releases to Trinity River, 2006-2011

Fiscal Year	Water Year Type	ROD Flow Target	ROD Flow Provided*	Peak Releases (cfs)
2006	Extremely wet	815,000 AF	809,900 AF	10,100
2007	Dry	453,000 AF	453,700 AF	4,750
2008	Normal	647,000 AF	648,700 AF	6,470
2009	Dry	453,000 AF	445,500 AF	4,410
2010	Normal	647,000 AF	656,700 AF	6,840
2011	Wet	701,000 AF	721,800 AF	11,600

* Computed flow volume ± 5% based on stream flow measurement accuracy.

Table 8: Placement of Coarse Gravel by Year (7,000 Cubic Yard Target), 2003-2011

Fiscal Year	Gravel Augmentation Location	Gravel * (CY)	Total per Year* (CY)
2003	Cableway	2,000	2,000
2006	Hatchery	1,600	1,600
2007	Hatchery	4,300	4,300
2008	High Flow Injections	2,300	12,300
	Lewiston-Dark Gulch	10,000	
2009	High Flow Injections	2,300	8,000
	Sawmill	5,700	
2010	High Flow Injections	3,100	13,500
	Lowden Ranch Area and Reading Creek	10,400	
2011	High Flow Injections	5,300	5,300
		Total	**47,000**

* Volume for mobile coarse gravel only. Reported volumes do not included oversized gravel or structural gravel to build permanent in-river features.

Table 9: Rehabilitation Site Construction Summary, 2005-2011

Fiscal Year	Rehabilitation Site	Number of Sites	Earth-work (CY)	Feet of Large Wood Habitat Structures	River Miles	Acres Treated
2005	Hocker Flat (complete)	1	83,000	0	1.0	26
2006	Canyon Creek Sites (complete)	4	91,000	100	1.7	40
2007	Indian Creek Sites (complete)	3	77,800	200	2.8	31
2008	Lewiston and Dark Gulch Sites (complete)	8	56,900	200	3.7	42
2009	Sawmill and Steel Bridge Day Use* (complete)	2	87,750	260	0.8	25
2010	Lowden, Trinity House Gulch, Reading Creek	5	202,600	300	2.4	36
2011	Wheel Gulch (complete)	1	48,000	200	0.3	7
	Total	**24**	**647,050**	**1,260**	**12.70**	**207**

* The No-Action alternative was chosen for the Steel Bridge Day Use Project Site.

Spring Chinook salmon spawning in the mainstem Trinity River

Dedicated 800,000 acre-feet Project Yield

3406 (b)(2)

CVPIA authorizes a portion of the CVP project yield to be dedicated and managed for the benefit of fish and other wildlife. Interior has the responsibility to annually dedicate and manage up to 800,000 AF of CVP (b)(2) water for fish, wildlife and habitat restoration purposes. This water includes both CVP releases and decreased CVP export pumping, relative to a hypothetical pre-CVPIA baseline operation (base case). This accounting is applied specifically to changes in operations on the American River (Nimbus Dam), Sacramento River (Keswick Dam), Stanislaus River (Goodwin Dam), Clear Creek (Whiskeytown Dam) and the Delta pumps (Jones Pumping Plant). The management of (b)(2) water is partially informed by the Anadromous Fish Restoration Plan (AFRP) developed per Section (b)(1), and the results of Instream Flow Incremental Methodology (IFIM) studies, undertaken as part of Section (b)(1)(B), which identify optimal flow, temperature needs, and timing for the life stages of anadromous fish.

The Dedicated Yield Program (DYP) actions affecting fish fall into the following categories:

- Instream flow augmentations on CVP-controlled streams intended to protect salmon and steelhead, as well as contribute toward meeting Anadromous Fish Restoration Program (AFRP) Final Restoration Plan flow objectives
- Increased releases from Goodwin Reservoir to help meet the Water Quality Control Plan (WQCP) requirements for San Joaquin River flows at Vernalis for fish and wildlife standards
- Increased releases from Keswick and/or Nimbus reservoirs to help meet the WQCP fish and wildlife standards
- Export reductions at the CVP Jones pumps to protect at-risk fish species, notably salmon, steelhead and delta smelt, and to help meet the WQCP Delta standards

PERFORMANCE MEASURES

Annual contribution – Reclamation annually contributes up to 800,000 AF of water from CVP facilities. In dry years, the target may be reduced to 700,000 AF. In critically dry years, the target may be reduced to 600,000 AF.

Contribution to fisheries habitat goal – The 800,000 AF of water contributes towards the 1,000,000 AF fishery habitat goal. The Section (b)(3) Instream Water Acquisition Program contributes the balance, up to 200,000 AF, towards this goal, as described in the CVPIA record of decision (ROD).

FY 2011 ACCOMPLISHMENTS

The program obligated $698,000 from the Restoration Fund in FY 2011.

The full 800,000 AF of (b)(2) water was available for fish actions in water year 2011. Table 10 presents the historic allocation and use of (b)(2) water. Table 11 summarizes how 348,800 AF of (b)(2) water was used in 2011 by location for fish and wildlife purposes. The remaining 451,200 AF of unused water remained in system for other project purposes.

Monies for this program activity fund real-time fish monitoring which informs when and where fish actions should be taken. On a weekly basis, fishery biologists from the Sacramento, San Joaquin and Delta regions report on fish movements to a B2 Interagency Team (Team). The Team, including fishery biologists from

FWS, USBR, NOAA, CDFG, and DWR, evaluate the data and collaboratively decide where to apply CVPIA (b)(2) water. Interior provides detailed accounting of (b)(2) fish actions at www.usbr.gov/mp/cvo.

Table 10: Allocation Target and Use of (b)(2) Water, 2001-2011

		Allocation of (b)(2) Water	Use of (b)(2) Water		
Year	Water Year Type*	(b)(2) Allocation Target (acre-feet)	Allocated Flow** (acre-feet)	Unused*** (acre-feet)	Banked (acre-feet)
2001	Dry	800,000	798,000		
2002	Dry	800,000	793,000		
2003	Above Normal	800,000	796,000		
2004	Below Normal	800,000	800,000		
2005	Above Normal	800,000	672,000		128,000
2006	Wet	800,000	422,000	183,000	195,000
2007	Dry	800,000	798,000		
2008	Critical	600,000	600,000		
2009	Dry	600,000	600,000		
2010	Below Normal	800,000	800,000		
2011	Wet	800,000	348,800	451,200	

* Water Year Type is based on the Sacramento Valley Index.
** Total water volume accounted for as (b)(2)
*** Section 3406 (b)(2)(D): If the quantity of water dedicated under this paragraph, or any portion thereof, is not needed for the purposes of this section, based on a finding by the Secretary, the Secretary is authorized to make such water available for other project purposes.

Table 11: FY 2011 Use of (b)(2) Water by Location

River	Action	Timeframe	Results
American	None	None	WY 2011 was classified as wet in the Sacramento River basin. No (b)(2) actions taken.
Clear Creek	WY 2011 was classified as wet in the Sacramento River basin. (b)(2) water was used to augment base case flows	October 1, 2010 – September 30, 2011	Contributed to AFRP Final Restoration Plan flow objectives and improved instream conditions for fall-run Chinook, spring-run Chinook and steelhead during spawning, incubation, rearing and downstream migration.
	(b)(2) water was used to provide short pulse flow.	May 2011	Contributed to AFRP Final Restoration Plan flow objectives and provided pulse flow to attract adult spring-run Chinook salmon to suitable spawning areas.
Sacramento	(b)(2) water used to augment would-be base flows to maintain 3800 cfs	February 2011	Contributed toward AFRP Final Restoration Plan flow objectives and improved instream conditions for late fall- and fall-run Chinook spawning and emergence.
Stanislaus	(b)(2) water used to augment base case flows	October 2010	Provided pulse flow to attract adult fall-run Chinook salmon to suitable spawning area
	(b)(2) water used to augment base case flows	October 2010 – March 2011	Contributed toward AFRP Final Restoration Plan flow objectives and improved instream conditions for fall-run Chinook and steelhead for spawning/rearing.
CVP Jones Pumping Plant	Reduction in CVP exports accounted as (b)(2) water since sufficient assets were expected to be available to cover future primary purpose actions	March 2011	Compliance with NMFS Old and Middle River requirement
	Federal exports were reduced pursuant to the NMFS BO. This year the reduction was accounted as a (b)(2) expenditure.	May 2011	Benefitted out-migrating salmon and steelhead smolts. Concurrent benefits to delta smelt.

Holding salmon in Clear Creek.

Water Acquisition Program – Instream Water

3406 (b)(3) & (g)

The Instream Water Acquisition Program (Instream WAP) acquires water to supplement the 800,000 acre-feet (AF) of CVP yield that is dedicated to fisheries. The increased flows benefit numerous resident and anadromous fish species, but primarily benefit Central Valley Chinook salmon, the majority of salmon produced in California. At times, this species has accounted for up to 70% or more of the statewide commercial harvest.

The Instream WAP primarily manages an agreement with the San Joaquin River Group Authority (SJRGA) and its member agencies to provide additional spring and fall fishery flows on the Stanislaus, Tuolumne, Merced, and lower San Joaquin rivers. The flows are used in support of the San Joaquin River Agreement (SJRA) and the Vernalis Adaptive Management Plan (VAMP), which is a scientifically based fishery management plan to determine the relationships between flows, exports, and other factors on fish survival in the Sacramento-San Joaquin Delta. In support of the 2009 National Marine Fisheries Service (NMFS) Operations Criteria and Plan (OCAP) Biological Opinion, the VAMP program is currently funding studies to confirm the outmigration success of salmon smolts. The smolts are released upstream of Vernalis, CA and are recaptured in the western delta.

Water acquisition for CVPIA-designated refuges and wildlife management areas is discussed in Section 3406 (d)(2), Refuge Water Acquisition Program (Refuge WAP).

PERFORMANCE MEASURE

Acquire up to 200,000 AF per year to supplement the 800,000 AF dedicated from CVP yield to meet the fisheries flow objective of 1,000,000 AF (per ROD, CVPIA Final PEIS, Jan 2001).

FY 2011 ACCOMPLISHMENTS

The Instream WAP obligated $6,799,000 from the Restoration Fund and $1,404,887 from the State of California Cost Share Fund in FY 2011. The Instream WAP used this funding to acquire a total of 38,500 AF in these areas:

- 12,500 AF for Merced River and Lower San Joaquin River pursuant to the VAMP/SJRA.
- Completed final year of SJRA contract for the ability to use up to 110,000 AF for VAMP spring pulse flows. However, no additional flows were required in April and My 2011.
- 26,000 AF for Stanislaus and lower San Joaquin River flows, along with water quality and other authorized New Melones purposes.

Table 12 shows the instream water acquisitions from 1994-2011.

Table 12: Annual (b)(3) Instream Water Acquisitions, Toward 200,000 Acre-Feet Target, 1994-2011

Year	AF Acquired	% of 200,000 AF target
1994	76,441	38
1995	0	0
1996	16,161	8
1997	155,983	78
1998	80,000	40
1999	224,498	112
2000	108,880	54
2001	109,785	55
2002	68,105	34
2003	91,526	46
2004	98,211	49
2005	38,500	19
2006	38,500	19
2007	114,645	57
2008	106,490	53
2009	38,500	19
2010	62,480	31
2011	38,500	19
Average	**81,511**	**41**

Tracy (Jones) Pumping Plant Program

3406 (b)(4)

The Tracy (Jones) Pumping Plant's six pumps, each capable of pumping 767 cfs into the Delta Mendota Canal, are powerful enough to alter stream flow in the Delta and the San Joaquin River Basin. This disorients migratory fish and draws them toward the pumps where they can become entrained, or trapped.

To mitigate entrainment, the Tracy Fish Collection Facility (TFCF), located upstream of the pumping plant, collects migratory fish and transports them to the Delta where they can resume outmigration to the ocean. The focus of the (b)(4) program is to improve fish protection and salvage through development of new technologies. Ongoing monitoring of the program's effectiveness helps define best practices that inform decision-making and long-term planning at Tracy and other South Delta facilities.

PERFORMANCE MEASURES

The Tracy (Jones) Pumping Plant program (TPPP) develops and implements actions to mitigate impacts to fisheries, targeting the 23 actions included in The Tracy Fish Facility Improvement Program Plan, as shown in Table 13.

FY 2011 ACCOMPLISHMENTS

The program obligated $2.2 million from Water & Related Resources program for the Tracy Fish Collection Facility; and $15,000 from the Bay-Delta Program for the Two Gates Fish Demonstration Project.

Actions to Improve Tracy Fish Collection Facility

The program continued engineering and biological assessments in support of Actions 17 and 18, which will improve the louver cleaner systems and allow the louvers to screen fish more efficiently. Also, continued to work on design details towards eventual completion of Action 19, which will result in the development of land to better Reclamation's ability to conduct research onsite and improve fish protection at the TFCF. Conceptual design and options in support of Action 20 were completed as well. Action 20 is intended to reduce fish predation, debris management, hydraulic control, louver screening, and fish transfer impacts through the construction of a new secondary screening and transfer system. Continued assessments were also conducted in support of Action 23

In addition to the 23 actions listed in Table 15, the program also completed a number of studies that will improve fish capture and reintroduction capabilities. The studies include salvage efficiency tests for delta smelt, evaluation of predatory impacts within the secondary system of the TFCF, and obligated schooling of threadfin shad during simulated transportation.

Some of these studies are related to specific RPA action items and some are included in the facility assessment program. The facility assessment program is needed in order to understand present day operational characteristics so as to have a baseline to compare improvements to and also figure out which technologies and concepts to apply to the eventual physical improvements.

Table 13: Summary of Progress Towards 23 Tracy Fish Facility Improvement Program Plan Actions

	Actions	Start Date	Completion Date
1	Implemented periodic predator removals	1992	"ongoing"
2	Upgraded instrumentation at the TFCF	1992	1993
3	Replaced high pressure utility pump with low pressure utility pump	1995	1996
4	Epoxy coated recessed collection tanks	1997	1997
5	Constructed aquaculture facility onsite	1997	2005
6	Constructed extraction device for Chinese mitten crabs/debris removal	1998	1999
7	Installed air system in recessed collection tanks	1999	1999
8	Developed onsite laboratory for fish taxonomic work	1999	1999
9	Added air system to fish haul trucks	2000	2000
10	Upgraded fish count area to accommodate DNA sampling & fish ID	2000	2000
11	Updated fish identification key for training of operators	2000	2000
12	Replaced worn ("leaky") bypass transition boxes	2003	2004
13	Replaced fish transfer bucket with new/improved fish transfer bucket	2006	2008
14	Replaced fish haul trucks with new/improved fish haul trucks	2006	2008
15	Constructed new biological resources building	2006	2010
16	Replaced existing trash rack cleaner with new/improved trash rack cleaner	2006	2010
17	Replace primary louvers/cleaners with new primary louvers/cleaning system	2006	2017*
18	Replace secondary louver/cleaners with new secondary louvers/cleaning system	2006	2014*
19	Develop land onsite to improve ability to conduct research and operate the facility	2006	2018*
20	Construct new secondary screening and transfer system	2010	2016*
21	Construct new aquaculture facility onsite	2012	2020*
22	Automate velocity control pumps for the fish bypass system	2013	2014*
23	Construct third fish release site	2014	2016*

* Estimated Completion Date

Contra Costa Canal Pumping Plant

3406 (b)(5)

The Contra Costa Canal is essential to the Contra Costa Water District, delivering water from the Delta to the district's treatment facilities and raw-water customers. The canal is 48 miles long, starting at Rock Slough in East Contra Costa County and ending at the Terminal Reservoir in Martinez. Four pumping stations currently lift water 124 feet above sea level from Rock Slough, and then gravity propels the water to its terminus in Martinez.

Contra Costa Pumping Plant No. 1 is located at the head of the Contra Costa Intake Channel. Without adequate screening or alternative mitigation, the operation of the Contra Costa Pumping Plant No. 1 results in fish mortality. In addition to the CVPIA mandate, the 1993 Los Vaqueros BO and the 2009 NMFS OCAP BO require that a fish screen be built at Rock Slough. A screen, 320-feet in length, was designed to match the flow of the Contra Costa Canal Intake Channel at the Rock Slough Fish Screen and to keep fish from entering the Contra Costa Canal intake. This will minimize the entrainment and loss of fish, fulfill legal requirements of the U.S. Fish and Wildlife Service's Los Vaqueros Biological Opinion for the threatened Delta smelt, and complete Central Valley Project Improvement Act, Section 3406(b)(5) requirements.

PERFORMANCE MEASURES

The Contra Costa program (CCP) mitigates fishery impacts with operational changes and installation of structures, including a fish screen.

FY 2011 ACCOMPLISHMENTS

The CCP obligated funding from a variety of sources: $2.4 million from the American Reinvestment and Recovery Act (ARRA), $13,396 from the Water & Related Resources Fund, and $4,622 from the Bay-Delta Fund.

In 2011 the CCP finished the third and final construction phase of the fish screen structure. Through the year the major components of the fish screen were assembled. In November (FY 2012) the fish screen was substantially complete and operational.

Construction of the Rock Slough Fish Screen substantially complete and operational. This project is located where the Contra Costa Canal Intake Channel is diverted off Rock Slough.

Red Bluff Diversion Dam

3406 (b)(10)

The Red Bluff Diversion Dam (RBDD) is located on the Sacramento River about 2.5 miles southeast of the city of Red Bluff. The dam has 11 gates that, when partially closed, divert water to the Tehama-Colusa and Corning canals to provide water for farmers, the Sacramento National Wildlife Refuges (SNWR), and minor municipal and industrial uses. In the summer, the dam creates a seasonal lake in a wide portion of the Sacramento River, attracting recreational users

Construction of the dam has impaired the ability of Chinook salmon to reach historic spawning habitat. To address this impact, a number of operational modifications have been tried and tested since 1986 when the gates were first raised to allow passage from December to April. By 1992, the winter-run population numbers had declined dramatically; an estimated 191 adults returned that year, resulting in winter-run Chinook being placed on the Endangered Species Act List. As a result the program began lifting the gates as an operational measure to promote species recovery. The gates were open for longer periods of time between 1992 and 1994, allowing winter-run population numbers to increase to approximately 20,000.

Operation of the dam gates also blocks passage of green sturgeon during their spawning migrations. Green sturgeon in the Sacramento River were listed as threatened under the ESA in 2006.

The NMFS' 1993 BO on the CVP/SWP operation required that the gates be raised September 15th to May 14th, beginning in 1994. The BO effectively moved the beginning date back from November 1 to September 15th to encourage spawning activity

Concrete complete on the pumping plant in FY 2011. Looking from downstream to upstream.

further upstream and moved the ending date forward from April 30th to May 14th to reduce predation losses at the gates (NMFS 1993b, p. 54)

Until 2011, two temporary pumping plants allowed the gates to remain open for 10 months each year (September - June). Although gate operations enabled the fall-run Chinook populations to increase in numbers, the spring-run Chinook populations continued to be impacted. As a result, the 2009 NMFS OCAP BO required the gates be raised year-round after 2011. The temporary pumping plant did not meet the capacity needs to deliver year-round irrigation supplies to local farmers. Therefore, the ability to meet the irrigation demand for 150,000 acres of agricultural land in the Tehama-Colusa Canal Authority would be severely compromised, if the new facility is not completed by May of 2012. The long-term solution is the construction of a new permanent pumping plant that will allow the RBDD gates to remain open year-round, without affecting deliveries to water contractors and the Sacramento National Wildlife Refuge (SNWR).

PERFORMANCE MEASURES

The Red Bluff Program's (RBP) current goals include passage of 80–100% of adult spring-run salmon, the run that continues to be significantly blocked. The RBP aims to achieve this target while maintaining water deliveries. This measure includes monitoring to confirm the successful passage of spring-run salmon above and below the dam.

Passage of 50-100% of adult green sturgeon is also targeted while maintaining water deliveries to SNWR and other water contractors. This measure includes monitoring to confirm the successful passage of green sturgeon above and below the dam.

The last goal of the RBP is to develop capacity for conveyance of 115,000 acre-feet (AF) of refuge water to the SNWR Complex on the west side of the Sacramento River. This performance measure was met in 1999 when a siphon was installed on the GCID Canal at Stony Creek to allow year-round deliveries. The new pumping plant will provide a backup to conveyance via GCID's facilities.

FY 2011 ACCOMPLISHMENTS

In FY 2011, the RBP obligated funding from a variety of sources:

- $22,267,909 from Water and Related Resources Fund
- $7,289,444 from the American Recovery & Reinvestment Act Fund
- $2,704,647 from the State of California Cost Share Fund

Pumping Plant and Fish Screen

Construction of the new, 2,500-cfs permanent pumping plant and fish screen progressed during FY 2011:

- The Bridge, Siphon and Canal contract moved to being nearly complete in FY 2011 with the completion of the bridge and siphon. Significant progress was made on the canals and landfill closure that were part of this project.
- The pumps and motors were fabricated and delivered to the project during FY 2011. They will be installed and tested by the Pumping Plant/Fish Screen Contractor.
- The concrete work on the Pumping Plant was completed during FY 2011 and most of the forebay excavation and fish screen concrete work was completed.

The Pumping Plant and Fish Screen are on schedule to deliver water to the Tehama Colusa Canal in May, 2012.

Passage of Spring-Run Salmon

On June 15, 2011, the RBDD gates were lowered but were kept open a minimum of 18 inches to allow the safe passage of out-migrating adult green sturgeon. Two acoustically tagged adult green sturgeon successfully passed through and were subsequently detected downstream by mobile tracking and stationary receivers.

Based on latest gate operations of the facility, approximately 80% of adult spring-run Chinook achieved unimpeded upstream passage in FY 2011.

Compliance with 2009 NMFS BO – The RBP continued green sturgeon studies, in compliance with the BO-required actions. In FY 2011, egg sampling occurred over a 94-river-kilometer range between Jelly's Ferry Bridge and Highway 32/Gianella Bridge. Preliminary results indicate that green sturgeon spawning occurred from early April to late June, and larvae are emerging from the spawning grounds between May and August.

Furthermore, spawning adults have been found to spawn in the tailrace of the dam in most years (including 2011) and, at times, in locations that are detrimental to the production of recruits due to RBDD operations and the physical disturbance (in terms of sediment) created by water flowing underneath RBDD gates. Finally, knowing the basic life history of this listed species in relation to current water resource management mandates (i.e., winter run temperature compliance targets), allows managers to better formulate recovery actions for this species in a highly regulated river system such as the Sacramento that has a number of ESA listed species to be concerned with presently and in the future.

Fish Screen with concrete placement and forebay excavation mostly complete in FY 2011.

Clear Creek Restoration Program

3406 (b)(12)

Clear Creek suffered widespread degradation through the 20th century due to several factors, including construction of McCormick-Saeltzer Dam in 1903, construction of Whiskeytown Dam in the 1960s, and aggregate and gold mining activities. These actions led to precipitous drops in Chinook salmon and steelhead spawning and juvenile production. In order to reverse the trend, CVPIA is implementing a restoration program to improve instream habitat, allowing greater spawning and rearing success.

PERFORMANCE MEASURES

The Clear Creek Restoration Program (CCRP) focuses on the following areas and uses the following goals to track progress: fish passage; erosion control; gravel placement (creation of spawning habitat); channel restoration; instream flow and temperature of flow releases. All of these goals are in support of the overall CCRP objective of restoring fish populations in Clear Creek, and increasing natural production, to meet the annual target of 7,100 for fall-run Chinook in Clear Creek. Although there is no doubling target for spring-run Chinook on Clear Creek, restoration actions will also help increase spring-run Chinook populations, contributing to the CVPIA's Central Valley-wide goals.

Fish Passage – The fish passage target was achieved in 2000, when McCormick-Saeltzer Dam was removed, opening 12 additional miles of habitat to fish passage.

Sluicing (injecting a "slurry" of water and spawning gravel) into Clear Creek upstream of the Peltier Campground during a FY 2011 gravel injection project where the site is inaccessible by dump truck

Erosion Control – The erosion control target was achieved ahead of schedule. All feasible and cost-effective erosion control projects initially identified were completed by 2001 and the necessity for further work will need to be determined.

Gravel Placement (Creation of Spawning Habitat) – The CCRP goal is to replenish Clear Creek spawning habitat areas with approximately 17,000 tons of gravel every year. Gravel placement contributes to the restoration of the 347,288 square feet of spawning habitat that existed before the construction of Whiskeytown Dam.

Channel Restoration – The CCRP is restoring 2 miles of stream channel to support successful spawning and rearing.

In-stream Flows and Temperature of Flow Releases – The CCRP provides instream flows, depending on hydrology and biological conditions, to ensure that flow volumes and temperature meet habitat needs for successful spawning and rearing. Using (b)(2) water and coordinating with operators, the CCRP aims to provide water at 60°F June 1–September 15, and 56°F September 16–October. The goal is to meet these targets at least 98% of days, with no more than two consecutive days of releases when exceeding the temperature target. The timing of flows benefit both spring run and fall run Chinook but are especially important to spawning spring run Chinook as they can only spawn in water cold enough to sustain eggs through their incubation period.

Since 1999, studies have been undertaken by CVPIA and CALFED to develop channel maintenance flows, which are vital for providing and maintaining spawning and rearing habitat in Clear Creek. In 2008 FWS and CALFED contracted to facilitate a pilot re-operation of Whiskeytown reservoir to achieve the channel maintenance flow prescription. This Environmental Water Program prescription calls for the re-operation of Whiskeytown Dam, between March 1 and May 15, to produce a Glory Hole spill event that results in a minimum target release of 3,250 cfs for a one-day duration. This event would occur seven times in a ten-year period. Flows of this magnitude and duration could reactivate fluvial geomorphic processes to re-create and maintain diverse instream and floodplain habitat required to support and recover aquatic and riparian species. This flow prescription is also required in the NMFS OCAP BO.

Monitoring and Adaptive Management – Although this is not a distinct goal for the CCRP, monitoring and adaptive management are important because these activities help the CCRP address limiting factors and achieve greater success in meeting its goals and RPAs.

FY 2011 ACCOMPLISHMENTS

In FY 2011, the CCRP obligated $679,838 from the Restoration Fund and $280,793 from the Water and Related Resources Fund.

Gravel Placement (Creation of Spawning Habitat) – A total of 10,000 tons of gravel was placed in Clear Creek in 2011 representing 58% of the annual target. More than 21,000 square feet of spawning habitat was created by the FY 2011 gravel placement projects.

- Gravel was placed in five sites during 2011: below Whiskeytown Dam, below Dog Gulch Creek, Above Peltier Bridge, Paige Bar (below Peltier Bridge), and below NEED Camp (Guardian Rock site).

The second annual evaluation of spawning gravel implementation and monitoring was submitted to NMFS as a requirement under the OCAP BO. Studies in 2011 suggested that gravel sizes specification should be modified in future years to improve use by spring Chinook. The FWS and BOR began cooperatively developing a new specification that will be tested during FY 2012.

Channel Restoration – Phase 3C, the last phase of the restoration project, will be considered for implementation in future years. On-going analyses are expected to result in final recommendations by the end of FY 2013.

Instream Flows and Temperature of Flows – The CCRP met its goal of providing base flows of 200 cfs between October 1–May 31. In addition, two pulse flows were provided during spring 2011 to help attract spring-run Chinook to Clear Creek. Although the spring-run population numbers continued to decline, and the numbers of spring-run Chinook (7) were low

in 2011, the pulse flows are beneficial in attracting fish and promoting upstream movement. Similar flows will occur each year as directed by the NMFS OCAP BO.

Water temperature targets were partially met. The 60°F target from June 1 through September 15 was achieved 77% of the time due to necessary instream dredging required for a one-time removal of toxic waste from the Spring Creek arm of Keswick Reservoir. All of the exceedances occurred during the 56°F spawning and incubation period when the target was met only 26% of the time.

In 2011, 2 Instream Flow Incremental Methodology (IFIM) reports were finalized after peer review. Work continued on bio-validation of the models. The resulting 14 IFIM flow-habitat models will be synthesized with population, temperature, and restoration information in 2012 to provide flow prescriptions that optimize habitat needs for all species, runs and life stages of salmonids in the different reaches of Clear Creek, throughout the year.

Instream Flows - Environmental Water Program – In FY 2011, CCRP entered into contracts to further the Environmental Water Program which aims to identify and discuss data gaps and uncertainties, understand operational tools, identify resources needed, ensure safety-of-dams considerations, and mitigate for foregone power revenues. Preparations were made for an October 2011 workshop to facilitate this Program.

Adaptive Management and Monitoring – In 2011, topographic surveys quantified the amount of fine sediment delivered to Clear Creek via a sub-watershed that experienced a substantial wildfire in 2008. Results indicated that sediment removal, erosion inventory and erosion control should be done in future years. Additionally, spawning studies for channel restoration phases 3A and 3B took place, showing that the amount of spawning habitat was greatly increased in both phase 3A and 3B, but juvenile rearing habitat in phase 3B may need improvements in the future.

In 2010, the fall-run Chinook escapement was 7,192, over double of the 3,228 fall-run Chinook observed on in 2009. These numbers indicate that despite a Central Valley-wide collapse of the fishery, the CCRP is continuing to sustain fall-run Chinook populations.

Downstream of the Peltier Campground, a truck prepares to place gravel on bank of Clear Creek. The gravel is mobilized downstream during high flow events

Spawning and Rearing Habitat Restoration Program

3406 (b)(13)

In a free-flowing river, rocks, gravel, dirt and other substrates are continually moving downstream, providing suitable habitat for successful spawning and juvenile rearing. The construction of CVP dams has had a dramatic impact on streams, by impeding this natural process.

The (b)(13) program represents a continuous effort to restore spawning and rearing habitat in three Central Valley streams:

- Upper Sacramento River, from Keswick Dam to the Red Bluff Diversion Dam
- American River downstream of Nimbus Dam
- Stanislaus River downstream of Goodwin Dam

The Spawning and Rearing Habitat Program (SRHP) focuses on sites that are thought to have the most benefit to increase the quality and quantity of spawning and rearing habitat. Two criteria guide the identification of gravel placement sites: the need for spawning habitat; and accessibility to the river by truck, helicopter or sluice to deliver the gravel.

Aerial photos, redd (fish egg "nests") surveys, snorkel surveys and boat surveys are used to identify areas for gravel augmentation. Prior to placing gravel, baseline data is collected using aerial photos, spawning surveys and rearing surveys. Once the gravel is placed, the SRHP monitors the spawning and rearing occurring at and near the restored sites to determine the program's effectiveness.

The SRHP relies on other river-wide monitoring to evaluate population level effects. This consists of adult escapement surveys conducted by the Department of Fish and Game in the Sacramento, American (Reclamation funded), and Stanislaus (Reclamation funded) rivers; juvenile production monitoring conducted by the Service in the Sacramento River

Gravel injection in the Sacramento River just below Keswick Dam.

(Reclamation funded), and private contractor in the Stanislaus River (CVPIA funded). No juvenile production monitoring is currently occurring in the American River. Adult escapement and juvenile production monitoring provides information on the number of juvenile emigrants produced per spawner.

PERFORMANCE MEASURES

The SRHP places gravel in the Sacramento, Stanislaus and American rivers on an annual basis to improve spawning and rearing habitat. The annual program targets are 10,000 tons on the Sacramento River, 3,000 tons on the Stanislaus River, and 7,000 tons on the American River.

The program also monitors the effectiveness of gravel placement by surveying for several indicators. The number of redds per square meter indicates whether salmon find the gravel appropriate for spawning (0.03 redds/square meter is a standard guideline). The level of egg retention in females indicates whether there are a sufficient number of suitable sites to spawn

Before (top) and after (bottom) gravel placement in the American River at upper Sunrise. Note the rewatered side channel and gravel placement area.

(less than 10% retention is a standard guideline). The percentage of salmon using emplaced gravel indicates whether the program is providing habitat that is suitable (the program aims for 10% on the Stanislaus River and 25% on the Sacramento and American rivers).

FY 2011 ACCOMPLISHMENTS

In FY 2011, the SRHP obligated $899,951 from the Restoration Fund.

Sacramento River – In 2011, the program placed 5,000 tons of gravel just below Keswick Dam, or 50% of the annual target of 10,000 tons. Within the gravel placement reach, monitoring showed a 6% winter run Chinook salmon spawning rate.

Stanislaus River – In 2011, the program placed 5,000 tons of gravel in Goodwin Canyon. Monitoring studies indicate that approximately 21% of spawning Chinook salmon used gravel placed by the program.

American River – In 2011, the SRHP placed 20,770 tons of gravel at upper Sunrise Park, 297% of the annual target of 7,000 tons. This included 10,340 tons of spawning sized material and 10,430 tons of oversized material used for side channel habitat restoration. Overall, the results indicate that there were plenty of gravel sites to choose from in FY 2011, allowing for a lower density of redds on any one site. The density was measured at 0.01 redd per square meter of emplaced gravel. The program monitoring data indicates that there was 4% Chinook salmon egg retention—well within the 10% goal—indicating that females were able to find suitable sites for spawning. Riverwide, 51% of steelhead and 47% of Chinook spawned on gravel placement projects. The American River project was funded by both b13 and AFRP.

Additional monitoring, using a before-after control-impact framework was conducted to evaluate the effectiveness of the projects including: hyporheic water chemistry, flow and temperature; gravel movement and river bed changes; Chinook and steelhead spawning habitat use; juvenile salmonid habitat preferences; macro invertebrate production; and floodplain inundation. Two years of gravel

Filling the incised main channel to rewater a dry side channel (providing spawning and rearing habitat) at upper sunrise on American River.

Front end loaders placing spawning gravel in the American River at Upper Sunrise.

placements are estimated to have increased floodplain inundation by 4.6 acres at 5,000cfs, supporting an additional 22,081-237,765 juvenile salmonids (see Table 14 for gravel to date summaries).

Table 14: Gravel Placed by Year in CVP Streams, and Percent of Target, 1997-2011

	Sacramento River 10,000 Ton Target	% Target	Stanislaus River 3,000 Ton Target	% Target	American River 7,000 Ton Target	% Target
1997	22,191	221	2,000	67	0	N/A
1998	22,191	221	3,000	100	0	N/A
1999	15,341	153	0	N/A	6,000	86
2000	29,850	298	1,300	43	0	N/A
2001	0	0	500	17	0	N/A
2002	15,341	153	4,000	133	0	N/A
2003	15,341	153	0	N/A	0	N/A
2004	22,191	221	1,200	40	0	N/A
2005	7,200	72	2,500	83	0	N/A
2006	6,000	60	2,500	83	0	N/A
2007	4,615	46	4,100	137	0	N/A
2008	8,300	83	0	N/A	7,000	100
2009	9,900	99	0	N/A	10,600	151
2010	5,500	55	0	N/A	16,000	229
2011	5,000	50	5,000	167	20,770	297
TOTAL	**186,000**	**126**	**26,100**	**58**	**60,370**	**57**

Installing woody material to provide juvenile habitat in the American River at upper Sunrise.

Front end loader placing spawning gravel in the Stanislaus River just below Goodwin Dam.

Comprehensive Assessment and Monitoring Program

3406 (b)(16)

Pursuant to CVPIA section 3406 (b)(16), the Comprehensive Assessment and Monitoring Program (CAMP) was established to assess the biological results and effectiveness of actions implemented by CVPIA in support of the fish doubling goal. To meet this mandate, CAMP produces annual reports that compile and synthesize anadromous fish production data from the Central Valley. These data are used to assess the effectiveness of habitat restoration actions such as water management modifications, structural modifications, habitat restoration, and fish screens. The 2011 CAMP Annual Report reports on 22 Central Valley watersheds, and also reports on a broader area that includes San Pablo Bay, Suisun Bay, and the Sacramento-San Joaquin River Delta.

The program is heavily dependent on other programs and agencies to provide information. To optimize its program budget, CAMP works with partners whenever possible to complete high-priority monitoring projects.

The CAMP Implementation Plan (IP) was developed in 1997, and describes methods and procedures for monitoring anadromous fish species in California's Central Valley, and for assessing the biological results and effectiveness of different categories of restoration activities. The plan is based on nine anadromous fish taxa: Chinook salmon (fall-, late fall-, winter- and spring-run), steelhead, striped bass, American shad, white sturgeon and green sturgeon.

CAMP focuses on three program objectives:

Objective #1 – Assess the overall effectiveness of actions implemented pursuant to CVPIA section 3406(b) in meeting AFRP fish production targets.

Objective #2 – Assess the relative effectiveness of categories of CVPIA section 3406 (b) actions (e.g., water management modifications, structural modifications, habitat restoration, and fish screens) toward meeting AFRP fish production targets.

Objective #3 – Implement a data management program to manage CVPIA data (a resource available to all interested parties), provide training in data management, ensure compliance with relevant federal laws and regulations, and ensure the effective and economical management of resources.

PERFORMANCE MEASURES

The CAMP Implementation Plan identifies 82 monitoring programs that are required to assess progress toward the AFRP fish doubling goals. An additional 18 other monitoring programs have been identified that relate to AFRP fish production. Of these programs, 57 IP programs and all 18 other monitoring programs relate to Objective #1; and 23 IP programs relate to Objective #2.

The 3 Objectives relate to the CAMP goals of producing an annual report based on an assessment of biological results and effectiveness actions (Objectives #1 and #2) and managing CVPIA data, which include the consolidation, standardization, and enhancement of CVP ecosystem data (Objective #3).

FY 2011 ACCOMPLISHMENTS

In FY 2011, the program obligated $1.7 million from the Restoration Fund.

Objectives #1

Annual Report – In FY 2011 CAMP produced an annual report based on 57 of the 82 monitoring elements. This report synthesized the data gathered under those 57 monitoring elements and assessed

the cumulative and relative effectiveness of actions pursuant to 3406(b) in meeting the AFRP fish production targets.

Acquire New Adult Salmon Data – Two of the 82 programs relate to the acquisition of new adult salmon data. The first is the quantification of the escapement of fall-run Chinook salmon on Cow and Cottonwood Creeks using weirs with video cameras. The data from the cameras was used to determine if the AFRP fish production targets on those watersheds were met in 2011.

The second program relates to the marking and tagging of juvenile Chinook salmon at the Coleman National Fish Hatchery and the Nimbus Fish Hatchery. The marking and tagging of the juvenile salmon facilitates the ability to quantify the relative proportion of hatchery- vs. naturally-produced adult salmon as they return to their natal streams to spawn, and thereby increases the accuracy of watershed-specific natural production estimates for different salmon runs and watersheds in the Central Valley. In 2011, CAMP marked and tagged juvenile salmon at the 2 hatcheries, and those activities pertain to 2 of the 57 activities involving objective #1 and the original 82 CAMP elements.

Objective #2

Continued the development of a database and programming code necessary to generate statistically robust, consistently generated juvenile Chinook salmon production estimates and confidence intervals from across the Central Valley. The juvenile salmon production estimates will provide a basis for assessing the biological response to habitat restoration projects in multiple watersheds. The data will also provide basic information pertaining to juvenile salmon demography, outmigration timing, and ecology.

Monitored the production of juvenile Chinook salmon that are produced by the Stanislaus River, with the goal of using that data to assess the effectiveness of habitat restoration activities in that watershed.

Continued to obtain support from Instream Flow Incremental Methodology (IFIM) staff to evaluate the relationship between river discharge levels and the acreage of floodplain inundated on the Stanislaus River. The data will be used in conjunction with juvenile salmon production data to assess the effects of floodplain restoration activities along the banks of the Stanislaus River.

Objective #3

Data Management Plan – The program is currently developing a CVPIA data acquisition and management plan (DAMP). Additionally, a contract has been entered to determine the most efficient methods of creating and implementing an accomplishments database.

Develop Metadata Tools – The program developed a GIS tool to provide easily obtained geographic information on streams, dams, and other geo-features related to CVPIA projects. The program also developed an Excel spreadsheet that allows users to enter metadata related to their projects. Funds have been allocated to expand previous work so that a web-based GIS portal will be created. This portal will allow users to access CVPIA documents using GIS.

Other Data Management – Metadata files were created for a number of data sets and documents. These included data for Fisheries (Chinookprod) and Refuges (Water Delivery data).

Anadromous Fish Screen Program

3406 (b)(21)

The Anadromous Fish Screen Program (AFSP) works together with the State of California to construct, replace and rehabilitate fish screens, and relocate diversions throughout the Central Valley and Sacramento-San Joaquin Delta. The AFSP strives to improve the effectiveness and efficiency of fish screens, and collaborates with other agencies to encourage the dissemination of information. The program also seeks to reduce the overall cost of fish screens. These efforts support the fish doubling goal by protecting juvenile Chinook salmon, steelhead, green sturgeon and white sturgeon from entrainment and predation at priority water diversions.

The AFSP provides matching funds for state and local funding, providing up to 50% of the cost of a fish screen project. The AFSP conducts monitoring at diversions and many fish screens to determine the critical factors related to fish losses, and to assure the effectiveness of constructed fish screens. Fish screen projects are complex, and are typically constructed in phases over several years. The four key project phases include a feasibility study, preliminary design, final design, and construction. Once a screen is constructed, the diverter is solely responsible for its ongoing operation and maintenance.

PERFORMANCE MEASURES

The AFSP's key performance measure is to assist the State of California in developing and implementing measures to avoid juvenile anadromous fish losses resulting from unscreened or inadequately screened diversions. This is accomplished primarily by installation of fish screens. Progress is measured in the number of fish screens constructed, with a target of screening the priority unscreened diversions on prescribed watersheds. The AFSP and the State of California are currently conducting fish entrainment monitoring at representative unscreened diversions to evaluate potential fish screening benefits and to determine the highest priority diversions for screening.

FY 2011 ACCOMPLISHMENTS

The AFSP obligated funding from the Restoration Fund in the amount of $3.9 million, $349,200 from Water and Related Resources Fund, and $2.0 million from Bay-Delta Fund.

Screening Diversions –Construction continued on of the American Basin (Natomas Mutual) Fish Screen Project (Phase I) for a screened diversion at Sankey on the Sacramento River that replaces two existing diversions on the Natomas Cross Canal. This project also results in the removal of an anadromous fish migration barrier (seasonal diversion dam) on the Natomas Cross Canal. This fish screen project will be completed in FY 2013.

The AFSP continued to support design, environmental compliance, and permitting activities for the Reclamation District 2035 Fish Screen project on the Sacramento River. This fish screen project is expected to begin construction in FY 2013.

The AFSP completed construction of the Patterson Fish Screen, consisting of a 195 cfs capacity vertical flat plate fish screen on the San Joaquin River. This fish screen protects outmigrating Chinook salmon and steelhead as well as resident game and non-game fish from entrainment.

Three cylindrical fish screens were constructed: Sutter Mutual Portuguese Bend (106 cfs), Oji Brothers Farms (28 cfs) and Windswept Land & Livestock #3 (9 cfs). The monitoring program associated with

these screens is conducted in partnership with the Family Water Alliance. The program collects data to assess the biological benefits of fish screening and to help prioritize future fish screening efforts. The 2011 activities included fish entrainment monitoring at nine diversion sites, in addition to screening the three diversion sites.

The AFSP continued to support design, environmental compliance and permitting activities for the City of Yuba City Fish Screen project for a 74 cfs diversion on the Feather River. This fish screen project is expected to begin construction in FY 2012 (see Table 15 for projects by watershed).

AFSP Technical Assistance – The AFSP continued a two-year (2010-2011) hydraulics and fish behavioral study at the UC Davis J. Amorocho Hydraulics Laboratory to identify critical factors resulting in fish losses at water diversions. The study will identify potential lower cost options for minimizing fish losses at smaller diversions, such as use of behavioral devices at some diversions rather than use of more expensive positive barrier screens. A final study report will be issued in FY 2013.

Table 15: AFSP Projects by Watershed and Cubic Feet per Second (cfs) Screened, 1994-2011

Watershed	Number of Fish Screens	Flow (cfs)
Sacramento	19	3,954
American	1	210
Yuba	1	65
Butte	4	257
Delta	6	113
San Joaquin	2	455
TOTAL	**33**	**5,054**

Aerial view of the Patterson Fish Screen

San Joaquin River Restoration Program

3406 (c)(1)

The San Joaquin River is a major tributary to the Sacramento-San Joaquin Delta, historically providing flows from the southern Central Valley. Section 3406(c)(1) mandates the preparation of a reasonable, prudent and feasible comprehensive plan to reestablish and sustain naturally reproducing salmon in the San Joaquin River below Friant Dam to the confluence with the Sacramento-San Joaquin Delta Estuary.

Subsequent to the passage of CVPIA, a Stipulation of Settlement (Settlement) was reached in September 2006 that resolved long-standing disputes related to Reclamation's operation of Friant Dam. The Settlement ended an 18-year lawsuit between the U.S. Departments of the Interior and Commerce, the Natural Resources Defense Council (NRDC) and the Friant Water Users Authority (FWUA).

Public Law 111-11 authorizes and directs the Secretary of the Interior to fully implement the Settlement and to use the CVPIA 3406(c)(1) to fund and implement a portion of the program. Public Law 111-11 also specifies that "...the Settlement satisfies and discharges all of the obligations of the Secretary contained in section 3406(c)(1)..." The San Joaquin River Restoration Program (SJRRP) implements the Settlement consistent with Public Law 111-11.

The agencies responsible for the management of the SJRRP include Reclamation (lead), the Service, National Marine Fisheries Service (NMFS), California Department of Water Resources (DWR), and California Department of Fish and Game (CDFG). Please refer to the SJRRP website for a complete status of all actions: www.restoresjr.net.

PERFORMANCE MEASURES

The Settlement includes two goals:

Water Management – To reduce or avoid adverse water supply impacts to all of the Friant Division long-term contractors that may result from implementation of the Settlement. (The Settlement calls for interim flows and restoration flows, which are additional releases out of Friant Dam to support fish and wildlife habitat needs.)

Restoration – To restore and maintain fish populations in "good condition" in the mainstem of the San Joaquin River below Friant Dam to the confluence of the Merced River, including naturally reproducing and self-sustaining populations of salmon and other fish.

FY 2011 ACCOMPLISHMENTS

The Program obligated $717,821 from the CVPIA Restoration Fund to achieve the following:

Invasive Vegetation Management and Control – In support of the Restoration Goal, Reclamation identified the need to manage and control invasive vegetation as part of the environmental compliance and permitting activities for the Water Year 2011 and 2012 Interim Flows, and specifically as part of Reclamation's Water Year 2011 and 2012 Interim Flows Environmental Assessments (EAs). The Invasive Vegetation Management Plan calls for monitoring and control and management activities focusing on five species, red sesbania, salt cedar, giant reed, Chinese tallow, and sponge plant. These activities will begin in FY 2012.

Annual Technical Report and Annual Monitoring and Analysis Plan – In support of the Restoration Goal, the SJRRP's Implementing Agencies have developed and are implementing an annual cycle of identifying study needs and monitoring activities and providing for timely release of all quality controlled monitoring data. In FY 2011, the SJRRP produced the Final 2011 Monitoring and Analysis Plan (Agency Plan) in November 2010; the 2010 Annual Technical Report in April 2011, and the 2012 Monitoring and Analysis Plan in November 2011.

In FY 2011, Reclamation also funded the Annual Technical Report and Monitoring and Analysis Plan efforts. This effort also includes coordination of the SJRRP's Restoration Goal Technical Feedback Group meetings that facilitates the timely release and discussion of monitoring data, upcoming monitoring efforts, and provides for early input in the Program's high priority construction projects. Activities under the contract will begin in FY 2012.

Fish Population Modeling – In FY 2011 and in support of the Restoration Goal, Reclamation also issued a contract for the development of a fisheries population model to support the continued development of the SJRRP Fisheries Management Plan and selection of alternative actions including the release and routing of flows, salmon reintroduction, and the construction of site-specific projects. The modeling effort will utilize the Ecosystems Diagnosis and Treatment modeling platform and "proof of concept" model previously prepared for the San Joaquin River. The effort will apply the Ecosystems Diagnosis and Treatment model to addressing fish management questions and site-specific planning and evaluation needs as well as improve the model. These efforts will begin in FY 2012.

The above accomplishments were achieved with CVPIA funding. To see all SJRRP accomplishments, visit www.restoresjr.net.

Don Portz, with Denver's TSC, talks with Fresno Bee reporter Mark Grossi about the study.

Norm Ponferrada with Denver's Technical Service Center, listens for acoustically tagged fist movement at the Hills Ferry Barrier on the San Joaquin River. The barrier is seasonally installed by the California Department of Fish and Game to prevent fall-run Chinook salmon from migrating upstream in the SJR from the Merced River. This study led by the TSC is evaluating the effectiveness of the barrier – one of many studies funded by the CVPIA to support the SJRRP's Monitoring and Analysis Plan.

Ecosystem and Water Systems Operations Models

3406 (g)

The goal of the Ecosystem and Water Systems Operations Models Program is to develop broadly available and readily usable models and supporting data to evaluate the ecologic and hydrologic effects of existing and alternative operations of public and private water facilities and systems in the Sacramento, San Joaquin, and Trinity River watersheds. The primary purpose of this effort is to support the Secretary's efforts in fulfilling the requirements of CVPIA through improved scientific understanding.

As part of the model development process, the Program continues to support hydrologic, physical and biologic model development, and data collection activities.

PERFORMANCE MEASURES

Develop Models - Develop readily usable and broadly available models and supporting data to evaluate existing and alternative water management strategies. Section 3406 (g) of the CVPIA anticipates that Interior will develop data and/or models to improved scientific understanding in nine integral areas.

FY 2011 ACCOMPLISHMENTS

The Modeling Program obligated $800,800 from the Restoration Fund in 2011.

The DSM2 model is being used for various purposes in CVPIA, but has had limited contributions from the 3406 (g) program. In FY 2011, the DSM2 model was modified and applied to investigate the installation of low-lift pump operations and alternatives at the Old River temporary barriers. The DSM2 modeling objective was to determine if the operation of these low-lift pumps would help meet salinity objectives for the southern Delta standards.

The Clear Creek inSALMO application was completed in FY 2011. The application provides opportunities to study how proposed habitat restoration actions might affect the spawning, rearing and emigrating juvenile production of salmon on restoration sites at Clear Creek. Reclamation and the U.S. Fish and Wildlife Service (Service) continuously seek opportunities to work with the National Marine Fisheries Service (NMFS) and other Federal and State fishery agencies to develop other salmon life-cycle models to meet biological and restoration modeling needs.

In FY 2011, the Service completed the Sacramento River Water Quality Model (SRWQM) extension from Knights Landing to Freeport, California. This temperature model extension provided opportunities for further expansion of the SRWQM to incorporate the Feather and American Rivers.

The water management model (CalLite 2.0) and the Graphical Users' Interface (GUI) were being developed in 2011. CalLite is an optimization and screening model that can simulate the hydrology, reservoir and project operations, and salinity responses. In FY 2011, the GoldSim (a proprietary Monte Carlo Simulation software) codes were replaced by flexible (developed in-house) Water Resources Simulation Language codes. Water Resources Integrated Modeling System was used to compile the codes. An interactive CalLite Graphical User Interface GUI was developed to setup an interactive CalLite GUI alternatives, run executables, and to analyze results. The User's Documentation, the Developer's Reference, the design and the Technical Specifications, the funding for the GUI development

and that for the XA Solver license, the training etc. were provided by the 3406(g) fund. The model is planned to be available in FY2012.

In FY 2011, Reclamation and the U.S. Geological Survey (USGS) staff reviewed the existing USGS Central Valley Data Base and GIS data to retrieve data/information. This information will subsequently be used as input for the HydroGeoSphere Central Valley Model (CVHGMS) application.

The 3406 (g) program also prepared publications and provided support to model applications for stakeholders. Table 16 presents the nine model types and FY11 accomplishments.

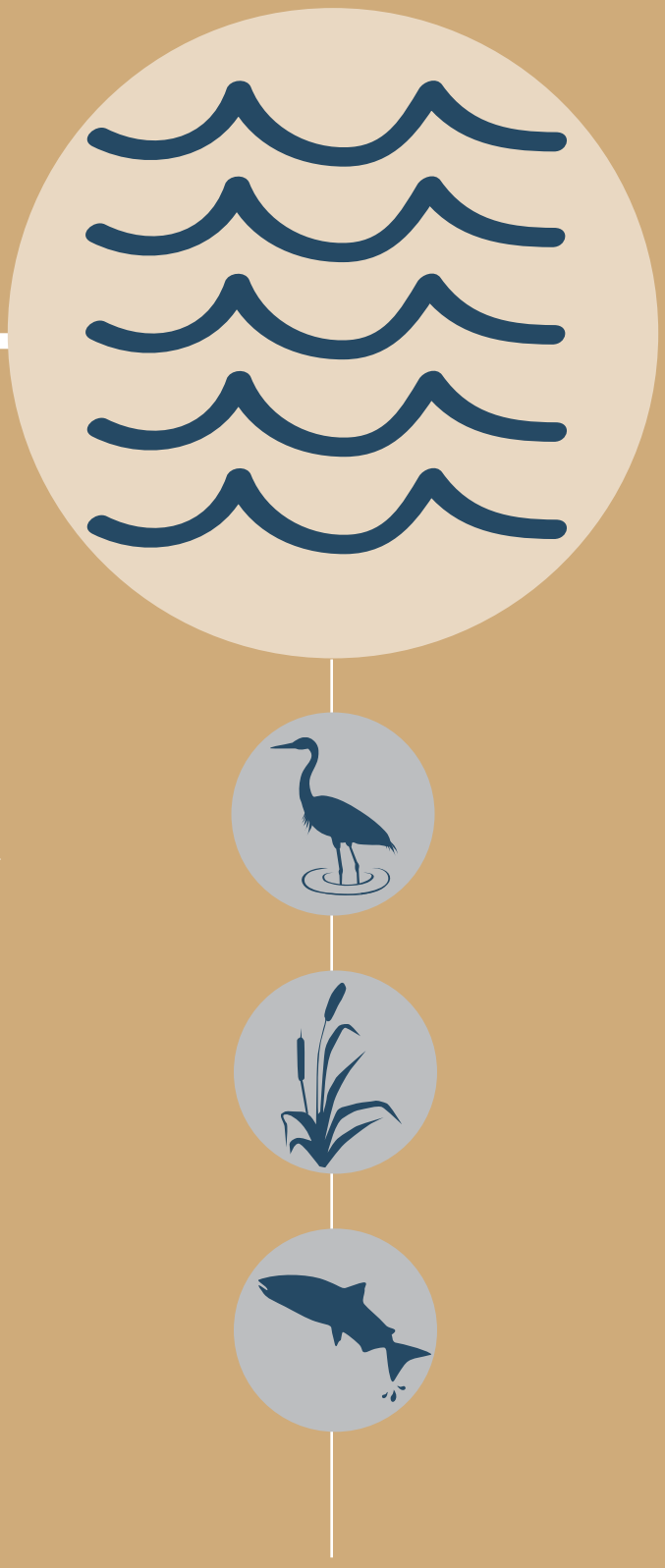
All of the projects that were undertaken in FY2011 met or exceeded the performance targets.

Table 16: Ecosystem and Water System Operations Models That are Developed by 3406(g) Program

Model Type	Models Developed To Date	FY 2011 Accomplishments
Comprehensive water budget of surface and groundwater supplies	CalSim II, CalSim 3.0 CalLite, HGS, ECOSIM-W and DSM2	The results of the HGS- CalSim linkage and pilot application were presented at the 2011 annual meeting of the California Water and Environmental Modeling Forum (CWEMF). After reviewing the contractor's progress for scheduling and budget, Reclamation decided not to pursue additional model development.
Related water quality conditions, including temperature dynamics related to storage	Upper Sacramento River Water Quality Model (SRWQM). San Joaquin Basin Temperature Model	SRWQM model was extended from Knights Landing to Freeport.
Surface-ground and stream-wetland interactions	HydroGeoSphere, CVHGSM (Central Valley HydroGeoSphere Model)	Reclamation collaborated with USGS to retrieve data from the USGS Central Valley Database to generate information as inputs for use with the HGS Central Valley application development.
Ecosystem modeling - flow needs to meet restored carrying capacity of streams	inSALMO	inSALMO Clear Creek application was completed in September 2011.
Ecosystem modeling - flow to store and maintain natural channel and riparian habitat values	RHEM	No new work was done in 2011 for the model.
Water operations models - CVP and SWP operations	CalSim II, CalSim 3.0 CalLite and ECOSIM-W	Several improvements were made to Calsim II, like improved representation of baseline conditions, Isolated Facility, CVP/SWP sharing of export restrictions under the D-1641 export-inflow ratio, and releases to meet the D-1641 salinity standards in the Delta in conjunction with exports CalSim 3.0 is scheduled for public release in FY 2012. CalLite 2.0 (Sacramento Basin application) and the GUI are scheduled for publicly release in FY 2012.
Ecosystem modeling in support of sustainable fish harvest levels, including tradable harvest rights		This currently has none of the limited available resources being dedicated to it. This is currently not a high priority for the program.
Ecosystem modeling to identify opportunities to protect and restore wetland and upland habitat	inSALMO	Completed inSALMO Clear Creek application development. Reclamation and Service will coordinate with NMFS to seek opportunity for another ecosystem model development.
Water management modeling to include firm CVP yield	CalSim II, CalSim 3.0, CalLite and ECOSIM-W	CalLite model was used to develop an application for the Central Valley Project Integrated Resources Plan (CVPIRP) application in FY 2011.

Chapter 3

CVP WATER OPERATIONS RESOURCE AREA



Modified CVP Operations

3406 (b)(1)(B)

An adequate flow of water in rivers and streams is essential for all stages of fish life: spawning, fry emergence, juvenile development, outmigration and passage back to spawning grounds. Flows help maintain a healthy environment for fisheries by maintaining sufficient stream depth and optimal temperatures for spawning and rearing. Periods of high flow also move sediments downstream to establish and maintain the river bottom. Reclamation and the Service are dedicated to creating optimal flows to support the goal of doubling the population of anadromous fish.

Determining the instream flow needs in CVP streams is an ongoing process that is being addressed by Instream Flow Incremental Methodology (IFIM). This habitat-based model was developed by the Service to assess instream flow needs for aquatic resources, including anadromous fish.

IFIM studies involve four basic steps: 1) monitoring a stream to assess current conditions, 2) modeling to determine optimal flows for current conditions, 3) peer review of modeling results to ensure accuracy, and 4) preparation of a final report to document findings.

IFIM studies funded under section (b)(1)(B) focused solely on CVP streams: American, Sacramento, and Stanislaus rivers and Clear Creek. The program goal was to complete up to nine IFIM studies to inform modification of CVP facilities in order to improve instream conditions for all life stages of anadromous fish. The program completed the ninth IFIM study in 2007.

The information developed by the IFIM is used by (b)(2) program managers in developing recommendations for modifying instream flows in CVP streams to reduce redd (fish egg "nests") dewatering, reduce juvenile stranding and provide suitable instream conditions. This involves changing and coordinating planned releases between CVP dams when such releases will improve instream conditions without affecting other CVP obligations or authorized purposes.

PERFORMANCE MEASURES

Modify Operations – The IFIM studies will inform how to vary CVP flows modifications depending on hydrology and biological conditions.

FY 2011 ACCOMPLISHMENTS

No funds were obligated from the Restoration Fund in FY 2011 for the MOP.

Modify Operations

The data generated by IFIM studies have been used by the Service and Reclamation to modify operations on CVP streams.

Clear Creek: Operations were modified on Clear Creek throughout the year to augment low base flows and provide spring attraction flows to improve conditions for fall-run Chinook salmon, spring-run Chinook salmon, and steelhead during spawning, incubation, and rearing.

Sacramento: Operations were modified on the Sacramento River in February to maintain a flow rate of approximately 3800-4000 cfs to improve conditions for late fall- and fall-run Chinook salmon spawning and emergence.

Flow Fluctuations and Reservoir Storage

3406 (b)(9) & (19)

River and stream flow fluctuations can result in fish losses through mortality of migrating and spawning adults, decreased egg viability in redds due to thermal distress, redd dewatering and isolation, and stranding of juveniles. The goal of the (b)(9) Flow Fluctuation Program (FFP) is to minimize these losses by moderating changes in CVP releases on Clear Creek and the Sacramento, American, and Stanislaus rivers.

The (b)(19) Reservoir Storage Program (RSP) seeks to maintain carryover water storage at Shasta and Trinity reservoirs and deliver appropriately timed flows and flows of adequate quality to support fisheries restoration and meet other project purposes.

In order to manage the program and reasonable and prudent alternatives (RPAs) contained in the 2009 NMFS OCAP BO, they program engages in sets of actions that vary based upon Shasta Reservoir end-of-September storage. These sets of actions broadly relate to the flow release schedule for Keswick Dam and Trinity Dam to maintain cold water supplies necessary for egg incubation for the following summer's cohort of winter-run. Depending on the water year type and amount of carryover storage at the end of September, the BO mandates close coordination between NMFS, California Department of Fish and Game (CDFG) and the Service to schedule releases for the subsequent year.

PERFORMANCE MEASURES

Flow Fluctuation – Eliminate, to the extent possible, fish losses on CVP streams due to flow fluctuations caused by operation of CVP facilities.

Carryover Storage – Maintain 1,900,000 acre-feet (AF) of carryover storage levels at Shasta Reservoir and 600,000 AF at Trinity River Reservoir.

FY 2011 ACCOMPLISHMENTS

The FFP obligated $35,691 from the Restoration Fund in FY 2011.

Flow Fluctuation

Clear Creek, American River, and Sacramento River – As part of an investigation funded by the 3406 (b)(2) Dedicated Yield Program, biologists surveyed salmon and steelhead redds in fall and winter of 2010-2011 on the American River. Insights gained will help make informed decisions pertaining to flow fluctuations as well as the potential use of (b)(2) dedicated yield.

American River – The American River Operations Work Group commissioned one salmonid isolation pool survey (August 2011) and multiple steelhead redd surveys (December 2010 – April 2011). In the isolation pool survey, no stranded juveniles were observed. The steelhead redd surveys in conjunction with visual counts are being used to monitor trends in in-river spawning steelhead abundance in the lower American River.

Stanislaus River – The Stanislaus Operations Group held monthly meetings to discuss and provide recommendations for achieving the minimum instream flow requirements and temperature objectives contained in the BO. The Stanislaus Flow Fluctuation Study was completed by CDFG. The group also

helped coordinate fish monitoring studies and habitat mapping.

Carryover Storage

The RSP met the carryover targets for Shasta and Trinity reservoirs in FY 2011 (see Table 17). Due to high precipitation and inflow to the reservoirs, the RSP met the carryover targets for Shasta and Trinity reservoirs in FY 2011. This helps to ensure that the next water year starts with a good base supply and a large cold water pool to meet the various temperature requirements on the rivers for the fish species.

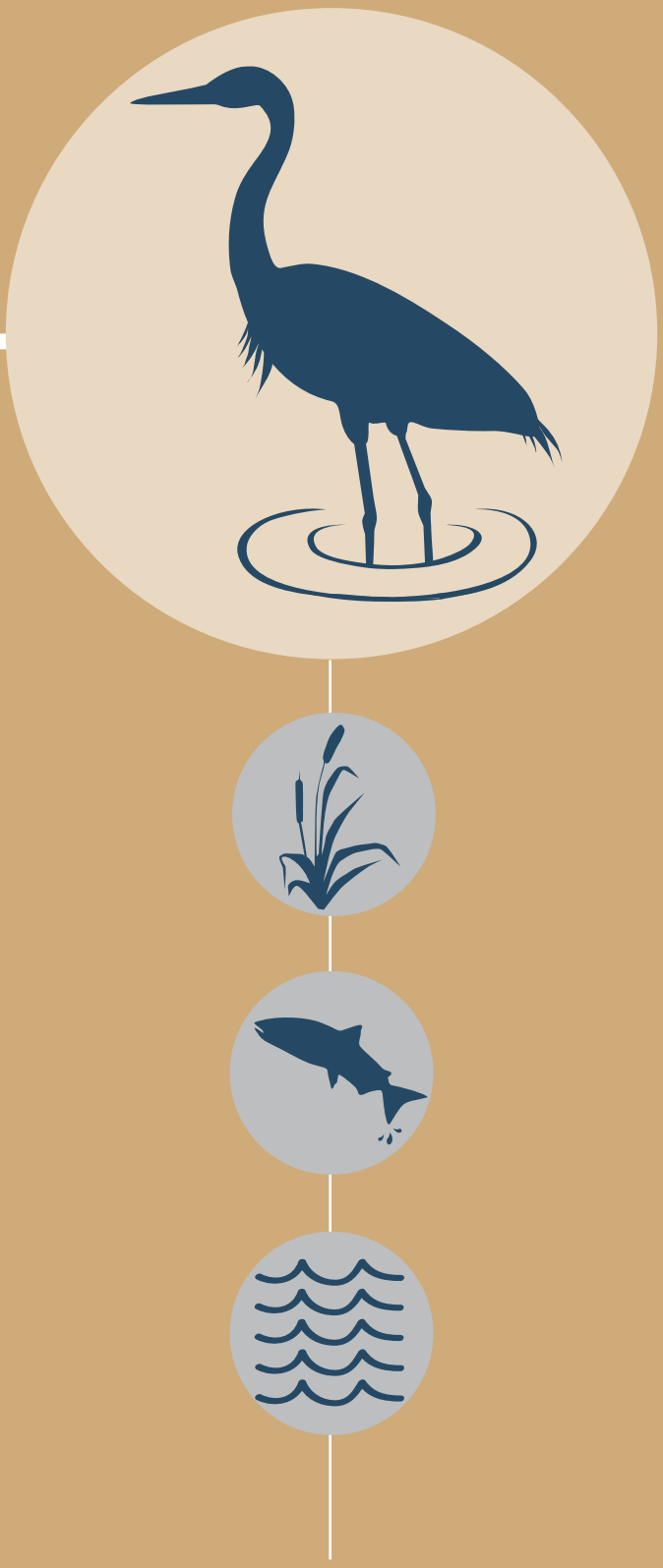
Table 17: Carryover Storage at Shasta and Trinity Reservoirs, 1998-2011

Water Year	Sac. Valley Index Water Year Type	Shasta Reservoir (Storage Target = 1.9 MAF*)	Trinity Reservoir (Storage Target = 600 TAF)**
1998	Wet	3.4 MAF	2,077 TAF
1999	Wet	3.3 MAF	1,962 TAF
2000	Above Normal	3.0 MAF	1,791 TAF
2001	Dry	2.2 MAF	1,428 TAF
2002	Dry	2.6 MAF	1,500 TAF
2003	Above Normal	3.2 MAF	1,881 TAF
2004	Below Normal	2.2 MAF	1,591 TAF
2005	Above Normal	3.0 MAF	1,890 TAF
2006	Wet	3.2 MAF	1,795 TAF
2007	Dry	1.9 MAF	1,461 TAF
2008	Critical	1.4 MAF	1,137 TAF
2009	Dry	1.8 MAF	919 TAF
2010	Below Normal	3.3 MAF	1,558 TAF
2011	Wet	3.3 MAF	2,167 TAF

* million acre-feet
** thousand acre-feet

Chapter 4

REFUGES RESOURCE AREA



Refuge Water Supply Program

3406 (b)(3), (d)(1), (2) & (5)

The Refuge Water Supply Program (RWSP) is comprised of three components:

3406 (b)(3) Refuge Water Acquisition – Acquisition of Incremental Level 4 quantities specified in 3406 (d)(2).

3406 (d)(1), (2) & (5) Refuge Water Conveyance – Delivery of Level 2 water and Incremental Level 4 water, and construction of water delivery facilities.

3406 (d)(5) Refuge Facilities Construction Actions – Infrastructure construction to provide full Level 4 water supplies to the boundary of the CVPIA refuges.

This component supports delivery of water to those lands identified in the Report on Refuge Water Supply Investigations (March 1989), and the San Joaquin Basin Action Plan/Kesterson Mitigation Action Plan (December 1989).

The RWSP's goal is to ensure that all CVPIA identified wetland habitat areas, hereinafter referred to as "refuges", annually receive water of specified quantity, of suitable flow rate and timing, and suitable quality to support their wetland and aquatic environments. A total of 19 refuges are served by the program (shown in Figure X).

The RWSP's water accounting of acquisitions and deliveries is based on Reclamation's Mid-Pacific Region's water service contract year. The contract year begins March 1 and ends on the last day of February the following year. The RWSP components—acquisition, conveyance, and construction—work together to implement the goals of CVPIA related to refuges.

The RWSP's two water types are defined as Level 2 water and Incremental Level 4 water.

- Level 2 is the amount of water required for minimum wetlands and wildlife habitat management based on historic average annual deliveries before 1989. Reclamation is required to provide full Level 2 water supplies annually. The Level 2 annual water delivery target is 422,251 acre-feet (AF), including 26,007 acre-feet of replacement water. Replacement water was originally provided by tailwater and groundwater but is now included in Level 2 water supplies due to water quality concerns.
- Incremental Level 4 water is the difference between Level 2 and Full Level 4 water supplies; it equals 133,264 AF.

Full Level 4 is the total annual amount of water identified for each refuge in CVPIA as required for optimum wetlands and wildlife habitat development and management. The Full Level 4 water delivery target for the 19 refuges is 555,515 AF and is met when Level 2 and Incremental Level 4 water targets are met in full.

Each year, Reclamation strives to provide as much Incremental Level 4 water as possible. The CVPIA specifies that Reclamation must acquire this Incremental Level 4 water supply through voluntary measures such as water conservation, conjunctive use, purchase, lease, donation, or similar activities.

LONG-TERM SUPPLY CONTRACTS PROVIDE STABILITY FOR REFUGE OPERATORS

To ensure reliability for refuge managers, Reclamation entered into long-term water supply contracts with the three refuge managing agencies: California Department of Fish and Game (CDFC), the Service,

and Grassland Water District (GWD). These contracts have a performance period of 25 years and are renewable, representing Reclamation's obligation under CVPIA to provide identified quantities of water to certain refuges in the Central Valley.

Each year in February and monthly thereafter through May, Reclamation's Central Valley Operations Office announces the water supply allocation available to the CVP contractors and CVPIA refuges (Level 2 water) for the current contract year. Each year between February and March, the RWSP provides the Interagency Refuge Water Management Team (IRWMT) with an initial projection of anticipated Incremental Level 4 water purchases for that contract year. The IRWMT determines the allocation of the projected Incremental Level 4 supplies. The IRWMT is comprised of representatives from Reclamation, the Service, CDFG, GWD, and the Central Valley Joint Venture. The creation of this team was established through a provision in the long-term water supply contracts. Concurrent to this process, the three refuge managing agencies develop their initial water delivery schedules for each refuge by March 1.

USE OF GROUNDWATER FOR REFUGE WATER SUPPLIES

The RWSP strives to diversify its water sources. For example, the RWSP pursues groundwater projects in partnership with local water districts because groundwater does not require external conveyance if the source can be located at or near a refuge. The lower cost of groundwater is also an advantage, although downsides include groundwater of poorer quality in some locations, particularly in the San Joaquin Valley; threat of aquifer depletion; and land subsidence. The RWSP relies on refuge managers to monitor groundwater quality for toxins, pollutants and salinity so as not to degrade the general quality of water on the refuges. To further that effort, in FY 2011, the RWSP continued funding a Real Time Water Quality Monitoring Project to study the salt load effluent from refuges in the San Joaquin Valley.

In FY 2011, several refuges relied at least in part on groundwater supplies, including Volta and Gray Lodge Wildlife Areas (WA), Merced and Pixley National Wildlife Refuges (NWR) and Grassland Resource Conservation District (RCD). Additionally, the RWSP completed construction of two new wells at the Volta WA in FY 2011 that will increase groundwater supplies to both Volta WA and Grasslands RCD.

REFUGE BENEFITS

Numerous biological benefits have resulted from a reliable year-round water supply through CVPIA that adequately meets the delivery schedule for wetland management on CVPIA refuges. Habitat is now available during the months of August and early September that benefits early arriving migrant waterfowl and shorebirds; habitat is also provided for resident wildlife and their young during the spring and summer, when wetland habitat can be particularly limited by hydrology. Introducing water for semi-permanent and permanent wetland habitat in the spring and summer directly benefits the recovery of special status species such as the giant garter snake, and tricolored blackbirds.

Wintering wildlife also benefit from this habitat diversity, as seasonal wetlands are now managed to coincide with peak migration times of shorebirds and waterfowl. Timely de-watering and irrigations promote the germination and irrigation of important moist-soil food plants, such as swamp timothy and watergrass. These plants provide a high-energy food source through both their seeds and associated invertebrate communities.

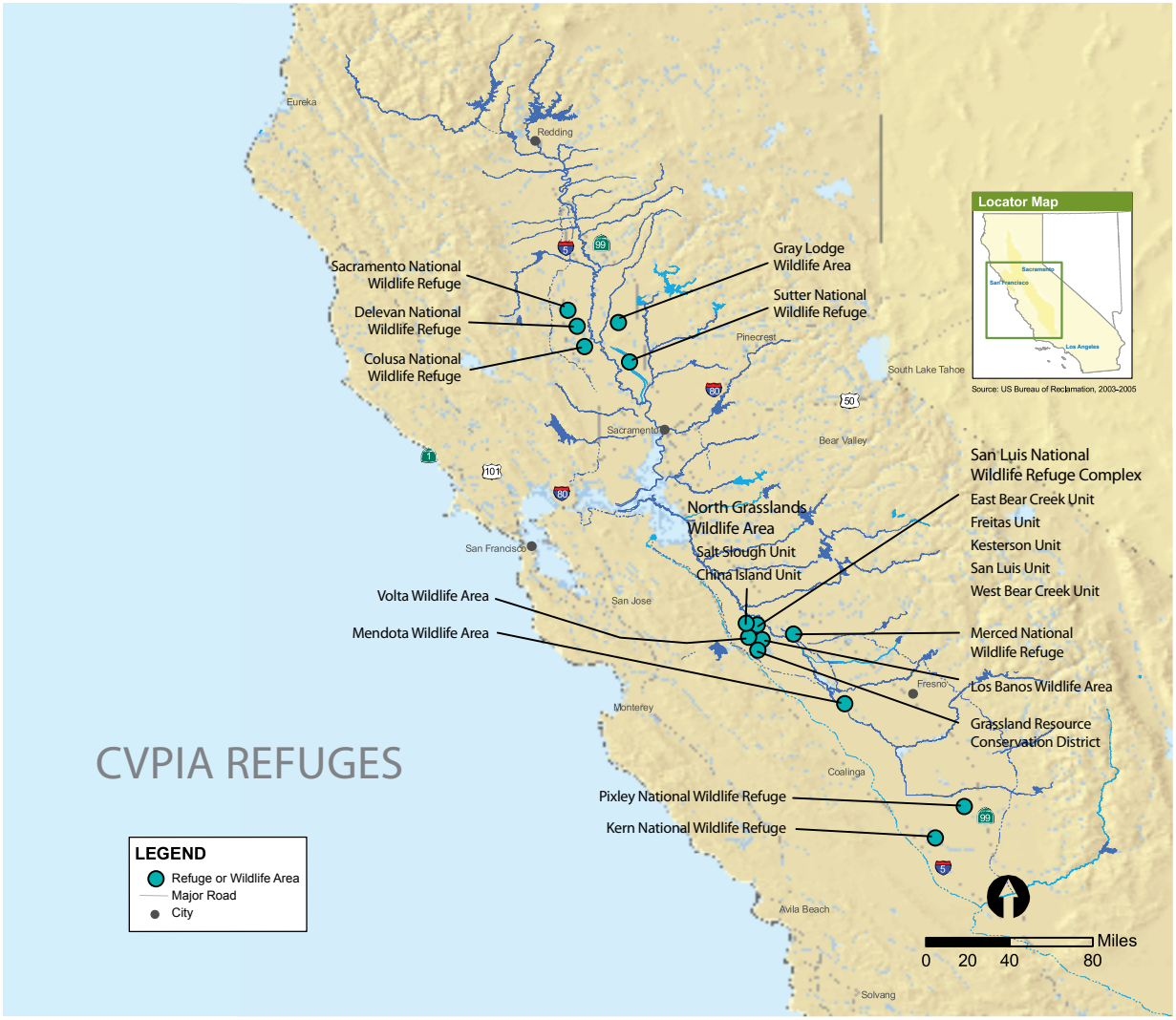


Figure 7. Central Valley Refuges Receiving CVPIA Water Supplies

Refuge Water Acquisition

3406 (b)(3) and (d)(2)

The Refuge Water Acquisition Program (RWAP) is responsible for the acquisition of133,264 acre-feet (AF) of Incremental Level 4 Water (also called supplemental water) for critical wetland habitat supporting resident and migratory waterfowl, threatened and endangered species, and wetland dependent aquatic biota on the refuges.

Presently, Incremental Level 4 (Inc L4) water consists of annual purchases from willing sellers from both surface and groundwater supplies. In 1998 and 2005 the RWAP acquired 9,300 AF of permanent Inc L4 surface water supplies. The RWAP also acquires a portion of water supplies at no cost, including rescheduled water, 215 water, and water delivered under a mitigation agreement with the Federal Energy Regulatory Commission.

The RWAP continues to use groundwater to lower costs and increase reliability of providing supplemental refuge water supplies with acquisitions from Grassland Water District (GWD) and by groundwater wells. The groundwater wells will increase water supply reliability and help to diversify Level 2 Water. It is anticipated that these wells will produce up to 5,000 AF annually.

PERFORMANCE MEASURES

Acquisition - The RWAP's goal is to acquire enough water to deliver 133,264 acre-feet (AF) of Inc L4 water to refuge boundaries annually (i.e. 133,264 AF plus any additional water needed to cover conveyance losses), excluding replacement water.

FY 2011 ACCOMPLISHMENTS

The RWAP obligated a total of $12,616,343 from the Restoration Fund, and $250,000 from the Water and Related Resources Fund. Of this, $11,500,000 was obligated for water acquisitions, $500,000 was applied to the Real-time Water Quality Monitoring project, $201,000 was applied to the South-of-Delta (SOD) coordinator duties, $113,000 was obligated towards groundwater assessment, and the remainder of funds covered program administration.

The RWAP obligated $8,307,694 for the purchase of 81,811 AF of water for Water Year 2011 and $3,200,000 was obligated for the future purchase of water for Water Year 2012. Additionally, 22,511 AF for WY 2011 was acquired at no cost through various other sources representing the total acquisition of 78% of the Inc L4 water delivery target (Table 18). This water was acquired for delivery in the 2011 water year which covers a portion of calendar year 2010 and a portion of calendar year 2011.

Gadwalls, Kern NWR

The 81,811 AF of purchased water was acquired from a variety of surface and ground water sources. An additional 18,686 AF of water was acquired without cost to Reclamation. Both purchased and no-cost supplies brought the Inc L4 water to 104,322 AF, which includes water to account for conveyance losses such as seepage and evaporation. Of the 104,322 AF, approximately 95,000 AF of full Level 4 water was actually delivered to the nine SOD refuges and 3,000 to Delevan NWR, a North-of-Delta (NOD) refuge. See the next section on Conveyance for more information on water deliveries.

The RWAP continued funding to Grassland Water District to implement the Real-time Water Quality Monitoring Project in the Grasslands Ecological Area (GEA), a State-designated geographic area in the San Joaquin Valley that encompasses wetlands consisting of 12 SOD CVPIA refuges. The study monitors quality of the water after it is applied to refuges, as this water eventually returns back into the surface water system and discharges to the lower San Joaquin River. Data from the extensive array of water quality monitoring stations in this project will provide information to refuge and land-use managers that will serve to better understand the flow and water quality contributions to the lower San Joaquin River, specifically as it relates to meeting the California Regional Water Quality Control Board's TMDL standards.

The RWAP co-funded with the Refuge Conveyance Program construction of 2 wells at Volta Wildlife Area under the American Recovery and Re-investment Act. This project was completed in FY 2011. The expected production capacity of these wells is approximately 5,000 acre-feet per year after the first year of production. The water will be equally split between Level 2 diversification and Inc L4 water supplies.

FY 2011 was the first year since CVPIA was enacted that full Level 4 water (Level 2 and Inc L4) was made available to eleven of the 14 SOD wildlife refuges. This is significant because these refuges are located in a hydrologically dry area and often lack ample water to maintain wetland habitat. Due to external conveyance infrastructure constraints, two refuges--East Bear and Pixley NWRs--were not able to receive full Level 4 water. The third refuge that did not receive full Level 4 water, Merced NWR, received sufficient water supplies from non-CVP sources in FY 2011. For refuges NOD, Inc Level 4 water supplies were only acquired for Delevan NWR. The Sacramento and Colusa NWRs employed water conservation measures that enabled them to be managed with Level 2 water supplies. Insufficient external conveyance facilities currently preclude delivery of full Level 4 water to Gray Lodge WA and Sutter NWR.

Table 18: Incremental Level 4 Acquisitions by Fiscal Year, 2002-2011

Fiscal Year*	Incremental Level 4 Water Acquired (AF)	Percent of Incremental Level 4 Target (133,264 AF)
2002	85,390	64
2003	70,000	53
2004	67,710	51
2005	70,962	53
2006	83,822	63
2007	41,111	31
2008	30,308	23
2009	31,726	24
2010	62,238	47
2011**	104,322	78
Average	**64,759**	**49**

* This table reflects acquisitions starting with Fiscal Year 2002, the first year that CVPIA mandated Full Level 4 deliveries for all refuges [Section 3046 (d)(2)].
** 2011 is the first year the Program is reporting purchased and non-purchased water acquired toward the Incremental Level 4 target.

Refuge Water Conveyance

3406 (d)(1), (2) and (5)

The Refuge Water Conveyance (Wheeling) Program (RWCP) is responsible for providing long-term, firm and reliable water deliveries to the 19 Federal, State, and private wetlands and wildlife habitat areas (collectively referred as refuges) located in the Central Valley of California. The RWCP has two primary performance goals, specifically, starting with Water Year 2002 forward:

- Annually provide/deliver Level 2 water supplies by specified amounts to the refuges totaling 422,251 acre-feet; and
- Annually deliver Incremental Level 4 acquired water supplies by specified amounts to the refuges totaling 133,264 acre-feet.

The RWCP conveys water supplies to the refuges using cooperative agreements with water delivery entities using Project and acquired water. Established refuge allocations for Level 2 and Incremental Level 4 water supplies serve as the Program's goals for water conveyance quantities.

Reclamation entered into five long-term water supply contracts with GWD, FWS, and CDFG which established Reclamation's commitment to the CVPIA delivery mandates. There contracts are: two with CDFG covering Gray Lodge, Los Banos, Volta, Mendota and North Grasslands Wildlife Areas; two with the FWS covering Sacramento, Delevan, Colusa, Sutter, San Luis, Merced, Kern and Pixley National Wildlife Refuges; and one with Grassland Water District for the Grassland Resource Conservation District (GRCD) which is comprised of privately-owned and managed wetlands.

Reclamation currently has eight long-term (7-50 years) conveyance agreements that are administered by the RWCP, along with one FWS 40-year conveyance agreement, also administered under the Program. The RWCP utilizes cooperative agreements to reimburse delivering entities for costs of conveying Level 2 and Incremental Level 4 water supplies through Federal, State, and private water distribution systems to the refuges. Conveyance agreements are administered out of Reclamation's South Central California Area Office, Northern California Area Office and FWS Region 8.

PERFORMANCE MEASURES

Delivery – The RWCP goal is to deliver Level 2 water supplies of 422,251 acre-feet (AF) per year (including 26,007 AF of replacement water); and Incremental Level 4 water of 133,264 AF per year.

The RWCP also delivers Level 2 water from non-CVP sources to help offset reliance on CVP yield in meeting Level 2 requirements.

FY 2011 ACCOMPLISHMENTS

The program obligated $10,294,003 from the Restoration Fund, $3,115,000 from the Water and Related Resources Fund, and $70,065 from the Bay-Delta Fund.

Egret at Kern National Wildife Refuge

Delivery – In 2011, a total of 367,592 AF of Level 2 water was delivered to the refuges, representing 87% of the target (Table 19).

A total of 101,854 AF of Incremental Level 4 water was delivered, representing 76% of the target. Table 20 shows the targets and deliveries for each refuge for the 2011 Fiscal Year.

Diversification – Of the total of 367,592 AF of Level 2 water delivered in 2011, a total of 55,343 AF was delivered from diverse sources (i.e. non-CVP sources), including riparian water rights water, pre-1914 water rights water, groundwater, and water provided under Merced Irrigation District's existing mitigation agreement with the Federal Energy Regulatory Commission.

The RWCP co-funded with the RWAP the construction of 2 wells at Volta Wildlife Area under the American Recovery and Re-investment Act. This project was completed in FY 2011. The expected production capacity of these wells is approximately 5,000 acre-feet per year after the first year of production. The water will be equally split between Level 2 diversification and Incremental Level 4 water supplies.

Table 19: Level 2 (L2), Incremental Level 4 (Inc L4) and Full Level 4 Delivery Water by Year, 2002-2011

Fiscal Year*	L2 Delivered	% 422,251 AF L2 Goal**	Inc L4 Delivered	% 133,262 AF Inc L4 Goal***	Total Delivery	% Goal (555,515 AF)
2002	319,354	76	66,146	50	385,500	69
2003	416,520	99	100,057	75	516,577	93
2004	369,948	88	77,003	58	446,951	80
2005	396,080	94	70,061	53	466,141	84
2006	379,666	90	87,042	65	466,708	84
2007	404,447	96	55,442	42	459,889	83
2008	396,158	94	41,830	31	437,988	79
2009	371,129	88	37,988	29	409,117	74
2010	390,546	92	58,021	44	448,567	81
2011	367,592	87	101,854	76	469,446	85
Average Deliveries	**381,144**	**90**	**69,544**	**52**	**450,688**	**81**

* This table reflects deliveries starting with FY 2002, the first year that CVPIA mandated Full Level 4 deliveries for all refuges [Section 3046 (d)(2)].

** Level 2 goal includes approximately 26,000 AF of replacement water.

*** Incremental Level 4 goal does not include replacement water.

Sunset, Sacramento NWR

Table 20: Water Targets and Deliveries for Each Refuge (FY 2011)

	WATER ALLOCATION TARGETS			2011 DELIVERIES			% TARGET ACHIEVED***		
Refuge Name - Region	Level 2 Water (AF)*	Inc Level 4 Water (AF)**	Full level 4 Water (AF) (= L2+IL4)	Level 2 Water (AF)	Inc Level 4 Water (AF)	Total Delivered (AF) (= L2+IL4)	Level 2 Water (%)	Inc Level 4 Water (%)	Full level 4 Water (AF) (= L2+IL4)
Grassland Water District (private) — San Joaquin Valley									
Grassland RCD	125,000	55,000	180,000	124,577	59,212	183,787	100	108	102
CA Department of Fish and Game — Sacramento Valley									
Gray Lodge WA	35,400	8,600	44,000	29,320	0	29,320	83	0	67
CA Department of Fish and Game — San Joaquin Valley									
Volta WA	13,000	3,000	16,000	13,220	511	13,731	102	17	86
Los Banos WA	16,670	8,330	25,000	13,925	8,771	22,696	84	105	91
Salt Slough Unit	6,680	3,340	10,020	3,717	5,458	9,175	56	163	92
China Island Unit	6,967	3,483	10,450	3,878	4,721	8,599	56	136	82
Mendota WA	27,594	2,056	29,650	25,076	1,362	26,438	91	66	89
U.S. Fish and Wildlife Service — Sacramento Valley									
Sacramento NWR	46,400	3,600	50,000	36,562	0	36,562	79	0	73
Delevan NWR	20,950	9,050	30,000	17,834	3,250	21,084	85	36	70
Colusa NWR	25,000	0	25,000	19,912	0	19,912	80	N/A	80
Sutter NWR	23,500	6,500	30,000	15,287	0	15,287	65	0	51
U.S. Fish and Wildlife Service — San Joaquin Valley									
San Luis Unit	19,000	0	19,000	16,194	0	16,194	85	N/A	85
Kesterson Unit	10,000	0	10,000	9,340	0	9,340	93	N/A	93
West Bear Creek Unit	7,207	3,603	10,810	7,139	3,603	10,742	99	100	99
Freitas Unit	5,290	0	5,290	3,608	0	3,608	68	N/A	68
Merced NWR	13,500	2,500	16,000	11,954	2,500	14,454	89	100	90
East Bear Creek Unit	8,863	4,432	13,295	3,055	0	3,055	34	0	23
U.S. Fish and Wildlife Service — Tulare Lake Basin									
Kern NWR	9,950	15,050	25,000	12,198	12,468	24,666	123	83	99
Pixley NWR	1,280	4,720	6,000	796	0	796	62	0	13
TOTAL	**422,251**	**133,264**	**555,515**	**367,592**	**101,854**	**469,446**	**87**	**76**	**85**

* This includes approximately 26,000 AF of replacement water.

* * Does not include replacement water

*** The % Target Achieved may exceed 100% because the target levels are for Contract Water Year (March – February) and the water deliveries represent volumes delivered during Fiscal Year (October – September).

Refuge Facilities Construction Actions

3406 (d)(5)

Refuges Facilities Construction Actions (RFCA) consists of two programs: The Refuge Facilities Construction Program (RFCP) and San Joaquin Basin Action Plan Lands (SJBAPL) program. Together the RFCA provides the necessary infrastructure with sufficient conveyance capacity to support long-term delivery of firm, reliable water supplies to the boundary of the CVPIA refuges, as identified in the Central Valley Project Improvement Act (CVPIA). The RFCP is responsible for the delivery of water to those lands identified in the Report on Refuge Water Supply Investigations (March 1989) and the SJBAPL program supports the delivery of water to the lands specified in the San Joaquin Basin Action Plan/Kesterson Mitigation Action Plan (December 1989).

The need to upgrade conveyance facilities is a result of capacity constraints in existing delivery systems and/or the lack of existing systems. The goal of the RFCA is to have the necessary facilities in place for delivery of full Level 4 water supplies to the CVPIA refuges, meeting their timing and scheduling requirements. A full Level 4 water supply will support optimum wildlife habitat over a broad range of species including targeted Threatened and Endangered species.

The RFCA identified 46 major structures and/or actions necessary to provide needed capacity for the delivery of full Level 4 surface supplies to these refuges. These infrastructure improvements can be divided into two categories:

- Modify existing facilities–Existing conveyance facilities can be upgraded to overcome capacity constraints, and
- Construct new facilities–New facilities are constructed where there is no existing system, or where modifications to an existing system would not be sufficient to meet demand.

Twenty of the projects are located on the SJBAPL refuge lands. The remaining 26 projects are associated with refuges identified in the Report on Refuge Water Supply Investigations, Central Valley Hydrologic Basin, California (March 1989) and are implemented through the RFCP. Those refuges still requiring conveyance facilities improvements projects are: Gray Lodge and Mendota Wildlife Areas, and Sutter and Pixley NWRs.

An Implementation Plan for the SJBAPL was completed in April 1998, and cooperative agreements with the San Luis Canal Company, Grassland Water District, and Central California Irrigation District to convey water to the Action Plan lands were completed in summer 1998. Reclamation is currently administering the cooperative agreements, which include construction and rehabilitation of facilities to accommodate the needs of the refuges within San Joaquin Basin Action Plan area.

Program management activities include project integration and coordination with the associated Refuge Water Conveyance (Wheeling) and Refuge Water Acquisition Programs. The objective of this activity is to ensure continuity of methodologies and approach towards executing and achieving RFCA objectives. Interagency coordination activities are included in this element as well as budget formulation, tracking, and management activities. Additional activities are administrative coordination for planning, design, and construction efforts between agencies and water purveyors (water districts). Reclamation Mid-Pacific Construction Office (MPCO) provides administration of design and construction contracts/agreements including construction contract award, facilities construction activities, construction inspection and management, and coordination as appropriate with other agencies regarding permit requirements.

PERFORMANCE MEASURES

The goal of the RFCA is to ensure that all 19 CVPIA refuges have the external conveyance capacity to receive Full Level 4 Water, totaling 555,515 acre-feet (AF), on an annual basis.

FY 2011 ACCOMPLISHMENTS

The SJBAPL program obligated $16,680 from the Restoration Fund, and $95,294 from the Water and Related Resources Fund.

The RFCP obligated $541,900 from the Restoration Fund, and $586,351 from the American Recovery and Reinvestment Act of 2009.

In FY 2011, the RFCA contracted services for repairs to the East Bear Pumping Plant. Emergency repairs were completed in FY 2011, and pumping was reinitiated on the East Bear Creek Unit by September 2011. Non-emergency repairs are expected to be completed in FY 2012.

Construction of the Gray Lodge/Pixley Groundwater Well Project began in FY 2011 with completion expected in FY12. Two wells are under construction at Pixley National Wildlife Refuge, and will provide for full Level 2 water supplies. Three wells are under construction at Gray Lodge Wildlife Area (GLWA), and will provide a portion of GLWA's Level 2 supplies. A design contract was executed for the GLWA/Biggs-West Gridley Water District facilities improvement project. A value engineering study was completed after finalization of concept design. Final design is expected to be completed in June 2012.

The conveyance target by refuge and actual conveyance capacity are shown in Table 21.

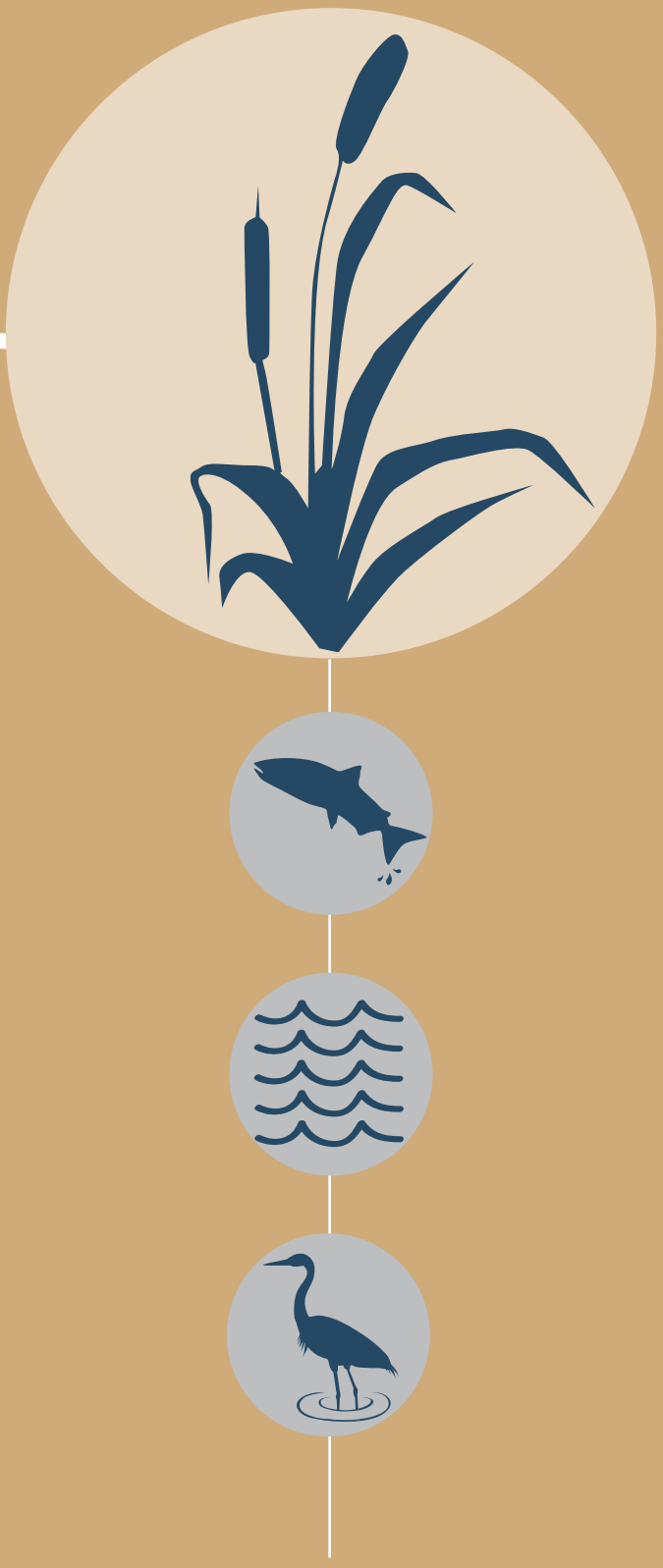
Snow Geese, Sacramento NWR

Table 21: Target Level 4 Conveyance Capacity vs. Actual by Refuge

Refuge Name - Region	Target Level 4 Capacity (in acre-feet)	Actual Conveyance Capacity (in acre-feet)	% of Target	Expected Date for Completed Conveyance Construction
Grassland Water District (private) – San Joaquin Valley				
Grassland Resource Conservation District	180,000	180,000	100	
CA Department of Fish and Game – Sacramento Valley				
Gray Lodge Wildlife Area	44,000	18,000	41	2015
CA Department of Fish and Game – San Joaquin Valley				
Volta Wildlife Area	16,000	16,000	100	
Los Banos Wildlife Area	25,000	25,000	100	
Salt Slough Unit	10,020	10,020	100	
China Island Unit	10,450	10,450	100	
Mendota Wildlife Area	29,650	26,000	91	2020
U.S. Fish and Wildlife Service – Sacramento Valley				
Sacramento National Wildlife Refuge	50,000	50,000	100	
Delevan National Wildlife Refuge	30,000	30,000	100	
Colusa National Wildlife Refuge	25,000	25,000	100	
Sutter National Wildlife Refuge	30,000	0	0	2017
U.S. Fish and Wildlife Service – San Joaquin Valley				
San Luis Unit	19,000	19,000	100	
Kesterson Unit	10,000	10,000	100	
West Bear Creek Unit	10,810	10,810	100	
Freitas Unit	5,290	5,290	100	
Merced National Wildlife Refuge	16,000	16,000	100	
East Bear Creek Unit	13,295	13,295	100	
U.S. Fish and Wildlife Service – Tulare Lake Basin				
Kern National Wildlife Refuge	25,000	25,000	100	
Pixley National Wildlife Refuge	6,000	0	0	2017

Chapter 5

OTHER RESOURCE AREA



Habitat Restoration Program

3406 (b)(1) Other

The Habitat Restoration Program (HRP) benefits federally listed Central Valley species and habitats impacted by construction and operation of the CVP. Habitat loss and fragmentation occurred across significant acreage as a result of CVP construction, and the program is charged with contributing to the habitat mitigation requirements for this loss.

The HRP's priorities include purchase of fee title or conservation easements on lands where threats are significant. The program also focuses on restoration of CVP-affected habitats, and research to facilitate species recovery. In addition, the HRP supports captive breeding of federally listed species affected by the CVP.

PERFORMANCE MEASURES

Protection and Restoration – The program contributes to the protection and restoration of the 2.7 million habitat acres affected by the construction and operation of the CVP. Protection includes both fee title acquisition and/or conservation easements.

The 1999 State Water Resources Control Board Decision 1641 (SWRCB's D-1641) requires that Reclamation provide compensation and habitat values to mitigate for impacts associated with the delivery of CVP water to lands previously outside the CVP Consolidated Place of Use. It identifies the HRP as one of three Reclamation programs suitable for fulfilling the mitigation plan. Pursuant to the SWRCB's D-1641, Reclamation developed the Consolidated Place of Use Habitat Mitigation Plan and Monitoring and Reporting Program (HMP) as a report/strategy of how the mitigation requirements will addressed. The HMP identifies the acquisition, maintenance, and restoration of 45,391 acres to occur as mitigation as part of the 2.7 million affected by the CVP.

A conservation easement placed on the vernal pool landscape at the Peek Ranch, Tehama County will help protect the 2,407-acre site.

Other Activities – The program also provides funding to support the recovery of threatened and endangered species through activities such as research, captive breeding and outreach.

FY 2011 ACCOMPLISHMENTS

The program obligated $1,698,730 from the Restoration Fund and $4,151,986 from the Bay-Delta Fund to achieve the following:

Protection and/or Restoration – HRP funding helped protect 5,404 acres of land through conservation easement acquisitions of 2,407 acres of vernal pool, grassland, and riparian habitats at the Peek Ranch in Tehama County, and 2,997 acres of vernal pool, grassland, and other habitats at the Kelsey Ranch in Merced County. Four hundred and eighty-one (481) of these acres also count towards the State Water Resources Control Board Decision 1641 acreage (see Table 22 for acres protected and restored).

HRP funding helped restore about 28 acres of alkali scrub and 101 acres of riparian woodland vegetation at the Panorama Vista Preserve in Kern County, and 492 acres of serpentine grassland and associated

A population of the federally endangered Bakersfield cactus grows among the 28 acres of alkali scrub habitat that was revegetated at the Panorama Vista Preserve in Kern County.

Table 22: Acres of Habitat Protected and Restored, 1996-2011

Year	Acreage Protected	Acreage Restored	Cumulative Acreage Progress of Protection and Restoration
1996	3,018	0	3,018
1997	284	617	3,919
1998	74,146	0	78,065
1999	1,180	0	79,245
2000	1,426	206	80,877
2001	2,831	0	83,708
2002	2,211	0	85,919
2003	2,866	0	88,785
2004	719	432	89,936
2005	755	3,370	94,061
2006	193	731	94,985
2007	1,603	122	96,710
2008	1,787	1,908	100,405
2009	5,165	0	105,570
2010	2,049	48	107,667
2011	5,404	621	113,692
Total	**105,637**	**8,055**	**113,692**

habitats at Santa Teresa County Park in Santa Clara County. None of these restored lands contributed towards the SWRCB's D-1641 acreage.

Other Activities – For the second year, the HRP provided funds for an effort to map vernal pool habitat within the Sacramento and San Joaquin valleys. The project will map remaining vernal pool habitat in five counties to quantify losses of habitat in core recovery areas between 2005 and 2009 (or later). This work will contribute to the recovery of federally listed species including vernal pool fairy shrimp, vernal pool tadpole shrimp, and succulent owl's clover. For the fourth year, the program also contributed funds for the captive breeding of the critically endangered Lange's metalmark butterfly. This species is found only at the Antioch Dunes National Wildlife Refuge in Contra Costa County.

Endangered Lange Metalmark butterfly at Antioch Dunes National Wildlife Refuge.

Land Retirement Program

3408 (h)

The Land Retirement Program (LRP) purchases land, water and other property interests from willing sellers who receive CVP water. By ceasing irrigation of these agricultural lands, the program reduces the volume of agricultural drainage produced, and provides the opportunity to protect and restore the retired land for wildlife habitat.

The Land Retirement Demonstration Project (LRDP) was implemented in 1999 at two sites—one in the western San Joaquin Valley (Tranquillity, managed by Reclamation) and the other in Tulare Lake Basin (Atwell Island, managed by the Bureau of Land Management (BLM))--to study the environmental impacts of land retirement and to evaluate cost-effective restoration strategies for retired lands.

PERFORMANCE MEASURES

Retire agricultural land – The program goal is to retire (remove from irrigated agriculture) 15,000 acres of agricultural lands by 2014 for the Land Retirement Demonstration Project. This acreage included the acquisition of 7,000 acres at Tranquillity and 8,000 acres at Atwell Island.

The program has completed its acquisition and restoration work in the San Joaquin Valley (Tranquillity site). Westlands Water District retired approximately 100,000 acres, which fulfilled and exceeded the goals of the CVPIA land retirement program and the San Joaquin Valley Drainage Report (1990) for acquisition in the San Joaquin Basin.

The program continues to pursue land retirement at the Atwell Island site to fulfill the goal of retirement of 8,000 acres in the Tulare Basin.

Restore habitat – Restore 400 acres of retired lands per year on Land Retirement Demonstration Project sites.

Reduce agricultural drainage volume – The program cumulatively reduced the production of agricultural drainage water by approximately 39,463 acre-feet through the removal of irrigation water from the parcels within the Land Retirement Demonstration Project.

FY2011 ACCOMPLISHMENTS

The program obligated $483,660 from the Restoration Fund, and $62,456 from the Water and Related Resources Fund.

Retire agricultural land – Contacts with the multiple Atwell Island Project Land owners were made for the acquisition of the remaining 750 acres. However, no land was acquired from willing sellers by the program during FY 2011. Table 23 lists the cumulative accomplishments of land retirement and the annual restoration and ag drainage reduction accomplishments.

Restore Habitat – 10,000 pounds of locally grown seed from native plants were planted on three-hundred acres of previously acquired land at the Atwell Island site in 2011. An excellent response of annual flora was observed at the restoration sites in the spring of FY 2011, contributing to the ongoing restoration of alkalai sink habitat at the site.

Reduce agricultural drainage volume – The program reduced the amount of agricultural drainage water on LRDP lands by approximately 39,463 acre-feet in FY 2011.

Other – The BLM is evaluating a proposal from a private solar energy developer to construct a solar energy production facility at the Atwell Island Demonstration Project site. Preliminary Biological studies were completed in 2011 and BLM is planning to start an EIR/EIS in 2012 for the project.

Table 23: Land Acquired and Restored, and Drainage Reduction by Year, 1995-2011

	Overall Targets		Annual Targets	
	Acres Acquired	Acres Acquired	Acres Restored	Reduction in Agricultural Drainage (acre-feet)
Year	**Atwell Island (8,000 acres)**	**Tranquillity* (7,000 acres)**	**400 acres**	**6,000 acre-feet**
1995	0	591	0	236
1996	0	0	0	236
1997	0	0	0	236
1998	0	995	1,220	634
1999	0	60	100	658
2000	2,645	0	777	1,716
2001	1,414	444	702	1,992
2002	1,510	0	373	2,672
2003	616	0	261	2,772
2004	155	0	308	3,000
2005	625	0	349	3,340
2006	38	0	416	3,355
2007	213	0	475	3,440
2008	0	0	390	3,568
2009	0	0	380	3,728
2010	50	0	400	3,888
2011	0	0	260	3,992
Total	**7,266**	**2,090**	**6,411**	**39,463****

* Land acquisition at the Tranquility site was deemed complete in 2001 with the retirement of approximately 100,000 acres of drainage problem lands by the Westlands Water District. Acreage shown reflect only USBR acquired lands.

** Reduction in Agricultural Drainage Total is cumulative from 1995 - 2011.

Contract Renewals and Water Transfers

3404 (c) and 3405

While not typically considered part of the resource areas , CVPIA Contract Renewals and Water Transfers are in fact a provision under the administration of the CVPIA. A brief summary of their accomplishments is discussed below.

CONTRACT RENEWALS (3404(c))

Section 3404(c) of the Central Valley Project Improvement Act authorized and directed the Secretary to renew repayment and water service contracts for the delivery of water from the Central Valley Project (CVP). Since the passage of the Act, Reclamation has and continues to execute renewal contracts for the continued delivery of CVP water.

To date, 88 long term renewal contracts and 27 interim-renewal contracts have been executed within the various divisions of the CVP. There are 4 contracts that have completed negotiation for a long term contract, and 1 currently in long term negotiations. In addition, 132 long term contracts have been renewed with the Sacramento River Water Right Settlement contractors and 1 is pending renewal upon expiration in July 2020. Reclamation will continue to implement interim contract renewal consistent with CVPIA until such time that all environmental requirements have been satisfied, including the completion of a new biological opinion on the overall operations of the CVP. At that time, Reclamation intends to complete long term contract renewal.

WATER TRANSFERS (3405)

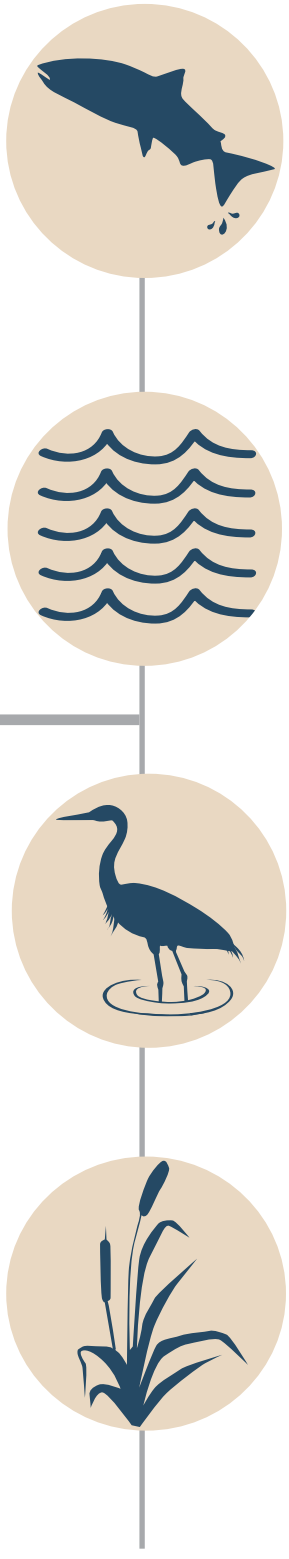
Water transfers are a means by which existing water supplies can be reallocated from one user to another to assist in meeting existing and future water needs within California. Water transfers represent an important management option because they create opportunities to meet municipal, industrial demands, as well as benefit environmental and recreational values. Under Section 3405, CVPIA authorizes individuals and districts who received CVP water to transfer all or a portion of that water to other users within the state for any purpose recognized as beneficial under state law, subject to certain terms and conditions.

Reclamation has approved the transfer of CVP water in the following categories for FY 2011:

- 566,845 AF of CVP agricultural water was approved for agricultural purposes
- 6,870 AF of CVP agricultural water was approved for agricultural purposes (Recaptured Water Account (RWA))
- 270,000 AF of CVP agricultural water was approved for municipal and industrial purposes (Metropolitan Water District)
- 1,200 AF of CVP municipal and industrial water was approved for agricultural purposes
- 2,200 AF of CVP municipal and industrial water was approved for municipal and industrial purposes
- 675 AF of CVP municipal and industrial water was approved for municipal and industrial purposes (Recaptured Water Account (RWA))
- 50,333 AF of CVP agricultural water approved to Reclamation's Refuge Water Acquisition Program

These records are normally maintained on a contract year basis, March 1 to February 28 (the contract year is designated by the year in which it begins). Therefore, the stated amounts will differ from other numbers reported for the contract year.

APPENDICES



Appendix A: Progress to Date Toward CVPIA Performance Goals

Performance Goal Description	Target	Reporting Period (Annual, Cumulative, or Average)	To Date (Cumulative or Average)	% of Target	2011 Accomp-lishments	Comments
FISHERIES						
ANADROMOUS FISH RESTORATION PROGRAM (AFRP), 3406 (b)(1)						
Double the number of naturally produced, Central Valley wide, Fall-run Chinook	750,000 fish	1992 - 2011 average	372,344	50	102,821	
Double the number of naturally produced, Central Valley wide, Late Fall-run Chinook	68,000 fish	1992 - 2011 average	18,383	27	5,577	
Double the number of naturally produced, Central Valley wide, Winter-run Chinook	110,000 fish	1992 - 2011 average	6,578	6	1,552	
Double the number of naturally produced, Central Valley wide, Spring-run Chinook	68,000 fish	1992 - 2011 average	14,091	21	2,064	
Double the number of Central Valley wide Green Sturgeon	2,000 fish	1992 - 2005 average	2,948	147	10,272	Last data submission was 2009. Data provided from CDFG in 2006 - 2009 is preliminary amd not used in calculation
Double the number of Central Valley wide 15-year old, White Sturgeon	11,000 fish	1992 - 2005 average	6,237	57	6258	Last data submission was 2009. Data provided from CDFG in 2006 - 2009 is preliminary amd not used in calculation
Double the number of Central Valley wide Striped Bass	2,500,000 fish	1992 - 2007 average	978,199	39	684,486	Data from 2010
Double the number of Central Valley wide American Shad	4,300 fish	1992-2009 average	2,468	57	683	Last data year 2009
Cubic Yards of Spawning gravel placed in the American, Merced, and/or Tuolumne rivers.	unspecified	Annual	39,000	N/A	39,000	
Tons of Spawning gravel placed in the Mokelumne River	unspecified	Annual	6,557	N/A	6,557	
Complete 105 structural actions	105 actions	Cumulative	63	60	10	
Contribute towards completion of 128 High and Medium Priority Actions	128 actions	Cumulative	45	35	0	
DEDICATED PROJECT YIELD, 3406 (b)(2)						
Provide instream flow, specified based on Wet, Dry, or Critically Dry year.	Wet Year target is 800,000 acre-feet	Annual	800,000	100	800,000	2011 Water Year was classified Wet
WATER ACQUISITION - INSTREAM, 3406 (b)(3)						
Provide supplemental (b)(2) instream flow water	200,000 acre-feet	Average from 1994 - 2011	80,956	40	38,500	FY2011 acquired water is 19.25% of target
TRACY PUMPING PLANT/TRACY FISH TEST FACILITY, 3406 (b)(4)						
Complete 23 actions to mitigate for fishery impacts	23 mitigation actions	Cumulative	16	70	0	

Performance Goal Description	Target	Reporting Period (Annual, Cumulative, or Average)	To Date (Cumulative or Average)	% of Target	2011 Accomp-lishments	Comments
CONTRA COSTA CANAL PUMP, 3406 (b)(5)						
Complete structural actions to mitigate for fishery impacts (fish screen and pumping plant)	Complete the fish screen and pumping plant modifications	Cumulative	Completed	100	Completed	
RED BLUFF DIVERSION DAM, 3406 (b)(10)						
Increase the Fish Passage Rate of Adult Spring-run Chinook	80-100%	Annual	80%	100	80%	Within target range
Increase the Fish Passage Rate of Adult Green Sturgeon	50-100%	Annual	75%	100	75%	Within target range
Complete the fish screen and pumping plant	100%	Cumulative	65%	65	40%	
CLEAR CREEK RESTORATION, 3406 (b)(12)						
Restore stream channel	2 miles	Cumulative	1.5	75	0.0	
Place spawning gravel annually	17,000 tons	Annual	10,000	59	10,000	
Meet variable flow target		Annual		100		Ongoing operation
Maintain water temperature for optimum anadromous fish production	Maintain proper temperature 100% of the time	Annual	88%	88		60°F 1-Jun to 14-Sep 56°F 15-Sep to 31-Oct
SPAWNING GRAVEL, 3406 (b)(13)						
Place 10,000 tons of spawning gravel annually in the Sacramento River.	10,000 tons	Annual	5,000	50	5,000	
Place 3,000 tons of spawning gravel annually in the Stanislaus River	3,000 tons	Annual	5,000	167	5,000	
Place 7,000 tons of spawning gravel annually in the American River	7,000 tons	Annual	20,770	297	20,770	
Increase the percentage of spawning salmonids using placed gravel in the Sacramento River	25% usage	Annual	6%	24%	6%	
Increase the percentage of spawning salmonids using placed gravel in the Stanislaus River	10% usage	Annual	21%	210%	21%	
Increase the density of redds on emplaced gravel in the American River	0.03 redds/sq. meter	Annual	0.01	33	0.01	
OLD RIVER BARRIER, 3406 (b)(15)						
Construct fishbarrier at Head of Old River	1 structural action completed	Cumulative	0	0	0	A temporary bubble barrier was installed in 2009 and 2010, but could not be deployed in 2011
Operate a fish barrier at Head of Old River	100% of fish blocked	Annual	0	0	0	Temporary barrier deployed in 2010 bloked 100% of fish
COMPREHENSIVE ASSESSMENT AND MONITORING PROGRAM, 3406 (b)(16)						
Create an Annual Report	1 Annual Report	Annual	1	100	1	
Management of CVPIA data	Unspecified	Annual	N/A	N/A	N/A	
ANADROMOUS FISH SCREENS PROGRAM (AFSP), 3406 (b)(21)						
Screen all high priority diversions on prescribed streams	Unspecified	Cumulative	33	Undefined	4	
TRINITY RIVER RESTORATION PROGRAM (TRRP), 3406 (b)(23)						
Increase the escapment of Hatchery produced Fall-run Chinook Salmon	9,000 fish	1992 - 2010 Average	8,953	99	18,827	Values provided are based on 2010 data
Increase the escapment of Naturally produced Fall-run Chinook Salmon	62,000 fish	1992 - 2010 Average	20,876	34	14,188	Values provided are based on 2010 data
Increase the escapment of Hatchery produced Spring-run Chinook Salmon	3,000 fish	1992 - 2010 Average	3,880	129	9,285	Values provided are based on 2010 data
Increase the escapment of Naturally produced Spring-run Chinook Salmon	6,00 fish	1992 - 2010 Average	4,477	75	5,483	Values provided are based on 2010 data




Performance Goal Description	Target	Reporting Period (Annual, Cumulative, or Average)	To Date (Cumulative or Average)	% of Target	2011 Accomp-lishments	Comments
Increase the escapment of Hatchery produced Coho Salmon	2,100 fish	1992 - 2010 Average	5,852	279	12,282	Values provided are based on 2010 data
Increase the escapment of Naturally produced Coho Salmon	1,400 fish	1992 - 2010 Average	817	58	1,890	Values provided are based on 2010 data
Increase the escapment of Hatchery produced Steelhead	10,000 fish	1992 - 2010 Average	4,640	46	12,556	Values provided are based on 2010 data
Increase the escapment of Naturally produced Steelhead	40,000 fish	1992 - 2010 Average	3,811	10	4,170	Values provided are based on 2010 data
Improve Infrastructure to allow ROD flows (369 TAF - 815 TAF)	Unspecified	Annual	Within target	100		
Provide minimum annual flows. The program releases between 369,000 and 815,000 AF each year, in accordance with the ROD	Volume target and peak flow varies by water year type	Annual	701,000	103	721,800	Based on 2011 as a wet water year
TRINITY RIVER RESTORATION PROGRAM (TRRP), 3406 (b)(1) Other						
Complete 47 channel rehabilitation projects in the Trinity mainstem and 3 side channels	47 projects	Cumulative	24	51	1	
Place 10,000 cubic yards of coarse sediment annually	10,000 cubic yards	Annual	5,300	53	5,300	
Reduce fine sediment delivery from tributary watersheds	10,000 to 20,000 cubic yards	Annual	9,600	96	9,600	
SAN JOAQUIN RIVER RESTORATION PLAN (SJRRP), 3406 (c) (1)						
Reduce or avoid water supply impacts to Friant Division long-term contractors	Unspecified	Annual	106,318	Undefined	106,318	
Restore and maintain fish populations in good condition	"Good" condition	Annual				
ECOLOGICAL AND WATER SYSTEMS MODELS, 3406 (g)						
Develop readily usable and broadly available hydrologic and ecologic models and supporting data to evaluate existing and alternative water management strategies	9 hydrologic/ ecologic models	Cumulative	8	89	0	
CVP WATER OPERATIONS						
RESERVOIR STORAGE, 3406 (b)(19)						
Maintain minimum reservoir storage in Shasta Reservoir	19 MAF	Cumulative	12 of 14	86	3.3 MAF	
Maintain minimum reservoir storage in Trinity Reservoir	600 TAF	Cumulative	14 of 14	100	2.167 TAF	
REFUGES						
REFUGE WATER SUPPLY PROGRAM - ACQUISITION (INC L4), 3406 (b)(3) and 3406(d)(2)						
Acquire 133,264 acre-feet for Incremental Level 4 water acquisition	133,264 acre-feet	Annual	97,997	74	97,997	
REFUGE WATER SUPPLY PROGRAM - CONVEYANCE, 3406 (d)(1)						
Provide Level 2 water supplies	422,251 acre-feet	Annual	367,592	87	367,592	Target includes 26,007 acre-feet of replacement water
REFUGE WATER SUPPLY PROGRAM - CONVEYANCE, 3406 (d)(2)						
Provide incremental Level 4 water supplies	133,264 acre-feet	Annual	101,854	76	101,854	
REFUGE WATER SUPPLY PROGRAM - CONSTRUCTION (FULL L4 CAPACITY), 3406 (d)(5)						
Provide external conveyance capacity to 19 refuges to receive Full Level 4 Water annually	555,515 acre-feet	Cumulative	489,865	88	0	
REFUGE WATER SUPPLY PROGRAM - CONSTRUCTION (PLANNING, DESIGN & CONSTRUCTION), 3406 (d)(5)						
Planning, design & construction to deliver water to 19 Refuges	19 refuges with adequate conveyance	Cumulative	15	79	1	E. Bear Unit complete

Performance Goal Description	Target	Reporting Period (Annual, Cumulative, or Average)	To Date (Cumulative or Average)	% of Target	2011 Accomp-lishments	Comments
OTHER						
HABITAT RESTORATION, 3406 (b)(1) Other						
Protect and/or restore habitat impacted by the CVP	A portion of 2,700,000 acres	Cumulative	113,692	TBD	6,025	Exact portion of target is yet to be determined
Protect and/or restore habitat areas specified by the SWRCB Decision 1641	45,391 acres	Cumulative	7,159	16	481	
LAND RETIREMENT, 3408(h)						
Retire 8,000 acres of Atwell Island land	8,000 acres	Cumulative, 1995–2011	7,266	91	0	
Retire 7,000 acres of Tranquility land	Complete	Cumulative, 1995–2011	7,000	100	N/A	
Restore 400 acres of retired land annually	400 acres	Cumulative, 1995–2011	6,411	76	260	
Reduce the production of agricultural drainage water by 6,000 AF through the removal of irrigation water from the parcels within the Land Retirement Demonstration Project	6,000 acre-feet	Cumulative, 1995–2011	39,463	67	104	3,992 AF reduced over 21 years on 9,980 acres of land

Appendix B: Acronyms

AF	acre-feet
AFRP	Anadromous Fish Restoration Program
AFSP	Anadromous Fish Screen Program Team
ARRA	American Recovery and Reinvestment Act
ATR	Annual Technical Report
BDCP	Bay Delta Conservation Plan
BLM	Bureau of Land Management
BMP	Best Management Practices
BO	Biological Opinion
CAMP	Comprehensive Assessment Monitoring Program
CALFED	CALFED Bay-Delta Program
CCWD	Contra Costa Water District Statement
CDFG	California Department of Fish and Game
CPAR	CVPIA Program Activity Review Statement
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
CY	contract year
DHCCP	Delta Habitat Conservation and Conveyance Program
DOI	Department of the Interior
DWR	Department of Water Resources
ECOSIM	Ecology Cogent Operations Suite of Integrated Models
EDT	Ecosystem Diagnostic and Treatment
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ESA	Endangered Species Act
EWSOMP	Ecosystem and Water Systems Operations Models Program
FWS	US Fish and Wildlife Service
FWUA	Friant Water Users Authority
FY	Fiscal year
GCID	Glenn-Colusa Irrigation District
GWD	Grassland Water District
HGS	HydroGeoSphere
HRP	Habitat Restoration Plan
IFIM	Instream Flow Incremental Methodology
Interior	Department of the Interior
IP	Implementation Plan
IRWMT	Interagency Refuge Water Management
LRP	Land Retirement Program
NMFS	National Marine Fisheries Service
NOAA Administration	National Oceanic Atmospheric
NRDC	Natural Resources Defense Council
NWR	National Wildlife Refuge
OCAP	Operating Criteria and Procedures
OMB	Office of Management and Budget
PART	Program Assessment Rating Tool
PEIS	Programmatic Environmental Impact
PIMS	Performance Information Management
POD	Pelagic Organism Decline
RBDD	Red Bluff Diversion Dam
RHEM	Riparian Habitat Establishment Model
ROD	Record of Decision
RPA	Reasonable and Prudent Action
RST	Rotary Screw Trap
RWSP	Refuge Water Supply Program
SJBAPL	San Joaquin Basin Action Plan Lands
SJBAP	San Joaquin Basin Action Plan
SJRA	San Joaquin River Agreement
SJRGA	San Joaquin River Group Authority
SJRR	San Joaquin River Restoration
SMUD	Sacramento Municipal Utility District
SNWR	Sacramento National Wildlife Refuges
SWP	State Water Project
TFCF	Tracy Fish Collection Facility
TRRP	Trinity River Restoration Program
US	United States

Appendix C: Glossary of Terms

- **Acre-foot (AF)**
  The quantity of water required to cover one acre to a depth of one foot: equal to 1,233.5 cubic meters (43,560 cubic feet)
- **Anadromous fish**
  Those stocks of salmon (including other species, e.g., steelhead, striped bass, white and green sturgeon, and American shad) that ascend the Sacramento and San Joaquin rivers and their tributaries and the Sacramento-San Joaquin Delta to reproduce after reaching maturity in San Francisco Bay or the Pacific Ocean; fish species that spend most of their lives in the ocean but reproduce in fresh water
- **Anadromous Fish Restoration Program (AFRP)**
  A program authorized by the CVPIA to address anadromous fish resource issues in Central Valley streams that are tributary to the Delta
- **Biota**
  Total collection of organisms of a geographic region or a time period
- **CALFED Bay-Delta Program**
  A unique collaboration among 25 state and federal agencies that came together to improve California's water supply and the ecological health of the San Francisco Bay/Sacramento-San Joaquin River Delta
- **Capillary rise**
  Movement of water upwards from the watertable (the top of the groundwater) into the unsaturated soil above; can be likened to a dry sponge (the unsaturated soil) being placed on top of a wet surface (the watertable), the sponge sucking up water being similar to capillary rise in soils
- **Central Valley**
  Area in the central portion of California bounded by the Cascade Range to the north, the Sierra Nevada to the east, the Tehachapi Mountains to the south and the coast ranges and San Francisco Bay to the west
- **Central Valley Project (CVP)**
  As defined by Section 3403(d) of the CVPIA, "all Federal reclamation projects located within or diverting water from or to the watershed of the Sacramento and San Joaquin rivers and their tributaries as authorized by the Act of August 26, 1937 (50 Stat. 850) and all Acts amendatory or supplemental thereto, ..."
- **Central Valley Project water**
  As defined by Section 3403(f) of the CVPIA, "all water that is developed, diverted, stored, or delivered by the Secretary in accordance with the statutes authorizing the Central Valley Project in accordance with the terms and conditions of water rights acquired pursuant to California law."
- **Central Valley Project Improvement Act (CVPIA)**
  Public Law 102-575, Title 34. This law was passed in 1992 for the following purposes:
  a. Protect, restore, and enhance fish, wildlife, and associated habitats in the Central Valley and Trinity River basins of California
  b. Address impacts of the Central Valley Project on fish, wildlife and associated habitats
  c. Improve the operational flexibility of the Central Valley Project
  d. Increase water-related benefits provided by the Central Valley Project to the State of California through expanded use of voluntary water transfers and improved water conservation
  e. Contribute to the State of California's interim and long-term efforts to protect the San




Francisco Bay/Sacramento-San Joaquin Delta Estuary

f. Achieve a reasonable balance among competing demands for use of Central Valley Project water, including the requirements of fish and wildlife, agricultural, municipal and industrial and power contractors

- **Central Valley Habitat Joint Venture (CVHJV)**
  The association of federal and state agencies and private parties established for the purpose of developing and implementing the North American Waterfowl Management Plan as it pertains to the Central Valley of California
- **Central Valley Rivers and Streams**
  The 22 Central Valley main rivers and streams were defined in the January 9, 2001, Final Restoration Plan, Appendix B as: Sacramento River, Clear Creek, Cow Creek, Cottonwood Creek, Battle Creek, Paynes Creek, Antelope Creek, Mill Creek, Deer Creek, Miscellaneous creeks, Butte Creek, Big Chico Creek, Feather River, Yuba River, Bear River, American River, Mokelumne River, Cosumnes River, Calaveras River, Stanislaus River, Tuolumne River, and Merced River.
- **Constant fractional marking program (CFM)**
  When fish are counted for CVPIA monitoring, program managers differentiate between wild and hatchery fish; hatcheries mark a percentage of juveniles before they are released and when fish come back to spawn, the mark will indicate which were hatchery-born
- **Diversion**
  Area where river water is rerouted in a direction other than its natural course
- **Entrainment**
  When fish are diverted from their natural spawning course (e.g., caught in a water pump or diverted from the river into a canal)
- **Environmental Impact Statement (EIS)**
  An analysis required by the National Environmental Policy Act (NEPA) for all major federal actions, which evaluates the environmental risks of alternative actions
- **Escapement**
  Measurement of adult spawning anadromous fish (e.g., salmon) that manage to return to their spawning stream
- **Firm water supplies**
  Non-interruptible water supplies guaranteed by the supplier to be available at all times except for reasons of uncontrollable forces or continuity of service provisions
- **Flow**
  The volume of water passing a given point per unit of time, usually in cubic feet per second (cfs)
- **Habitat**
  Area where a plant or animal lives
- **Level 2**
  A term used to refer to refuge water supply deliveries; the 1989 and 1992 Refuge Water Supply Studies define Level 2 refuge water supplies as the average amount of water the refuges received between 1974 and 1983
- **Level 4**
  A term used to refer to refuge water supply deliveries; Level 4 refuge water supplies are defined in the 1989 and 1992 Refuge Water Supply Studies as the amount of water for full development of the refuges based upon management goals developed in the 1980s
- **Measure**
  A type of program activity defined by the provisions of CVPIA that includes specific physical or structural actions
- **Metric**
  The defined quantifiable measurement of outputs or outcomes
- **Mitigation**
  One or all of the following: (1) Avoiding an impact by not taking a certain action or parts of an action; (2) minimizing impacts by limiting the degree or magnitude of an action and its implementation; (3) rectifying an impact by repairing, rehabilitating, or restoring the affected environment; (4) reducing or eliminating an impact over time by preservation and maintenance operations during the life of an action; and (5) compensating for an impact by

replacing or providing substitute resources or environments

- **Natural Production**
  As defined by Section 3403(h) of the CVPIA, "fish produced to adulthood without direct human intervention in the spawning, rearing, or migration processes"
- **Outcome**
  The intended results or consequences to be achieved through implementing measures and programs described in the CVPIA
- **Output**
  The specific actions, measures, programs and services produced by Reclamation and the Service and provided to the public or others; outputs are the activities of the CVPIA Program to achieve the outcomes defined by the Act or developed by Reclamation and the Service to achieve the environmental restoration purposes
- **Pelagic Organism Decline**
  A recent decline in both abundance and species richness of pelagic (living in water above the bottom) organisms within the Sacramanto-San Joaquin Delta; pelagic organisms include, most notably, the delta smelt and longfin smelt, federally-listed endangered species of fish
- **Program**
  The overall effort to implement the provisions of CVPIA
- **Program Activity**
  The individual provisions of CVPIA that are being implemented by "program managers" at Reclamation and the Service
- **Program Manager**
  The staff at Reclamation and the Service that oversees implementation of the CVPIA program activities; each active program activity has a program manager from its respective agency
- **Redd Dewatering**
  Occurs when redds (fish egg "nests") are left exposed by receding water levels
- **Restoration Fund**
  The fund established by Section 3407 of the CVPIA to contribute resources for the environmental restoration provisions of the Act; revenue comes into the fund primarily through surcharges on water and power contract rates
- **Restoration Fund Roundtable**
  A collective of stakeholders representing environmental organizations, federal and state resource agencies, water and power contractors, and other interested parties who meet as needed to discuss issues, news and activities related to the Central Valley Project Improvement Act (CVPIA) and provide information to Reclamation and the Service
- **Riparian**
  Of or relating to or located on the banks of a river or stream
- **South Delta**
  Sacramento-San Joaquin Delta
- **Stranding**
  Stranding is a term used to describe fish that are trapped in pools of water that have no connectivity to the larger stream because of insufficient flow
- **Target**
  The quantifiable or otherwise measurable characteristics that tell how well a program must accomplish a performance measure.
- **Taxa**
  Designating an organism or group of organisms
- **Timeframe**
  The period of time when program activities occur (e.g., annual or long term) that combine with a performance measure and target, establish a performance goal
- **Water Acquisition**
  The purchase of water from willing sellers
- **Weir**
  Type of fish ladder that utilizes a series of small dams and pools to create a long channel and allow spawning fish to get around an obstruction, like a dam
- **WY**
  Water year

Appendix D: CVPIA Title 34 of Public Law 102-575

SECTIONS

Anadromous Fish Restoration Program – Section 3406 (b)(1)

"The Secretary … is authorized and directed 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." The section also states, "this goal shall not apply to the San Joaquin River between Friant Dam and the Mendota Pool, for which a separate program is authorized under subsection 3406(c) of this title; Provided further, That the programs and activities authorized by this section shall, when fully implemented, be deemed to meet the mitigation, protection, restoration, and enhancement purposes established by subsection 3406(a) of this title; And provided further, That in the course of developing and implementing this program the Secretary shall make all reasonable efforts consistent with the requirements of this section to address other identified adverse environmental impacts of the Central Valley Project not specifically enumerated in this section."

Habitat Restoration Program – Section 3406 (b)(1) "other"

"…in the course of developing and implementing this program the Secretary shall make all reasonable efforts consistent with the requirements of this section to address other identified adverse environmental impacts of the CVP not specifically enumerated in this section."

Trinity River Restoration Program – Section 3406(b)(1) "other" and 3406(b)(23)

"…That in the course of developing and implementing this program the Secretary shall make all reasonable efforts consistent with the requirements of this section to address other identified adverse environmental impacts of the Central Valley Project not specifically enumerated in this section"; and

"In order to meet Federal trust responsibilities to protect the fishery resources of the Hoopa Valley Tribe, and to meet the fishery restoration goals of the Act of October 24, 1984, Pub. L. 98-541, provide through the Trinity River Division, for water years 1992 through 1996, an instream release of water to the Trinity River of not less than 340,000 acre-feet per year for the purposes of fishery restoration, propagation, and maintenance…"

Modified CVP Operations – Section 3406 (b)(1)(B)

"As needed to achieve the goals of this program, the Secretary is authorized and directed to modify CVP operations to provide flows of suitable quality, quantity, and timing to protect all life stages of anadromous fish, except that such flows shall be provided from the quantity of water dedicated to fish, wildlife, and habitat restoration purposes under paragraph (2) of this subsection; from the water supplies acquired pursuant to paragraph (3) of this subsection; and from other sources which do not conflict with the fulfillment of the Secretary's remaining contractual obligations to provide CVP water for other authorized purposes. Instream flow needs for all Central Valley Project controlled streams and rivers shall be determined by the Secretary based on recommendations of the U.S. Fish and Wildlife Service after consultation with the California Department of Fish and Game."

Dedicated 800,000 acre-feet Project Yield – Section 3406 (b)(2)

"…dedicate and manage annually 800,000 acre-feet of Central Valley Project yield for the primary purpose of implementing the fish, wildlife, and habitat restoration purposes and measures

authorized by this title; to assist the State of California in its efforts to protect the waters of the San Francisco Bay/Sacramento-San Joaquin Delta Estuary; and to help meet such obligations as may be legally imposed upon the Central Valley Project under state or federal law following the date of enactment of this title, including but not limited to additional obligations under the federal Endangered Species Act…"

Water Acquisition Program - Instream Water – Sections 3406 (b)(3) and 3406 (g)

"The Secretary … is authorized and directed to develop and implement a program in coordination and in conformance with the plan required under paragraph (1) of this subsection for the acquisition of a water supply to supplement the quantity of water dedicated to fish and wildlife purposes under paragraph (2) of this subsection.... The program should identify how the Secretary intends to utilize, in particular the following options: improvements in or modifications of the operations of the project; water banking; conservation; transfers; conjunctive use; and temporary and permanent land fallowing, including purchase, lease, and option of water, water rights, and associated agricultural land."

Tracy (Jones) Pumping Plant Program – Section 3406 (b)(4)

"Develop and implement a program to mitigate for fishery impacts associated with operations of the Tracy Pumping Plant. Such program shall include, but is not limited to improvement or replacement of the fish screens and fish recovery facilities and practices associated with the Tracy Pumping Plant."

Contra Costa Canal Pumping Plant - Section 3406 (b)(5)

"…Develop and implement a program to mitigate for fishery impacts resulting from operations of the Contra Costa Canal Pumping Plant No. 1. Such a program shall provide for construction and operation of fish screening and recovery facilities, and for modified practices and operations."

Flow Fluctuations and Reservoir Storage – Section 3406 (b)(9) and (b)(19)

"(9) Develop and implement a program to eliminate, to the extent possible, losses of anadromous fish due to flow fluctuations caused by the operation of any Central Valley Project storage or re-regulating facility…"

"(19) Reevaluate existing operational criteria in order to maintain minimum carryover storage at Sacramento and Trinity River reservoirs to protect and restore the anadromous fish of the Sacramento and Trinity Rivers in accordance with the mandates and requirements of this subsection and subject to the Secretary's responsibility to fulfill all project purposes, including agricultural water delivery."

Red Bluff Diversion Dam – Section 3406 (b)(10)

"Develop and implement measures to minimize fish passage problems for adult and juvenile anadromous fish at Red Bluff Diversion Dam…"

Clear Creek Restoration Program – Section 3406 (b)(12)

"Develop and implement a comprehensive program to provide flows to allow sufficient spawning, incubation, rearing, and outmigration for salmon and steelhead from Whiskeytown Dam as determined by instream flow studies conducted by the California Department of Fish and Game after Clear Creek has been restored and a new fish ladder has been constructed at the McCormick-Saeltzer Dam…"

Spawning and Rearing Habitat Restoration Program – Section 3406 (b)(13)

"Develop and implement a continuing program … to restore and replenish spawning gravel… and rearing habitat … on the American, Stanislaus and Sacramento Rivers … shall include preventive measures…"

Head of Old River Barrier – Section 3406 (b)(15)

"Construct, in cooperation with the State of California and in consultation with local interests, a barrier at the head of Old River in the Sacramento-San Joaquin Delta to be operated on a seasonal basis to increase the survival of young outmigrating salmon that are diverted from the San Joaquin River to Central Valley Project and State Water Project pumping plants and in a manner that does not significantly impair the ability of local entities to divert water…"

Comprehensive Assessment and Monitoring Program – Section 3406 (b)(16)

"…Establish, in cooperation with independent entities and the State of California, a comprehensive assessment program to monitor fish and wildlife resources in the Central Valley to assess the biological results and effectiveness of actions implemented pursuant to this subsection…."

Anadromous Fish Screen Program – Section 3406 (b)(21)

"Assist the State of California in efforts to develop and implement measures to avoid losses of juvenile anadromous fish ... measures shall include but shall not be limited to construction of screens on unscreened diversions, rehabilitation of existing screens, replacement of existing non-functioning screens, and relocation of diversions to less fishery-sensitive areas."

San Joaquin River Restoration Program – Section 3406 (c)(1)

"The Secretary shall " ... develop a comprehensive plan which is reasonable, prudent, and feasible to address fish, wildlife, and habitat concerns on the San Joaquin River, including but not limited to the streamflow, channel, riparian habitat, and water quality improvements that would be needed to reestablish where necessary and to sustain naturally reproducing anadromous fisheries from Friant Dam to its confluence with the San Francisco Bay/ Sacramento-San Joaquin Delta Estuary."

Refuge Water Supply Program – Section 3406 (b)(3), 3406 (d)(1), 3406 (d)(2), 3406 (d)(5)

"3406 (b)(3) Develop and implement a program in coordination and in conformance with the plan required under paragraph (1) of this subsection for the acquisition of a water supply to supplement the quantity of water dedicated to fish and wildlife purposes under paragraph (2) of this subsection and to fulfill the Secretary's obligations under paragraph 3406(d)(2) of this title…."

"3406 (d)(1)Upon enactment of this title, the quantity and delivery schedules of water measured at the boundaries of each wetland habitat area described in this paragraph shall be in accordance with Level 2 of the "Dependable Water Supply Needs" table for those habitat areas as set forth in the Refuge Water Supply Report and two-thirds of the water supply needed for full habitat development for those habitat areas identified in the "San Joaquin Basin Action Plan/Kesterson Mitigation Action Plan Report…"

"3406 (d)(2) Not later than ten years after enactment of this title, the quantity and delivery schedules of water measured at the boundaries of each wetland habitat area described in this paragraph shall be in accordance with Level 4 of the "Dependable Water Supply Needs" table for those habitat areas as set forth in the "Refuge Water Supply Report" and the full water supply needed for full habitat development for those habitat areas identified in the "San Joaquin Basin Action Plan/Kesterson Mitigation Action Plan Report..."

"3406 (d)(5) The Secretary is authorized and directed to construct or to acquire from non-Federal entities such water conveyance facilities, conveyance capacity, and wells as are necessary to implement the requirements of this subsection; provided, that such authorization shall not extend to conveyance facilities in or around the Sacramento-San Joaquin Delta Estuary..."

Ecosystem and Water Systems Operations Models – Section 3406 (g)

"The Secretary, in cooperation with the State of California and other relevant interests and experts, shall develop readily usable and broadly available models and supporting data to evaluate the ecologic and hydrologic effects of existing and alternative operations of public and private water facilities and systems in the Sacramento, San Joaquin, and Trinity River watersheds. The primary purpose of this effort shall be to support the Secretary's efforts in fulfilling the requirements of this title through improved scientific understanding concerning, but not limited to, the following:

(1) a comprehensive water budget of surface and groundwater supplies, considering all sources of inflow and outflow available over extended periods;

(2) related water quality conditions and improvement alternatives, including improved temperature prediction capabilities as they relate to storage;

(3) surface-ground and stream-wetland interactions;

(4) measures needed to restore anadromous fisheries to optimum and sustainable levels in accordance with the restored carrying capacities of Central Valley rivers, streams, and riparian habitats;

(5) development and use of base flows and channel maintenance flows to protect and restore natural channel and riparian habitat values;

(6) implementation of operational regimes at State and Federal facilities to increase springtime flow releases, retain additional floodwaters, and assist in restoring both upriver and downriver riparian habitats;

(7) measures designed to reach sustainable harvest levels of resident and anadromous fish, including development and use of systems of tradeable harvest rights;

(8) opportunities to protect and restore wetland and upland habitats throughout the Central Valley;

(9) measures to enhance the firm yield of existing Central Valley Project facilities, including improved management and operations, conjunctive use opportunities, development of offstream storage, levee setbacks, and riparian restoration."

Use of Project Facilities for Water Banking Section 3408 (d)

"The Secretary, in consultation with the State of California, is authorized to enter into agreements to allow project contracting entities to use project facilities, where such facilities are not otherwise committee or required to fulfill project purposes or other Federal obligations, for supplying carry-over storage of irrigation and other water for drought protection, multiple-benefit credit-storage operations, and other purposes. The use of such water shall be consistent with and subject to State law. All or a portion of the water provided for fish and wildlife under this title may be banked for fish and wildlife purposes in accordance with this subsection."

Land Retirement – Section 3408 (h)

"The Secretary is authorized to purchase from willing sellers land and associated water rights and other property interests … which receives Central Valley Project water under a contract executed with the United States, and to target such purchases to areas deemed most beneficial to the overall purchase program, including the purposes of this title."