Central Valley Project Improvement Act

Public Law 102-575

Annual Report

Fiscal Year 2013

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

January 2014

Cover photographs:

Top: Trinity River. Restoration projects create new fish habitat by increasing bank length. A straight channel, once restricted by the large trees seen in the middle of the new island, is now divided into two channels that each carry 50% of the flow - still allowing boating and fishing. Note the large wood structure that helps direct flows and also provides additional fish habitat by mimicking the natural processes that once maintained anadromous fish habitat in free flowing rivers.

Middle: White-faced Ibis on nest at Kern National Wildlife Refuge.

Bottom: Juvenile steelhead/rainbow trout in a favored feeding location in the Stanislaus River.

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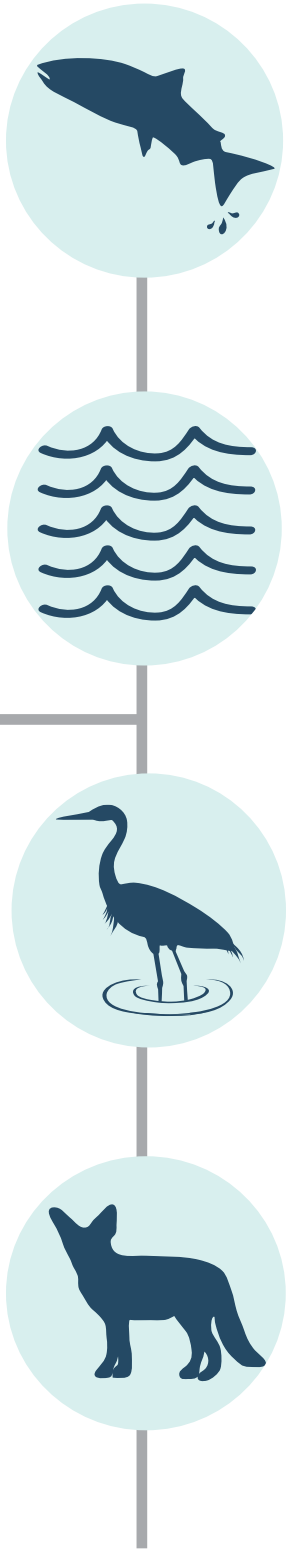

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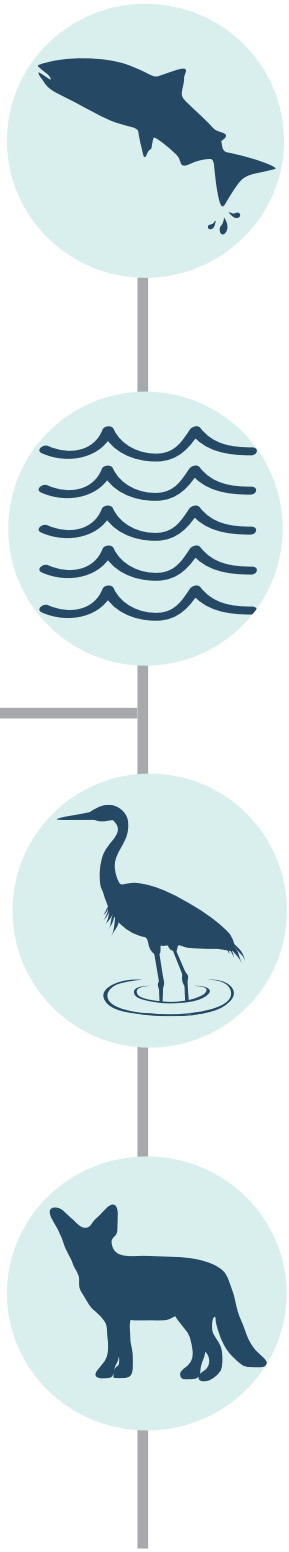


Executive Summary

Executive Summary

PURPOSE

This fiscal year (FY) 2013 CVPIA Annual Accomplishments Report summarizes the actions and accomplishments authorized under the Central Valley Project Improvement Act (CVPIA or Act) of 1992 for October 1, 2012 - September 30, 2013. 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, 2013 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). Chapter 6 shows the current Programs and their status toward completion of goals. Complete and inactive programs are listed along with a description of their status which includes programs that have been closed out and incorporated into other programs. The relevant Sections of the Act are provided for reference in Appendix C.

Tule elk at San Luis NWR.

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. Title 34 of the law 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.

CVPIA Goals and FY 2013 Accomplishments

The current focus of the CVPIA Program is on fish and wildlife restoration, water management, and

Preparing a juvenile salmon with a hydro-acoustic tag for the Whole Facility Evaluation Study, Tracy Fish Collection Facility

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 highlights of 2013 accomplishments. Chapters 2, 3, 4 and 5 of this report provide information on the accomplishments of each resource area, while a synopsis of the programs targets, status to date and 2013 accomplishments are presented in Chapter 6.

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

Ongoing Programs			Completed Programs
Fisheries Resources	**Refuge Resources**		**All Resource Areas**
Central Valley	3406 (b)(3) and 3406 (d)(2) Refuge Water Acquisition Program		3406 (b)(5) Contra Costa Canal Pumping Plant
3406 (b)(1) Anadromous Fish Restoration Program	3406 (d)(1), (d)(2), and (d)(5) Wheeling and Conveyance		3406 (b)(6) Shasta Temperature Control Device
3406(b)(2) Dedicated Project Yield	3406 (d)(5) Facilities Construction and San Joaquin Basin Action Plan Lands		3406 (b)(10) Red Bluff Diversion Dam
3406(b)(3) Instream Water Acquisition Program	**Other Resources**		3406 (b)(11) Coleman National Fish Hatchery
3406 (b)(4) Tracy Pumping Plant Program	3404 Contract Renewals		3406 (b)(17) ACID Diversion Dam
3406 (b)(12) Clear Creek Restoration Program	3405 Water Transfers		3406 (b)(20) Glenn-Colusa Irrigation District Program
3406 (b)(13) Spawning and Rearing Habitat Restoration Program	3406 (b)(1) "other" Habitat Restoration Program		3406 (b)(22) Waterfowl Incentive Program
3406 (b)(15) Head of Old River Barrier	3408 (h) Land Retirement Program		3406(c)(1) San Joaquin River Restoration Program
3406 (b)(16) Comprehensive Assessment and Monitoring Program	**CVP Water Operations Resources**		3406 (c)(2) Stanislaus River Basin Water Needs Program
3406 (b)(21) Anadromous Fish Screen Program	3406 (b)(1)(B) Modified CVP Operations		3406 (d)(6) Central Valley Wetlands Supply
3406 (g) Ecosystem and Water System Operations Models	3406 (b)(7) Flow Standards and Objectives		3406 (e) Supporting Investigations
Trinity River Basin	3406 (b)(8) Short Pulse Flows		3406 (f) Project Fisheries Impact Report
3406 (b)(23) Trinity River Restoration Program	3406 (b)(9) Flow Fluctuations		3408 (i) Water Conservation Program
San Joaquin River Basin	3406 (b)(19) Reservoir Storage		3408 (j) Water Augmentation (Yield Study)
P.L. 111-11 San Joaquin River Restoration Program			

* In FY 2012, the Red Bluff Diversion Dam Program substantially completed construction of the new, 2,500-cfs permanent pumping plant and fish screen. Fine tuning of the pumping plant equipment and monitoring of the riparian mitigation site continues to occur using non-CVPIA Restoration Funds.

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

improves freshwater habitat for Chinook salmon and other anadromous fish species.

In addition to the estimates of natural production, the CVPIA Program uses the suite of structural and non-structural restoration actions from the Plan to measure progress. For example, on Clear Creek and the Trinity River, 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.

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

2013 Accomplishments

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

The Final AFRP Restoration Plan calls for addressing the limiting factors in each watershed. On watersheds where the CVPIA substantially addressed most limiting factors, fish populations have exceeded the doubling goals. These watersheds include Clear Creek, Butte Creek, and Battle Creek. The AFRP continued progress toward actions and evaluations in the Sacramento and San Joaquin watersheds to

Cottonwood and willow pole cuttings being planted with a "stinger" implement mounted on a backhoe as part of the Hammon Bar riparian restoration pilot project, lower Yuba River, California.

enhance passage and habitat, and reduce loss of fish. About 23% of the 289 Restoration Plan actions and evaluations have been completed to date. Of the 128 "time certain" high and medium priority actions, forty-six (36%) have been completed. Although no structural or non-structural actions were completed in FY 2013, various projects to address high priority limiting factors in 20 watersheds continued, including fish passage, entrainment, habitat restoration, and spawning gravel augmentation projects as well as variety of assessments and evaluations that are providing information critical for future projects. The most recent fish count data is presented through 2012.

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

700,000 AF of (b)(2) water was available for fish actions in water year 2013 consistent with the shortage provisions in the Act for dry years.

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

Up to 25,000 acre feet of supplemental water was made available to help meet the Vernalis spring flow target. Flows were not required in 2013 to meet targets, therefore, the acquisition was not exercised.

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

Actions taken to improve the Tracy Fish Facility in FY 2103 include continued work to improve the louver systems, the development of land for onsite research and fish protection, replacement of the secondary louvers, the continued work towards a third fish release site and various research studies that will improve fish capture and reintroduction capabilities.

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

The CCRP provided instream pulse flows and maintained temperature of flows to attract fish and promote upstream movement. The program also evaluated past spawning gravel placement and monitored the impacts of the 2008, 2012 and 2013 wildfires in the South Fork Clear Creek tributary. The program continued monitoring fish populations with 2012 escapement numbers for full-run estimated at 7,631.




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

In 2013, the program placed 14,000 tons of gravel just below Keswick Dam on the Sacramento River and placed 6,000 tons of gravel and improved a 400-yard long side channel at River Bend Park on the American River. The program conducted monitoring of redd surveys and surveys of downstream movement of previously placed gravel on the Stanislaus River.

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

CAMP produced its 2012 annual report assessing the overall effectiveness of actions implemented pursuant to CVPIA section 3406(b) in meeting AFRP fish production targets. CAMP continues to support fish population evaluations through the development of the Rotary Screw Trap Platform, monitoring at several locales within the CVP area, marking and tagging of juvenile fall-run Chinook salmon at the Nimbus Fish Hatchery and Coleman National Fish Hatchery and studies on the Cottonwood and Battle Creeks. The program also supported the Science Based Management Framework in conjunction with the other fisheries programs to develop tools and a process that will enable a comprehensive and prioritized fisheries management approach CVPIA-wide.

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

Construction was completed on 6 new fish screens including the Natomas Mutual Sankey Fish Screen Project (389 cfs); River Garden Farms #3 -Townsite (62 cfs), Alamo Farms #1 (36 cfs), Tisdale Irrigation District #2 (44 cfs), and Cranmore Farms #2 (40 cfs) on the Sacramento River, and Joe Sanchez Farms (24 cfs) in the Sacramento-San Joaquin Delta. The AFSP continued to support the following fish screen projects: RD 2035/Woodland Davis Clean Water Agency Joint Intake, Lake Pritchard, and Colusa Indian Community Council on the Sacramento River; Feather Water District North and South diversions on the Feather River; South Sutter #1 on Auburn Ravine, and West Stanislaus Irrigation District on the lower San Joaquin River.

Ecosystem and Water Systems Operation Models, 3406 (g)

The Modeling Program continued to develop models and supporting data to evaluate water management strategies for the CVPIA Programs. In FY 2013, the program continued ongoing development and modification of the following programs: CalSim II, the CalLite, CalSim 3.0, HEC-5Q based temperature model, C2VSIM (California Central Valley Groundwater-Surface Water Simulation Model), ANN, DSM2, inSALMO, and HydroGeoSphere (HGS). The program also prepared publications and provided support to model applications.

Trinity River Basin

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

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).

In 2013, the TRRP placed gravel at the Lewiston Diversion Pool during the 4,500 cfs peak flow (200 cubic yards (CY)) and at Sawmill rehabilitation site (1,500 CY). Channel rehabilitation projects were implemented at 2 sites on Lorenz Gulch. Five watershed projects including watershed condition assessments and educational outreach activities were completed in FY 2013 that kept approximately 15,500 CY of fine sediment out of the mainstem. The Program conducted monitoring and assessment of biological and physical conditions to determine project effectiveness and salmon production.

San Joaquin River Basin

San Joaquin River Restoration Program, P.L. 111-11

Section 10009 (b)(2) of Public Law 111-11 authorizes up to $2 million (indexed to 2006 funds) from the CVP Restoration Fund for implementation of the San Joaquin River Restoration Program (SJRRP). Activities, including planning and environmental studies aim 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 Central Valley Project Restoration Fund supplements the program's funding under PL 111-11.

In FY 2013, the SJRRP coordinated technical meetings that facilitate the timely public release and discussion of monitoring data, upcoming monitoring efforts, and provide for early input to the Program's high priority construction projects. The Program continued the environmental analysis for the Reach 4B and Mendota Pool Bypass projects, as well as the Conservation Facility development. The Program also established the broodstock population of spring-run Chinook salmon at the Interim Conservation Facility.

CVP Water Operations Resource Area Goals

The CVPIA includes several programs 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 Clear 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.

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

The FFP, in partnership with the 3406 (b)(2) Dedicated Yield Program, surveyed salmon and steelhead redds on Clear Creek, the American River, and the Sacramento River and performed three salmonid isolation pool surveys and multiple steelhead redd surveys on the American River. The Sacramento River Stranding Project, a collaborative project with Golden Gate Salmon Association, began in FY 2013 to reduce fall chinook salmon redd dewatering post-irrigation season. Additionally, a Flow Fluctuation Study was completed on the Stanislaus River. The RSP met the carryover targets for Shasta and Trinity reservoirs with 1.9 million acre feet (AF) and 1,303 thousand AF, respectively.

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. Full Level 4 water is the sum of Level 2 and Incremental Level 4 water.

Water Acquisitions – Refuge Water (Refuge WAP), 3406 (d)(2)

In 2013, the RWAP purchased up to 40,596 AF of water for Water Year 2013 through contracts with Grasslands Water District, San Joaquin River Exchange Contractors Water Authority and Merced Irrigation District.

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

The RWCC delivered an estimated 389,343 AF of Level 2 water and an estimated total of 48,096 AF of Incremental Level 4 water to the refuges during FY 2013. Of the Level 2 water, a total of 51,879 AF was delivered from diverse, non-CVP sources.

Reclamation delivered 100 percent of Level 2 water supplies scheduled by CVPIA refuges in FY 2013. The goal of delivering 422 TAF was not met for several reasons. Contributing factors to refuges not scheduling 100% of their L-2 allocation include:

- Conveyance capacity restrictions to certain refuges;
- Refuge internal distribution systems groundwater pump mechanical failures;
- Unexpected erosion around newly constructed alfalfa valves;
- Regionally, a few refuges received more precipitation than other refuges, reducing their demand for full Level 2 during certain months in FY2013; and
- Water schedules that are developed and implemented on a water-year basis versus a fiscal-year. Much of the RWSP is implemented and operated on a water-year basis, including the Refuge Water Supply Contracts and refuge water conveyance agreements.

Refuge Facilities Construction Component (RFCC), 3406 (d)(5)

To date, 15 of the 19 CVPIA refuges have the external conveyance capacity to receive Full Level 4 water. In FY 2013, the RFCC focused construction efforts at the East Bear Pumping Plant located at the East Bear Creek Unit of the San Luis National Wildlife Refuge Complex, and at the Gray Lodge and Pixley groundwater wells. Initial studies began to assess a water supply conveyance system for the Sutter National Wildlife Refuge and for the final design of the Biggs-West Gridley Water District (BWGWD) Facilities Improvement Project.

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.

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

The HRP focuses on protecting and restoring 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 through restoring lands to native habitat. The HRP also funds research, and captive propagation and reintroduction projects. 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 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 be addressed. The HMP identifies acquisition, maintenance, and restoration of 45,391 acres needing to occur as mitigation related to the CVP Consolidated Place of Use. To date, the program has protected 954 acres of land towards the D-1641 goal.

In 2013, the HRP helped protect 1,953 acres of land through fee title acquisitions in Fresno, Butte and Tulare Counties. The HRP also provided funds for

genetic research for the endangered riparian brush rabbit in San Joaquin County.

Land Retirement Program (LRP), 3408 (h)

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.

In 2013, the LRP planted 5,900 pounds of locally grown seed from native plants on 197 acres of previously acquired land at the Atwell Island site. Through the removal of irrigation, the program reduced the amount of agricultural drainage water at the Atwell Island site by approximately 3,600 AF in FY 2013.

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

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.

To date, 100 long term renewal contracts and 28 interim-renewal contracts have been executed within the various divisions of the CVP. 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 472,393 acre-feet of CVP water for transfer for FY 2013.

FUNDING

For FY 2013, $50.4 million was appropriated to the Restoration Fund. As shown in Figures ES-3, a total of $88.0 million was obligated on CVPIA projects from a combination of funding sources: Restoration Funds ($53.8 million), Water and Related Resources ($24.8 million), state cost share funds ($0.1 million), and Bay-Delta funds ($9.8 million). See Table ES-1 for a breakdown of funding for each CVPIA Program activity in FY 2013.

In 2013, 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 Screen Program, Models, Clear Creek Restoration Program, Comprehensive Assessment and Monitoring Program, and Refuges Program. The Gravel Placement Task Order was completed in FY 2013. The remaining Task Orders and Amendment No. 7 are expected to be in place by the end of FY 2014. FY 2015 will require negotiations of a new cost share agreement.

RECENT DEVELOPMENTS

Refuges Independent Review

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. 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 (http://www.usbr.gov/mp/cvpia/docs_reports/index.html). 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 Independent Review

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) http://www.usbr.gov/mp/cvpia/docs_reports/index.html), which calls for a science-based adaptive management approach, increased focus on the Bay-Delta and increased flows for fish.

It is expected that the entire decision making process with system-wide model, objectives and a recommendation for a supporting organizational structure will be presented for public feedback for implementation in 2015.

Operations Criteria and Plan (OCAP) And Biological Opinions in the Delta

In FY 2013, the CAMP Program contributed to meeting the RPA requirements through on the ground activities. Examples include the monitoring of juvenile Chinook salmon at various locales in the CVP Service Area Boundary.

Table ES-1: FY 2013 Breakdown of Funding Obligations by Program Activity

Section	Activity		Water & Related Funds	Restoration Funds	State Funds	Bay Delta Funds	ARRA Funds	Total Funds
3405(a)	Water Transfer Program		0	0	0	430,184	0	430,184
3406(b)(1)	Anadromous Fish Restoration Program		577,508	8,809,702	0	6,247,468	0	15,634,678
3406(b)(1)	Habitat Restoration Program		0	1,604,246	0	0	0	1,604,246
3406(b)(1)	Trinity River Restoration Program		10,782,901	1,999,143	0	0	0	12,780,044
3406(b)(23)	Trinity River Restoration		3,214,440	0	0	0	0	3,214,440
3406(b)(2)	Dedicated Project Yield		0	551,887	0	0	0	551,887
3406(b)(3)	Water Acquisition Program - Instream Water		2,565,077	2,940,055	0	0	0	5,505,132
3406(b)(4)	Tracy (Jones) Pumping Plant Program	Tracy (Jones) Pumping Plant[1]	1,354,568	0	0	0	0	1,354,568
		Two Gates	0	0	0	18	0	0
3406(b)(5)	Contra Costa Pumping Plant No. 1		22,082	233,391	99,882	0	102,906	458,261
3406(b)(9)	Flow Fluctuations		0	96,965	0	0	0	96,965
3406(b)(10)	Red Bluff Diversion Dam		5,929,812	0	(27,610)	0	(625,071)	5,277,131
3406(b)(12)	Clear Creek Restoration Program		0	612,992	0	0	0	612,992
3406(b)(13)	Spawning Gravel		0	620,753	0	0	0	620,753
3406(b)(16)	Comprehensive Assessment and Monitoring Program		0	1,386,732	0	0	0	1,386,732
3406(b)(20)	Glenn Colusa Irrigation District		351	0	0	0	0	351
3406(b)(21)	Anadromous Fish Screen Program		(63,258)	5,169,957	0	2,800,000	0	7,906,699
PL 111-11	San Joaquin River Restoration Program[2]		0	1,922,015	0	0	0	1,922,015
3406(d)(1)	Refuge Water Supply		Level 2 conveyance included in (d)(5) wheeling					
3406(d)(2)	Refuge Water Supply Level 4		0	5,250,711	0	350,000	0	5,600,711
3406(d)(5)	Refuge Facilities Construction Program	Construction	0	9,583,686	0	0	(3,875)	9,579,811
		Wheeling	200,000	11,277,741	0	0	0	11,477,741
3406(d)(5)	San Joaquin Basin Action Plan		(1,436)	31,985	0	0	0	30,549
3406(g)	Ecosystem & Water System Operations Models		180,840	863,020	0	0	0	1,043,860
3408(h)	Land Retirement Program		45,280	296,843	0	0	0	342,123
3410	CVPIA Administration		584	580,280	0	0	0	580,864
	TOTAL FUNDING OBLIGATED		**24,808,749**	**53,830,104**	**72,272**	**9,827,652**	**(526,040)**	**88,012,737**

[1] A negative amount represents a recovery of a prior year obligation.
[2] Only represents funding from the CVPIA Restoration Fund.

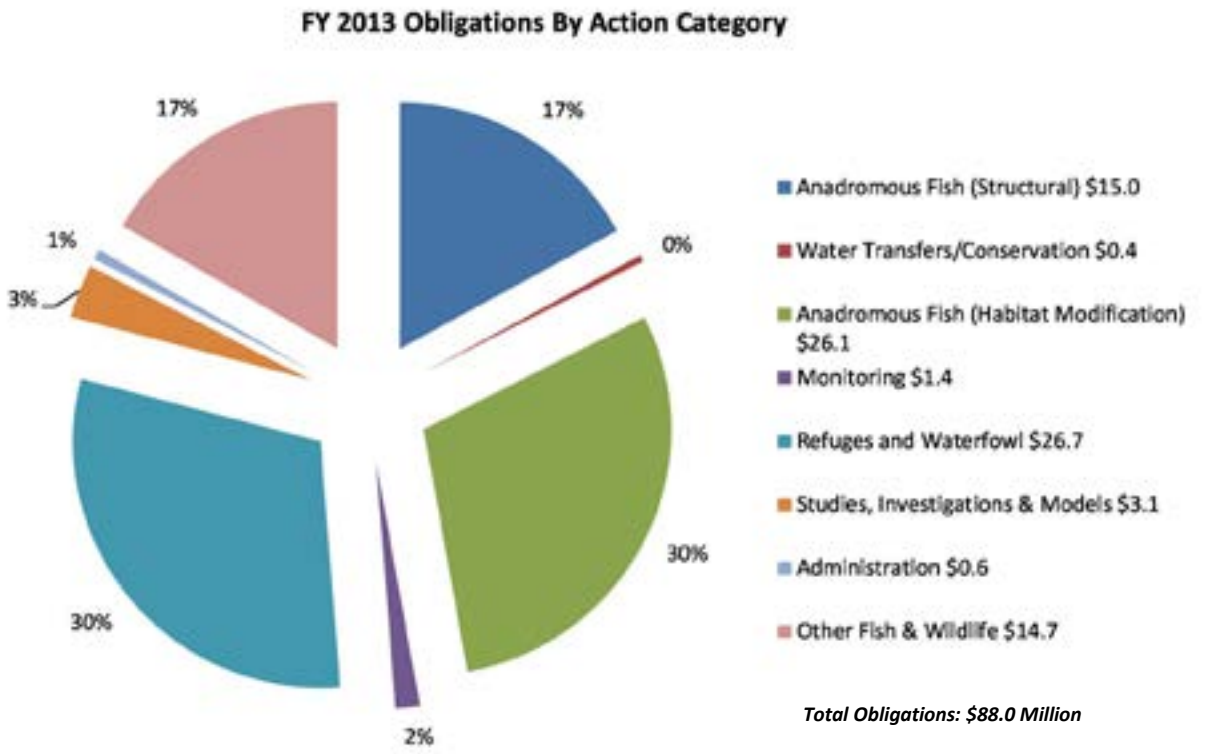


Figure ES-2: FY 2013 Financial Obligations By Action Category (in $ millions)

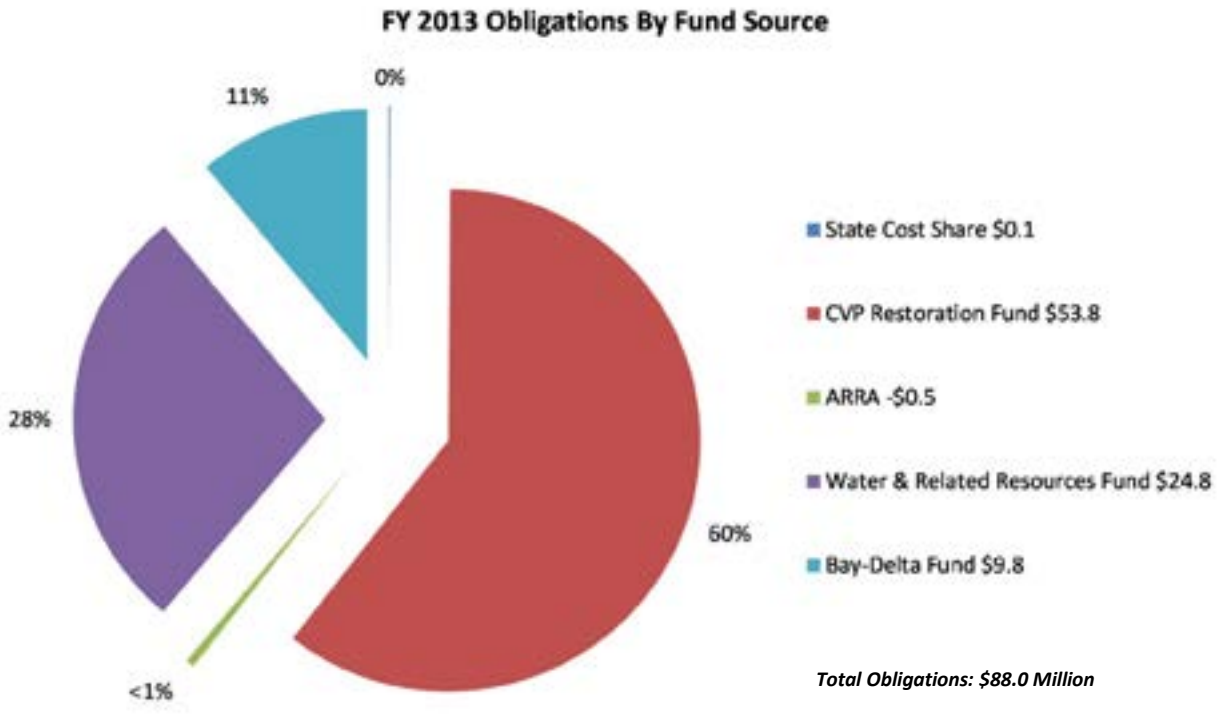
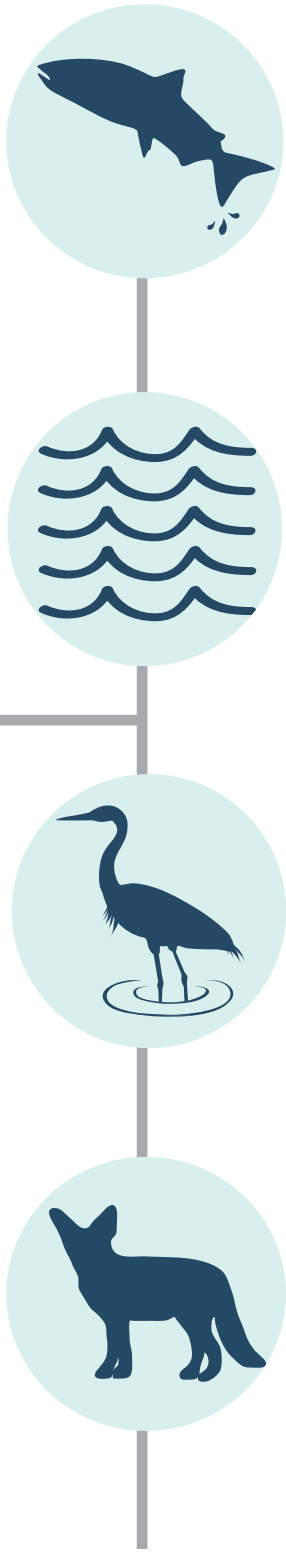


Figure ES-3: FY 2013 Financial Obligations By Fund Source (in $ millions)

Sediment monitoring helps quantify sediment loads and adaptively manage future coarse sediment augmentation based on the transport rates and distance of different sizes of coarse gravel.



Chapter 1

Introduction

Chapter 1 - Introduction

PURPOSE

This fiscal year (FY) 2013 CVPIA Annual Accomplishments Report summarizes the actions authorized under the Central Valley Project Improvement Act (CVPIA or Act) of 1992 and highlights FY 2013 accomplishments (October 1, 2012 - September 30, 2013). 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. This reports describes the goals of the Act, CVPIA background, program funding and recent developments. Program performance measures, 2013 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). Chapter 6 shows the current Programs and their status toward completion of goals.

BACKGROUND

Authorized in 1935, the CVP 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 water in the Central Valley originates in the north and is conveyed southward, primarily through the Sacramento River system (see Figure 1). The water then flows into the Sacramento-San Joaquin River Delta before it is either pumped south or discharged to the San Francisco Bay and the Pacific Ocean.

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 legislation amends previous authorizations of the California Central Valley Project (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 CVPIA addressed the importance of the CVP to the State's water resources, and made significant changes in the policies and administration of the project. 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), partners, organizations and stakeholders during each fiscal year to plan and implement activities.

Figure 1: Central Valley Project (CVP) System

For 75 years, Central and Southern California has relied on the CVP for a large part of its farm, urban and industrial water demands. The ecosystems of the Central Valley, Delta Estuary, San Francisco Bay, and Trinity River are affected by these 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 actions are in addition to and complement the mandates of the fish and wildlife protection, restoration and enhancement provisions of the Act.

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 four broad resource areas: Fisheries, Water Operations, Refuges and Other Terrestrial Resources. 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.

A synopsis of the programs targets, status to date and 2013 accomplishments are presented in Chapter 6.

FUNDING

CVPIA fish, wildlife, and improved water management and conservation actions are implemented through a variety of agreements 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 uses multiple funding sources: CVP Restoration Fund (RF), Water and Related Resources (W&RR), Bay-Delta Fund, American Recovery and Reinvestment Act Fund (ARRA), and the

Predator removal using CO2 at Tracy Fish Facility.

State of California (State). The Act specifies whether funding for each provision is reimbursable from project beneficiaries, a non-reimbursable federal expenditure, 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 for mitigation and restoration payments specified in Section 3407(c)(2). 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 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 $1.6 billion has been obligated by the CVPIA Program over the past 20 years, as shown in Figures 2 and 3.

FY 2013

For FY 2013, $50.4 million was appropriated to the Restoration Fund. As shown in Figure 5, a total of $88.0 million was obligated on CVPIA projects from a combination of funding sources: Restoration Funds ($53.8 million), Water and Related Resources ($24.8 million), state cost share funds ($0.1 million), and Bay-Delta funds ($9.8 million). See Table 1 for a breakdown of funding for each CVPIA Program activity in FY 2013.

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 2012, 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 Screen Program, Models, Clear Creek Restoration Program, Comprehensive Assessment and Monitoring Program, and Refuges Program. The Gravel Placement Task Order was completed in FY 2013. The remaining Task Orders and Amendment No. 7 are expected to be in place by the end of FY 2014. FY 2015 will require negotiations of a new cost share agreement.

Shasta Dam.

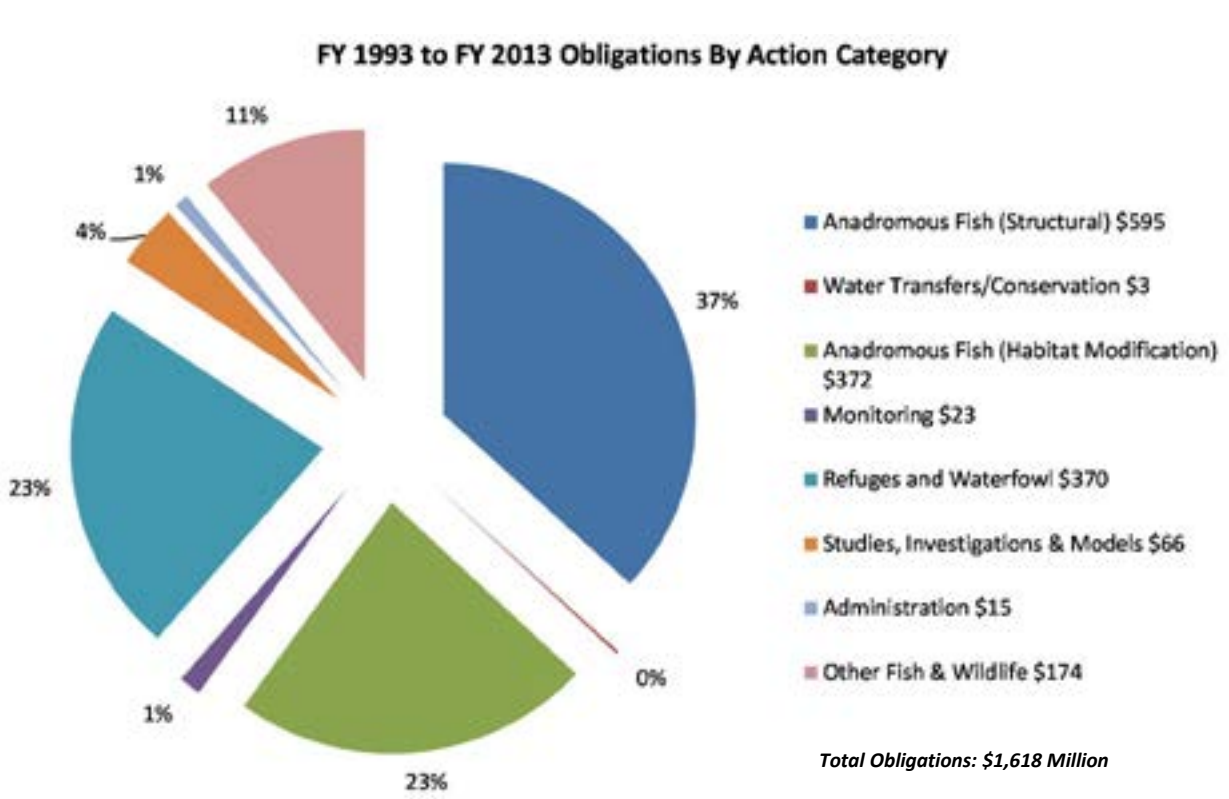


Figure 2: Program Financial Obligations By Action Category to Date (in $ millions)

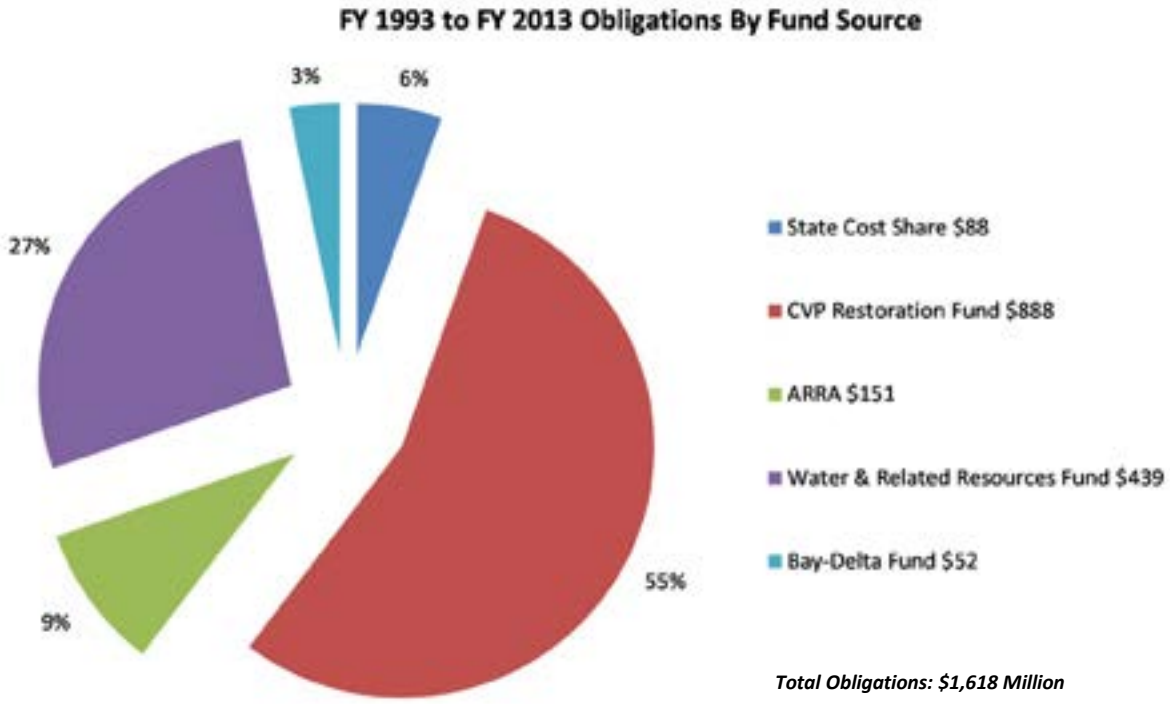


Figure 3: Program Financial Obligations By Fund Source to Date (in $ millions)

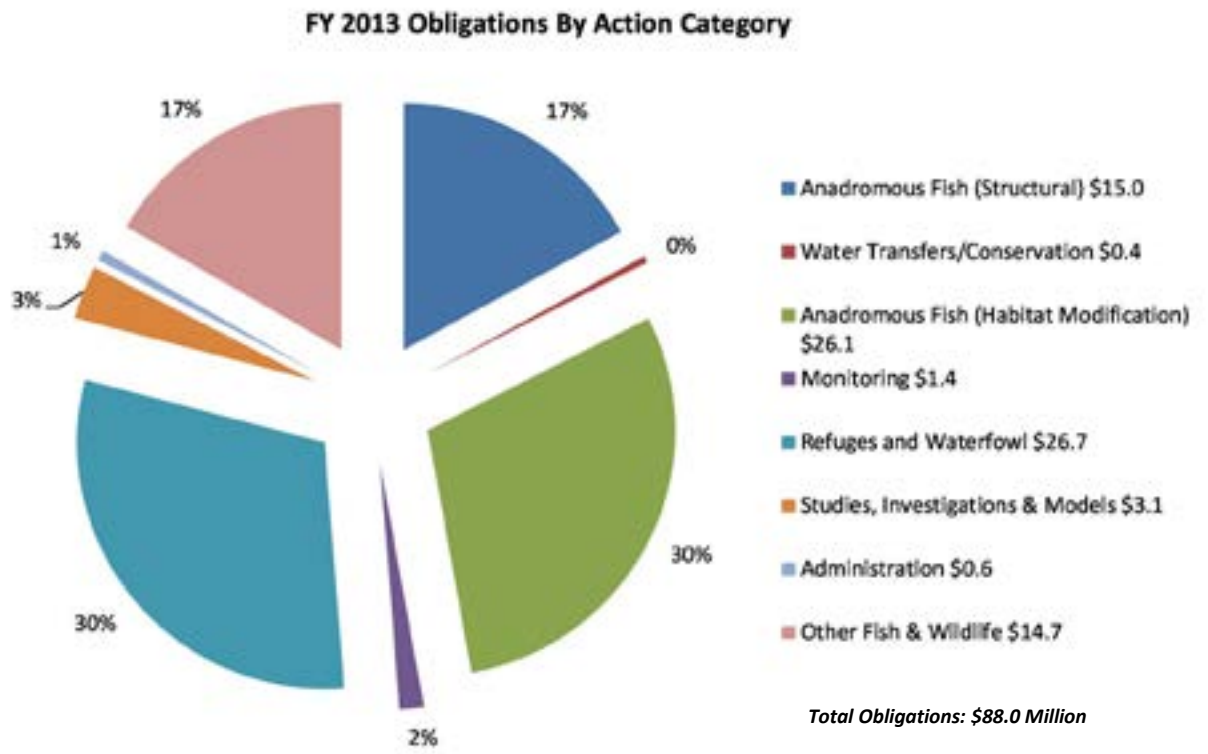


Figure 4: FY 2013 Financial Obligations By Action Category (in $ millions)

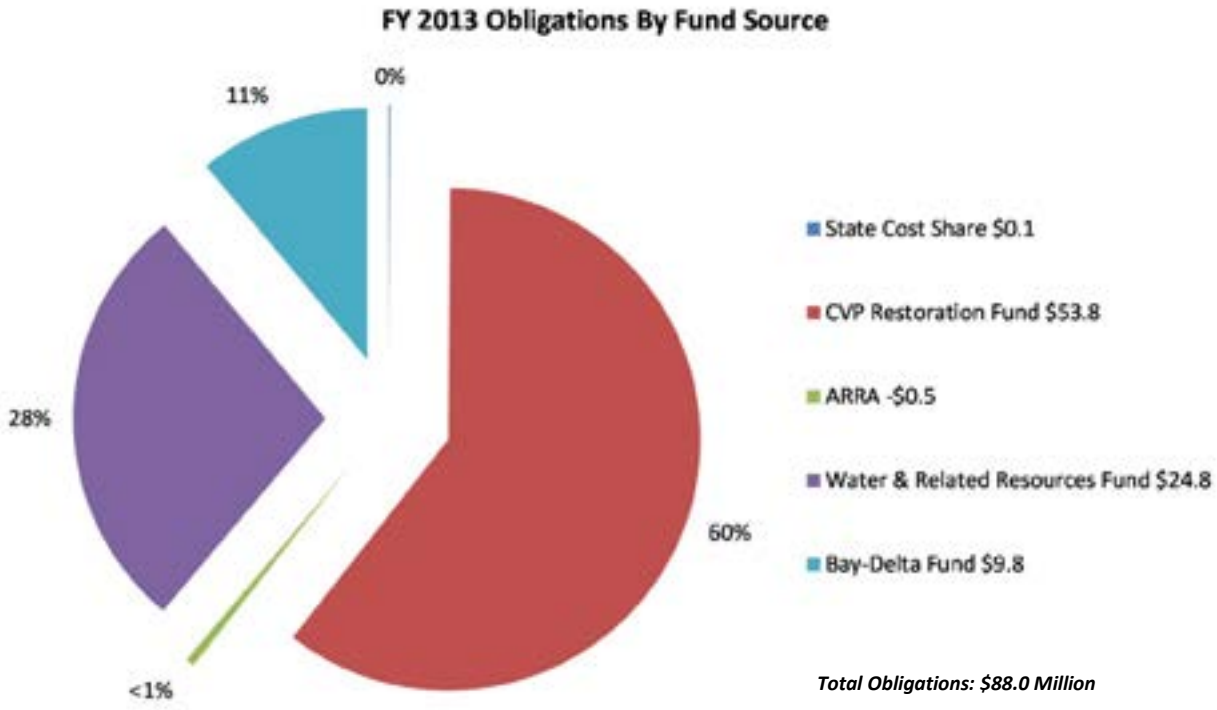


Figure 5: FY 2013 Financial Obligations By Fund Source (in $ millions)

Table 1: FY 2013 Breakdown of Funding Obligations by Program Activity

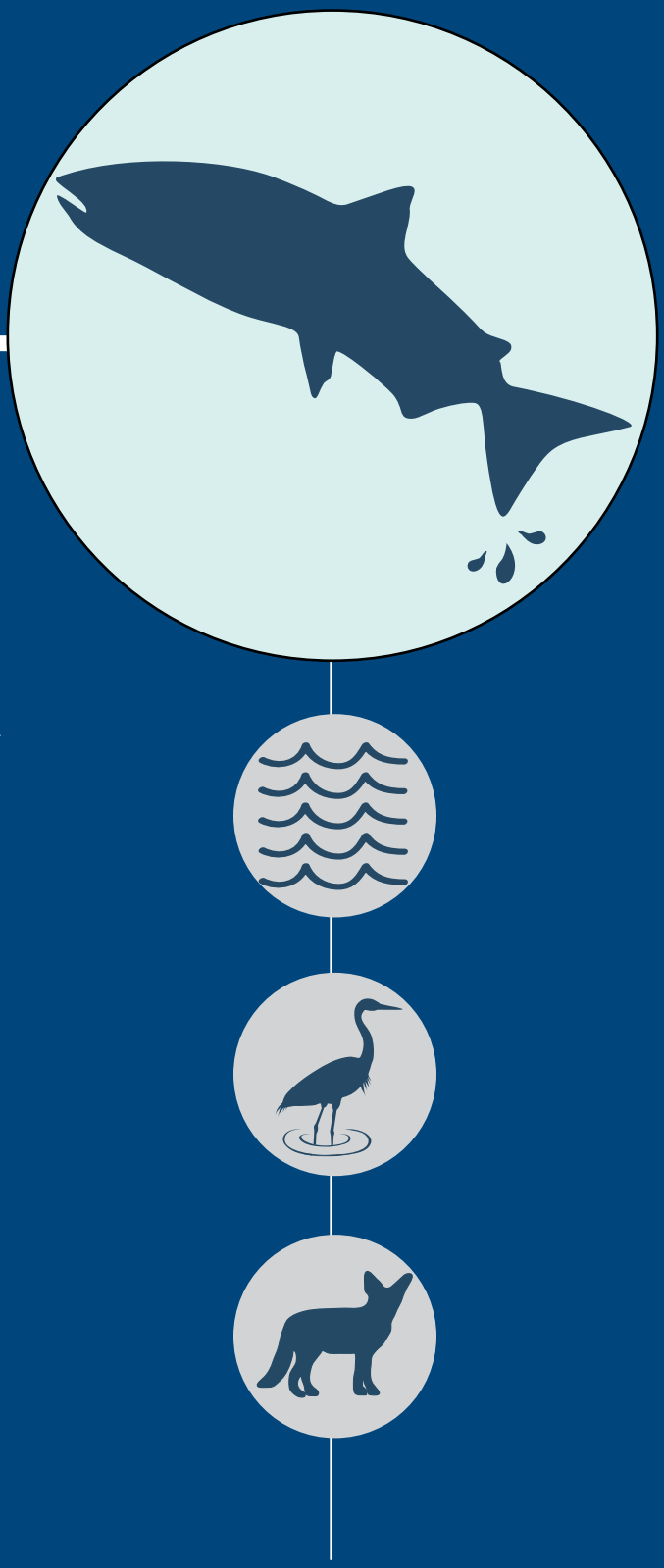
Section	Activity		Water & Related Funds	Restoration Funds	State Funds	Bay Delta Funds	ARRA Funds	Total Funds
3405(a)	Water Transfer Program		0	0	0	430,184	0	430,184
3406(b)(1)	Anadromous Fish Restoration Program		577,508	8,809,702	0	6,247,468	0	15,634,678
3406(b)(1)	Habitat Restoration Program		0	1,604,246	0	0	0	1,604,246
3406(b)(1)	Trinity River Restoration Program		10,782,901	1,999,143	0	0	0	12,780,044
3406(b)(23)	Trinity River Restoration		3,214,440	0	0	0	0	3,214,440
3406(b)(2)	Dedicated Project Yield		0	551,887	0	0	0	551,887
3406(b)(3)	Water Acquisition Program - Instream Water		2,565,077	2,940,055	0	0	0	5,505,132
3406(b)(4)	Tracy (Jones) Pumping Plant Program	Tracy (Jones) Pumping Plant[1]	1,354,568	0	0	0	0	1,354,568
		Two Gates	0	0	0	18	0	0
3406(b)(5)	Contra Costa Pumping Plant No. 1		22,082	233,391	99,882	0	102,906	458,261
3406(b)(9)	Flow Fluctuations		0	96,965	0	0	0	96,965
3406(b)(10)	Red Bluff Diversion Dam		5,929,812	0	(27,610)	0	(625,071)	5,277,131
3406(b)(12)	Clear Creek Restoration Program		0	612,992	0	0	0	612,992
3406(b)(13)	Spawning Gravel		0	620,753	0	0	0	620,753
3406(b)(16)	Comprehensive Assessment and Monitoring Program		0	1,386,732	0	0	0	1,386,732
3406(b)(20)	Glenn Colusa Irrigation District		351	0	0	0	0	351
3406(b)(21)	Anadromous Fish Screen Program		(63,258)	5,169,957	0	2,800,000	0	7,906,699
PL 111-11	San Joaquin River Restoration Program[2]		0	1,922,015	0	0	0	1,922,015
3406(d)(1)	Refuge Water Supply		Level 2 conveyance included in (d)(5) wheeling					
3406(d)(2)	Refuge Water Supply Level 4		0	5,250,711	0	350,000	0	5,600,711
3406(d)(5)	Refuge Facilities Construction Program	Construction	0	9,583,686	0	0	(3,875)	9,579,811
		Wheeling	200,000	11,277,741	0	0	0	11,477,741
3406(d)(5)	San Joaquin Basin Action Plan		(1,436)	31,985	0	0	0	30,549
3406(g)	Ecosystem & Water System Operations Models		180,840	863,020	0	0	0	1,043,860
3408(h)	Land Retirement Program		45,280	296,843	0	0	0	342,123
3410	CVPIA Administration		584	580,280	0	0	0	580,864
	TOTAL FUNDING OBLIGATED		**24,808,749**	**53,830,104**	**72,272**	**9,827,652**	**(526,040)**	**88,012,737**

[1] A negative amount represents a recovery of a prior year obligation.
[2] Only represents funding from the CVPIA Restoration Fund.

Wildflowers: Valley Downingea in Grasslands Resource Conservation District.

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. 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..."

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. 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

PERFORMANCE MEASURES

Central Valley rivers and streams were defined in the January 9, 2001, Final Restoration Plan (FRP) 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. The 22 rivers and streams are specifically called out within Appendix B of the FRP and are listed in Appendix B of this report.

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.

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 priority actions that are "time certain", structural (53), such as fish screens or passage obstacles and non-structural actions (75), such as flow fluctuations or studies (Table 4).

FY 2013 ACCOMPLISHMENTS

The AFRP obligated $8,809,702 from the Restoration Fund and $577,508 from the Water and Related Fund in FY 2013.

Table 2: Yearly Estimates of Natural Production of Anadromous Fish and the Average Natural Production by Species within Central Valley River and Streams, 1992-2012

						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
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	N/A	N/A	192,117	27,778	3,167	4,463
1993		5,153	656,505	68	692	316,846	2,411	1,060	4,229
1994		1,318	599,770	N/A	6,392	382,650	1,063	505	7,811
1995		6,803	N/A	N/A	N/A	709,299	764	4,284	36,884
1996		4,260	1,043,239	N/A	N/A	485,160	453	2,160	6,309
1997		2,591	N/A	1,306	11,689	601,000	1,350	2,079	3,866
1998		4,134	1,356,412	470	8,971	272,337	83,027	5,680	49,676
1999		715	N/A	N/A	N/A	399,951	17,299	5,472	11,163
2000		764	1,591,419	N/A	N/A	658,688	19,933	2,657	11,643
2001		761	N/A	7,117	5,129	525,947	27,679	9,916	31,185
2002		1,914	945,878	1,690	2,775	537,843	56,588	9,195	31,626
2003		9,342	829,111	N/A	N/A	518,803	9,106	10,853	33,319
2004		947	1,312,452	N/A	N/A	507,252	21,277	14,812	28,674
2005		1,741	1,058,679	2,555	2,898	395,601	20,738	21,417	38,813
2006		2,303	N/A	3,144	6,991	227,677	15,575	19,680	14,487
2007		551	752,275	1,530	10,559	106,592	30,326	4,121	16,777
2008		271	1,116,062	1,330	6,257	39,236	4,806	2,555	11,619
2009		624	830,641	10,272	6,258	30,604	4,350	4,070	3,196
2010		683	696,159	N/A	N/A	120,464	5,860	1,534	3,222
2011		892	894,606	N/A	N/A	170,321	5,645	899	6,847
2012		414	742,853	N/A	N/A	293,985	5,539	3,900	30,522
Average	N/A	2,389	964,033	2,948	6,237	356,780	17,218	6,191	18,397
% of Goal	N/A	56%	39%	147%	57%	48%	25%	5.6%	27%

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 2012.

c Estimated abundance of adult striped bass in the Central Valley's anadromous waters, 1992-2012. Estimates for 2007 - 2012 are preliminary and subject to change. Years with missing data is due to CDFW survey frequency which is based upon funding.

d Estimated abundance of green sturgeon >40 inches in total length, 1992-2012. Estimates for 2006, 2007, 2008, and 2009 are preliminary and subject to change. Years with missing data is due to CDFW survey frequency which is based upon funding.

e Estimated abundance of 15-year-old white sturgeon, 1992-2012. 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 1992-2013

Watershed	Total actions and evaluations in Final Restoration Plan	Actions and evaluations completed to date	Actions and evaluations addressed in 2013	% of actions and evaluations completed to date
American River	13	2	1	15
Antelope Creek	2	0	1	0
Battle Creek	12	8	3	67
Bear Creek	2	0		0
Bear River	8	0	1	0
Big Chico Creek	10	3		30
Butte Creek	39	32		82
Calaveras River	6	0	1	0
Central Valley-Wide	15	1	4	7
Clear Creek	7	5		71
Colusa Basin Drain	2	0		0
Cosumnes River	9	2	2	22
Cottonwood Creek	5	1	2	20
Cow Creek	4	0	2	0
Deer Creek	5	0	1	0
Elder Creek	2	0		0
Feather River	12	0	1	0
Merced River	8	0	4	0
Mill Creek	5	1	1	20
Miscellaneous Small Tributaries	1	0		0
Mokelumne River	13	1	1	8
Ocean	3	0		0
Paynes Creek	2	0		0
Upper Mainstem Sacramento River	22	8	2	36
Sacramento-San Joaquin Delta	29	0	4	0
Mainstem San Joaquin River	13	0	1	0
Stanislaus River	9	1	4	11
Stoney Creek	1	0		0
Thomes Creek	6	2		33
Tuolumne River	10	0	2	0
Yuba River	14	0	4	0
All Watersheds[1]	**289**	**67**	**42**	**23**

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

Table 4: Summary of Progress Towards 128 High and Medium Priority "Time Certain" Actions (53 Structural, 75 Non-Structural)

Watershed	53 Structural Actions		75 Non-structural Actions	
	Number of structural actions completed in FY 2013*	Number of structural actions completed since 1992	Number of non-structural actions completed in FY 2013*	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		
Mill Creek		1		
Stanislaus River				1
Thomes Creek				2
All Watersheds		**21**		**25**

* NOTE: Although structural or non-structural actions were not completed in FY 2013, work continued on 20 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. Table 2 presents the average natural production estimate by species since 1992, including the most recent data available.

The Central Valley Chinook salmon (all races) natural production average from 1992-2012 was 398,585 fish which dropped below the 1967-1991 baseline average Chinook salmon production of 497,054. This may be due to the continued lower production returns of fall run fish in 2012 that totaled 293,985 fish (Table 2). Average Chinook salmon natural production for the period 1992-2012 has exceeded the watershed doubling goal target on Clear Creek, Butte Creek, and Battle Creek, and in 2012 the Mokelumne River observed high returns (12,484 naturally produced fish) (Table 5). Substantial gains in fish populations have been observed where investment in flow and passage has occurred. Clear Creek and the Mokelumne River have also had a substantial investment in habitat restoration. The Mokelumne River fish poplulations are also aided by non-AFRP organizations, such as East Bay Municipal Utilities District, that conduct restoration activities. Winter-run natural production numbers had continued to trend upward since 1994 until the poor returns in the last six years (2007-2012). Spring-run numbers have trended upwards since 1991, and production increased in 2012 to 30,522 naturally produced fish. Fall-run natural production has decreased to the baseline levels due to the recent stock collapse observed in 2007-2010 though numbers have increased in some watersheds in 2012. Late fall-run production had increased after 1997, but production decreased and has stayed low after 2007.

Table 2 shows the yearly estimate of natural production for each anadromous fish species since 1992 and Table 5 shows the average natural production estimate of Chinook salmon in each watershed from 1992-2012. Available data are insufficient to estimate natural production of steelhead in the Central Valley. Monitoring data for white sturgeon and green sturgeon in San Pablo and Suisun bays are available for eleven years and ten years, respectively, between 1992 and 2009. The AFRP production target for 15-year-old white sturgeon was met once while the production target for green sturgeon >40 inches (total length) was met in 2001, 2005, 2006, and 2009. The midwater trawl index for juvenile American shad in the Sacramento-San Joaquin River Delta and San Pablo and Suisun bays

Table 5: Average Natural Production Numbers in Each Watershed Compared to the AFRP Doubling Goal Targets, 1992-2012

Watershed	Species	Doubling Goal Target	1992-2012 Average Natural Production Numbers	Percent of Target
American River*	Fall-Run	160,000	104,751	65.5
Antelope Creek	Fall-Run	720	0	0
Battle Creek*	Fall-Run	10,000	17,610	176.0
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	2,251	150.0
Clear Creek	Fall-Run	7,100	10,663	150.0
Cosumnes River	Fall-Run	3,300	814	24.7
Cottonwood Creek	Fall-Run	5,900	1,950	33.0
Cow Creek	Fall-Run	4,600	1,876	40.8
Deer Creek	Fall-Run	1,500	865	57.7
Feather River*	Fall-Run	170,000	89,922	52.9
Merced River*	Fall-Run	18,000	6,517	36.2
Mill Creek	Fall-Run	4,200	1,838	43.8
Miscellaneous Creeks	Fall-Run	1,100	78	7.1
Mokelumne River*	Fall-Run	9,300	8,556	92.0
Paynes Creek	Fall-Run	330	N/A	N/A
Sacramento River	Fall-Run	230,000	70,485	30.6
Stanislaus River	Fall-Run	22,000	5,180	23.5
Tuolumne River	Fall-Run	38,000	6,634	17.5
Yuba River	Fall-Run	66,000	30,983	46.9
Central Valley Wide	Fall-Run	750,000	356,780	47.6
Battle Creek*	Late-fall-Run	550	677	123.1
Sacramento River	Late-fall-Run	68,000	17,367	25.5
Central Valley Wide	Late-fall-Run	68,000	17,218	25.3
Butte Creek	Spring-Run	2,000	14,525	726.2
Deer Creek	Spring-Run	6,500	1,984	30.5
Mill Creek	Spring-Run	4,400	1,204	27.4
Sacramento River	Spring-Run	59,000	684	1.2
Central Valley Wide	Spring-Run	68,000	18,397	27.0
Calaveras River	Winter-Run	2,200	0	0
Sacramento River*	Winter-Run	110,000	6,191	5.6
Central Valley Wide	Winter-Run	110,000	6,191	5.6
TOTAL	**All races**	**990,000**	**398,585**	**40.3**

* Watersheds that contain a fish hatchery.

suggests the AFRP production target for this species was met in three of 21 years between 1992 and 2012. The 2012 midwater trawl index for this species (414) decreased from 2011 (892), and the 2012 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 has occurred in 16 out of 21 years between 1992 and 2012 and the AFRP production target has not been met.

About 23% of all Restoration Plan actions and evaluations (67/289) have been completed in the 1992 to 2013 time period (Table 3). Of the 128 "time certain" high and medium priority actions, forty-six (36%) have been completed since 1992 (Table 4). Although structural or non-structural actions were not completed in FY2013, various projects to address high priority limiting factors in 20 watersheds continued, including fish passage, entrainment, habitat restoration, and spawning gravel augmentation projects as well as variety of assessments and evaluations that are providing information critical for future projects.

Accomplishments in the Sacramento Basin

American River – A structured decision making (SDM) prototype model was developed and further refined to assist in selecting the best actions for restoration given existing conditions, e.g., spawning versus rearing habitat. Additional spawning and side channel habitat was restored in FY2013 with the addition of 4,000 cubic yards of gravel. An additional 2,000 cubic yards of coarse material was used to raise the bed elevation in the spawning area and stabilize areas of active sediment transport. Floodplain benches were also built and instream woody material placed in the restored side channel to enhance rearing habitat for juvenile Chinook salmon and Central Valley steelhead. This project is co-implemented with the 3406(b)(13) program, U.S. Fish and Wildlife Service (USFWS), U.S. Army Corps of Engineers (ACOE), California Department of Fish and Wildlife (CDFW), and the Sacramento Area Water Forum.

Antelope Creek – The Juvenile Fish Passage Improvement Project at Edwards Diversion Dam (Central Valley Evaluation 11) will prevent out-migrating salmonids from becoming entrained in the two diversion canals. In FY2013, the Tehama County Resource Conservation District completed additional analysis to evaluate various alternatives for juvenile fish passage. The Technical Advisory Committee has met with the diverters to determine the most feasible alternative. A final report of the project's history, along with identifying data gaps discovered during detailed design discussions, will be completed early in 2014. This project was a cooperative effort between the USFWS, National Marine Fisheries Service (NMFS), CDFW, and the Tehama County Resource Conservation District.

The Antelope Creek Crossing Repair Project at the Tehama Wildlife Area removed a road crossing that was a barrier to steelhead, spring-run Chinook salmon, and fall-run Chinook salmon during dry years (Central Valley Evaluation 11). Construction was completed in 2012. In FY 2013, the riparian planting portion of the project was completed. The December 2012 storm slightly damaged the road and abutment fill on one end of the bridge which was repaired this year. Monitoring of the streambed for future adjustment occurred in November 2012 prior to the storm and was re-surveyed this year. This project improved passage to 6.5 miles of spawning and holding habitat. This project was a cooperative effort between the USFWS and CDFW.

In 2013, additional stream gages were installed and water quality monitoring was initiated to collect additional information for the Lower Antelope Creek Geomorphic Analysis in Tehama County (Evaluation 1). This is a cooperative project between the USFWS, CDFW, Los Molinos Mutual Water Company, NMFS, and the Tehama County Resource Conservation District.

Battle Creek – The Battle Creek Salmon and Steelhead Restoration Project will restore approximately 42 miles of habitat in Battle Creek and an additional 6 miles of habitat in its tributaries. Of the nine Bureau of Reclamation (USBR) contracts that constitute Phase 1A and 1B, seven have been

awarded. At the Wildcat Dam & Canal site, both the dam & canal have been removed and the associated road repair is completed. A new fish screen and bypass is in place at Eagle Canyon Dam (Actions 2, 6, and 7). The additional pending work has been delayed to be completed until 2016. This project is a cooperative effort among the U.S. Department of the Interior, USBR, USFWS, NMFS, CDFW, and the Pacific Gas and Electric Company (PG&E).

Bear River – AFRP reviewed existing temperature data, field notes, and satellite imagery to identify appropriate locations to conduct more detailed habitat typing and snorkel surveys in Dry Creek (tributary to the Bear River) on Beale Air Force Base and in the Spenceville Wildlife Area. Habitat restoration targeting fall-run Chinook salmon which typically do not over-summer may be warranted.

Cottonwood Creek – Post-construction topographical surveys of the Anderson-Cottonwood Irrigation District (ACID) Siphon Project area in Cottonwood Creek (Action 2) were completed in 2012 and the final report was completed in 2013. This project improved access to 30 miles of spawning habitat for fall- and spring run Chinook salmon and Central Valley steelhead.

Additional data collection for the Cottonwood Creek Sediment Budget Project (Phase 1) including the addition of new stream gages and surveys were implemented in 2013. The USFWS also identified and established index sites and continued to track changes in anadromous fish habitat through 2012 and 2013. The USFWS also completed fish surveys from the confluence with the Sacramento River upstream for approximately 19.2 miles. The survey extended from 9 October 2012 through 27 November 2012 and encompassed a majority of fall-run Chinook salmon spawning in Cottonwood Creek. Coded-wire tags, biological and genetic samples, and associated information were collected. A final report on the sediment budget project is anticipated to be completed in 2014.

The Nonnative Invasive Plant Management and Control Project (Action 5) continued treatments to remove nonnative invasive plants in Cottonwood Creek. In early October of 2012, four miles (76.75 acres) of cut stump treatment to Salt Cedar (Tamarix sp) was applied and the treatment was repeated again on September 2013. This project is a cooperative effort between the USFWS, California Conservation Corps, CDFW, the Cottonwood Creek Watershed Group, and the Tehama County Resource Conservation District.

In 2013, AFRP staff attended six technical team meetings to review draft documents and develop the alternatives analysis (Phase 1) for the South Fork Cottonwood Creek Fish Passage Improvement Project (Central Valley Evaluation 11). A selected alternative is being prepared for the final design phase and the environmental compliance and permitting steps have been initiated. This project is a cooperative effort between the USFWS, CDFW, USBR, NMFS, and the landowner.

Cow Creek – The designs were completed and permitting initiated in 2013 for the Clover Creek Fish Passage/Millville Diversion Dam Restoration Project. This project will open up 10 miles of historic habitat to fall-run Chinook salmon and steelhead (Action 3). This is a cooperative project with the USFWS, CDFW, the California Department of Water Resources (CDWR), the Natural Resources Conservation Service, and the Millville Ditch Association.

A riparian habitat assessment was initiated in 2012 to determine riparian restoration priorities (Action 4) in Cow Creek. Aerial photos and site surveys are being used to inventory plant species, understory growth, and other riparian habitat parameters. In FY 2013, Stillwater Sciences staff reviewed the draft vegetation maps prepared by AIS and completed the field verification and conditions assessment visits during the summer of 2013. Next, the final vegetation maps will be prepared and potential restoration sites will be identified. This is a cooperative project with the USFWS, CDFW, and the Cow Creek Watershed Group.

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 fish passage and screening issues related to man-made barriers and diversions. Field surveys were implemented in 2013. This is a cooperative

project with the USFWS, CDFW, Cow Creek Watershed Group, and the Western Shasta Resource Conservation District.

Deer Creek – Field site surveys were completed during the low flow period in the summer of 2013 for the Lower Deer Creek Falls Fish Passage Improvement Project (Phase 1). This project will assess the current ladder and develop engineered plans to repair or replace the Lower Deer Creek Falls fish ladder (Central Valley Evaluation 11). This project is a cooperative effort between the USFWS, NMFS, USBR, CDFW, and the Deer Creek Irrigation District.

An Interagency Agreement was established to set up a network of acoustic receivers in the Deer and Mill Creek tributaries to the Sacramento River and implement a study that will assess reach specific survival rates of juvenile Chinook salmon from the Upper Sacramento River to the Delta. In 2013, fish collection sites and techniques were agreed upon by the agencies. The initial collection and acoustic tagging of wild juvenile Chinook salmon occurred in the spring of 2013. Data has been collected and is currently being analyzed. An additional year of funding has been added to the agreement. This study is being co-implemented by the USFWS, NMFS, the CDFW Ecosystem Restoration Program, and UC Santa Cruz.

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 FY2013. DIDSON surveys began February 15, 2013 in the lower Feather River. As of July 22, 2013, CDWR completed 49 surveys at 13 sites for a total of about 19 hours of footage. They recorded 4 sturgeon images at Beer Can Beach (RM 8.8) and had 24 detections below Shanghai Bend (RM 24.5), which they estimate represent between 3-5 fish. Three green sturgeon were collected and acoustically tagged. The DIDSON also helped determine where to deploy egg mats in an effort to document spawning. No green sturgeon eggs were collected. This is a cooperative project between the USFWS and CDWR whom cost shared about $20,000 in in-kind services.

Mill Creek – The Mill Creek fish passage assessment and restoration project was funded in FY2011 and additional funding to complete the environmental permitting was modified into the agreement on September 2013 (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. The three structures were surveyed in 2012 and the alternatives report was finalized in 2013. Final designs for the three sites should be completed in early FY 2014. This is a cooperative project between the USFWS, CDFW, Los Molinos Mutual Water Company, and the Mill Creek Conservancy.

A riparian habitat assessment was initiated in 2012 to determine riparian restoration priorities (Action 4) in Mill Creek. Aerial photos and site surveys are being used to inventory plant species, over story growth, and other riparian habitat parameters. In FY 2013, Stillwater Sciences staff reviewed the draft vegetation maps prepared by AIS and completed the field verification and conditions assessment visits during the summer of 2013. Next, the final vegetation maps will be prepared and potential restoration sites will be identified. This is a cooperative project with the USFWS, CDFW, and the Mill Creek Conservancy.

Sacramento River – Redd stranding surveys were implemented between January 11, 2013 and March 19, 2013 in the upper mainstem Sacramento River. Eighty-one redds were observed and monitored of which twelve redds were documented as being dewatered during the sampling period. In the spring of 2013, fish stranding surveys were implemented to observe and report on locations (side channels, pools) that could potentially contain stranded juvenile salmonids that were isolated to varying degrees by flow reductions. During the survey season, seventy-two separate stranding locations between the Keswick Dam (the uppermost limit of anadromy on the mainstem Sacramento River) and the Red Bluff Diversion Dam (a total of fifty-nine river miles) were observed. An Annual Report was completed summarizing the 2012/2013 redd dewatering and juvenile fish stranding data. Maintaining stable flows during egg incubation and emergence are important to reduce negative impacts to fall run and late-fall run Chinook salmon and steelhead fry production on the mainstem Sacramento River. This

project is a cooperative effort between the USFWS, CDFW, CDWR, and Pacific States Marine Fisheries Commission with support from NMFS and Nor-Cal Fishing Guides and Sportsmen's Association.

Yuba River – Four acres were planted with 4,700 cottonwood and willow pole cuttings to restore riparian habitat on Hammon Bar in FY2013, raising the total area planted for the project to five acres. Overall first year survival was 80% for FY2012 plantings, but fell to 50% for FY2013 plantings due to the very dry conditions. The planting area is intended to flood periodically under moderate flows and thus provide juvenile salmonids with improved rearing habitat (Evaluation 4). This project is a cooperative effort between the USFWS, CDFW, Bureau of Land Management (BLM), Americorps, Western Aggregates, PG&E, and the South Yuba River Citizens League. PG&E is cost sharing $50,000 of the total project cost.

The Yuba River Study Utilizing the Spawning Habitat Integrated Rehabilitation Approach (SHIRA) has led to a detailed map and 2-D model of the lower Yuba River. Mapping of the final reach (i.e., the Narrows) was completed as part of a related AFRP project. Reports assessing the 2012 data were presented at the Lower Yuba River Accord Symposium on June 12th, 2013. AFRP staff continued to be an active participant on the Yuba Accord RMT providing technical expertise on anadromous fish habitat restoration and guiding future restoration efforts with the SHIRA model. This project is a collaborative effort between the USFWS, NMFS, Army Corps of Engineers (ACOE), Yuba County Water Agency (YCWA), and the University of California at Davis. ACOE provided $100,000 and YCWA contributed $30,000 in cost-share to further refine the model.

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. Reports assessing the 2012 data were presented at the Lower Yuba River Accord Symposium on June 12th, 2012. AFRP staff continued to be an active participant on the Yuba River Management Team providing technical expertise on anadromous fish population monitoring. This project is a collaborative effort between the USFWS, NMFS, ACOE, CDFW, YCWA, and the Pacific States Marine Fisheries Commission. YCWA provided $120,000 for in-kind services to operate and maintain the fish counting systems on both ladders at Daguerre Point Dam.

Accomplishments in the San Joaquin Basin

Calaveras River – The Caprini Low Flow Crossing Fish Passage Project was completed this fiscal year on September 2013. This project restored access to about 6 miles of habitat (Action 3). Final designs were completed and permitting initiated for the California Central Traction Railroad bridge site. Both projects are a cooperative effort between the USFWS, CDFW, CDWR, Stockton East Water District, Fisheries Foundation of California, and the University of the Pacific. Stockton East Water District is cost-sharing $200,000 of the total project cost.

Cosumnes River – Post-project monitoring for the Cosumnes River Passage Improvement Project was continued in 2013. A DVR security camera system, trail cameras, and a VAKI Riverwatcher fish counting system were installed at North Granlees Dam Fish Ladder and Rooney Dam (a downstream site remediated in 2010). Using the data gathered by these devices, an escapement estimate of 1,071 fall-run Chinook salmon was developed. The monitoring also confirmed that the rebuild of the North Granlees Fish Ladder is performing as designed and fish are easily passing at a wide range of flows and conditions. This project improved fish passage at Rooney Dam and North Granlees Dam restoring unimpeded access to anadromous fish in the Cosumnes River (Evaluation 2).

The final designs to re-connect three historic tidal sloughs and restore 85 acres of floodplain habitat in the Delta within the Cosumnes River Preserve were completed (Delta Evaluations 4 and 6). The NEPA, National Historic Preservation Act Section 106, ESA, Clean Water Act Section 404 and 401, and other applicable permits were developed. Pre-project biological and physical survey activities funded in 2012 were completed. This project is a cooperative effort between the USFWS, CDWR, Ducks Unlimited,

ACOE, and BLM. Ducks Unlimited and the ACOE cost shared an estimated $800,000.

Merced River – AFRP staff continued to administer the rotary screw trap monitoring agreement with Merced Irrigation District. This project documented the number of juvenile salmon and steelhead that outmigrated from the Merced River in 2013. Estimates of juvenile salmonid production were calculated and the existing outmigration database was updated. Additional data to assess effectiveness of flow management and habitat restoration projects was collected. Merced Irrigation District cost shared about $300,000 for the operation of the rotary screw traps from January 5th to June 15th, 2013 and a fish counting weir from September 29th to December 31st, 2012.

Designs and permitting for the Merced River floodplain and channel restoration project at Snelling (Action 3) were completed in 2013. The objective of the project is to improve spawning and rearing habitat for juvenile salmonids on the Merced River by restoring areas degraded by gold mining operations. Pre-project monitoring which included vegetation surveys, nesting raptor survey, channel velocity and depth profiles, channel bathymetry and floodplain topographic surveys, benthic macro-invertebrate sampling, fish population monitoring, and substrate quality assessments were also completed. Approximately 48,136 yds^3 of gravel was excavated from the floodplain in December 2012. During July–August 2013 18,196 yds^3 of spawning gravel material and 7,965 yds^3 of cobble material were generated from dredger tailing material remaining in the floodplain feature area. A stockpile of 3,164 yd^3 of spawning gravel was left on-site for placement in river next year. In total, 22,997 yds^3 of screened material were placed in the Merced River from 29 August to 25 September 2013. This project is a cooperative effort between the USFWS, CDFW, and Merced County.

The final year of construction activities on the Merced River Ranch Project was completed on September 2013 where approximately 87,222 cubic yards of material were excavated and sorted to restore the floodplain and channel. An estimated 26,848 cubic yards of gravel was placed in the Merced River to enhance spawning habitat. The Merced River Ranch Floodplain Enhancement Project restored 4.28 acres of riparian floodplain, created a 0.27 mile long side-channel, and restored 1.23 miles of spawning habitat. This project is a cooperative effort between the USFWS, CDFW, Merced County, and the Merced Irrigation District.

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 FY2013. Staff reviewed and provided comments on the Updated Study Report and various Technical Memorandums on channel armoring, IFIM habitat modeling, temperature criteria, water balance operations models, 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 – Ongoing habitat assessments and modeling of the treatment reaches and downstream affected areas has been completed for the Mokelumne River Spawning Habitat Improvement Project (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 was completed in 2013. This project is a cooperative effort between the USFWS and the East Bay Municipal Utility District (EBMUD).

In FY2013, 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 (about 5,000 acre feet) with Delta Cross Channel (DCC) operations in an effort to improve adult Chinook salmon returns (Delta Evaluation 5). The DCC gates were not closed in October of 2012 due to low flow conditions and water quality concerns in the South Delta. About 80 adult Chinook salmon were acoustically tagged before, during, and shortly after the Mokelumne River fall pulse flow. Preliminary results of this experiment found that straying of Mokelumne River origin fish can be reduced considerably with fall pulse flows and closing the DCC during a portion of October. Modifications to DCC operations can be used to help AFRP achieve its doubling goal in the Mokelumne River. This project is a cooperative effort between

the USFWS, NMFS, CDFW, Woodbridge Irrigation District, and the EBMUD.

San Joaquin River – AFRP staff partnered with the CDFW to maintain VEMCO™ acoustic receivers in the San Joaquin River and continue an annual white sturgeon population assessment. AFRP experimented with egg mats and underwater video survey techniques to identify and map sturgeon spawning habitat. Consequently, 65 white sturgeon eggs were collected in 2012 at four sampling locations in the San Joaquin River, representing at least six spawning events and three new spawning locations. Additionally, 10 and 19 white sturgeon were captured and implanted with acoustic transmitters in 2012 and 2013, respectively. Movements of these fish were tracked to learn more about the spatial and temporal distribution of white sturgeon in the San Joaquin River. Also, the AFRP partnered with USGS to map habitat-related physical characteristics along the San Joaquin River with a multibeam sonar, acoustic Doppler current profiler, and RTK-GPS.

Stanislaus River – FY 2013 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. A report summarizing the FY12 salmonid production data was completed. The second year of the Chinook salmon juvenile acoustic study was completed this year and the annual report was submitted. Juvenile salmon were radio tagged and tracked using both fixed and mobile detectors. The study will identify geographic sources of mortality for juvenile salmonids within the migratory corridor and evaluate the effectiveness of improving survival with a spring pulse flow. These studies assist with evaluating benefits resulting from habitat restoration actions. Tri-Dam cost shared about $300,000 for the operation of the rotary screw traps from January 1st to June 15th, 2013 and the fish counting weir from September 11, 2012 to June 30, 2013.

A construction summary report of the Lancaster Road Floodplain and Side-channel Restoration Project was completed in 2013. Additional post-project monitoring was undertaken and results were presented at professional conferences. Post-project monitoring which included vegetation surveys, channel velocity and depth profiles, channel bathymetry and floodplain topographic surveys, benthic macro-invertebrate sampling, fish population monitoring, and substrate quality assessments were also completed for the Honolulu Bar Floodplain Restoration Project. These projects were designed to increase juvenile salmonid rearing habitat and decrease predation (Action 2). The Stanislaus River floodplain restoration projects were implemented in partnership with ACOE, Oakdale Irrigation District, Cramer Fish Sciences, FishBio, River Partners, and CDFW.

Planning documents and design alternatives were developed for the Knights Ferry Floodplain Restoration Project and the Buttonbush Floodplain Restoration Project (Action 2). Pre-project monitoring data was collected to characterize the pre-project habitat conditions including water depth and velocities, substrate size distribution, and biological data. Topographic and bathymetric surveys were also completed to be used to further refine design alternatives. These projects are a cooperative effort between the USFWS and the ACOE.

The Fourth Annual Stanislaus River Salmon Festival was held on November 3rd, 2012 at the Knights Ferry Recreation Area, with AFRP staff heavily involved in the organization and implementation of the event. The East Stanislaus Resource Conservation District, Modesto Junior College, Great Valley Museum, FishBio, U.S. Army Corps of Engineers, and both Oakdale and Knights Ferry schools played key roles in organizing the event.

Tuolumne River – Post-project monitoring at the Bobcat Flat Restoration Project sampled fish through snorkel and seine surveys and benthic macro-invertebrate sampling in the constructed floodplain and side-channel in the Tuolumne River (Action 2). The Bobcat Flat Restoration Project restored 8 acres of highly disturbed floodplain and about 1.6 miles of fall run Chinook salmon and Central Valley steelhead spawning and rearing habitat in 2011. Adult and juvenile salmon were observed using the improved habitat October 2012 - May 2013. The Final Report was completed in 2013. This project was a collaborative effort between USFWS, CDFW Ecosystem Restoration Program, and Friends of the Tuolumne River.

The AFRP continued to participate in the FERC proceedings for the Don Pedro Hydroelectric Project (P-2299) (Actions 1 and 6; Evaluations 1, 2, 3, and 4). AFRP participated in multiple relicensing meetings in FY2013 and submitted study proposals for Floodplain Habitat Modeling, juvenile Chinook salmon and predator acoustic telemetry studies, and a predator mark and recapture study. Staff also provided detailed comments on the Don Pedro FERC Initial Study Report and on the Don Pedro Chinook Population Model. AFRP is collaborating with numerous stakeholders in the watershed through the relicensing process to develop conceptual models and evaluate the limiting factors and fishery resources in the Tuolumne River.

Aerial photograph of habitat restoration work at the Merced River Ranch that was completed in 2013. Work included the introduction of over 91,000 cubic yards of spawning gravel and construction of a 1,426 foot side channel and 4.28 acre floodplain. This project addresses multiple limiting factors for salmonids in the Merced River, including limited quality and quantity of spawning habitat for adults, limited rearing habitat for juveniles, and degraded riparian habitat and river function.

Bay-Delta Activities

3406 (b)(1)

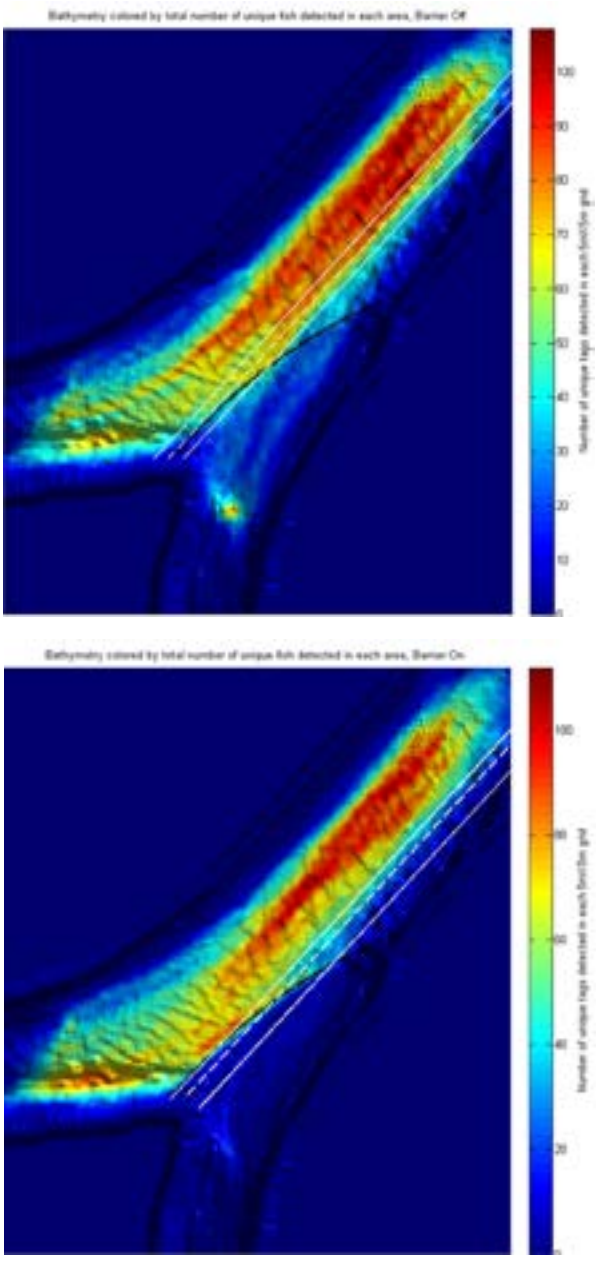
Reclamation's Bay-Delta Office (BDO) coordinates with the CVPIA office to respond to the urgent needs of species in the Bay-Delta. As such, projects typically include those which address CVP operations and the Reasonable and Prudent Alternatives (RPA) prescribed by the regulating agencies.

FY 2013 ACCOMPLISHMENTS

The BDO obligated $6,247,000 from the Bay-Delta Fund in FY13.

BDO carried out several projects to benefit fish through the CVPIA. A network of about 30 tidal flow and continuous water quality monitoring stations were maintained throughout the Delta to measure fish habitat quality, to inform hydrodynamic and sediment modeling efforts, and to provide CVP/SWP operators with an early warning system for the arrival of turbidity plumes containing delta smelt. These data are posted in near-real time on the US Geological Survey NWIS web site. The BDO program also funded the third year of the 'first flush' study which focuses on the relationship between tidal flow and turbidity during the first high flow event of the winter. Two years of field data have been collected, one article has been published, and a second is in review.

The BDO also continued funding for: (1) development of a life cycle model for delta smelt; (2) 3-dimensional hydrodynamic/particle tracking modeling in support of studies of delta smelt hatching distribution simulations and and juvenile salmon migration studies; (3) the six-year study of juvenile steelhead survival in the south Delta (required under the NMFS Biological Opinion); (4) a NMFS study of the genetic impacts of hatcheries on wild stocks; (5) a NMFS study on how large intake structures affect predators and predation on juvenile salmonids; (6) the first phase of a Chinook salmon life cycle model for use in Bay Delta Conservation Plan and other impact analyses and planning studies; and (7) the analysis of salmon movement past the Delta Cross Channel and Georgiana Slough using hydroacoustically tagged hatchery salmon smolts.



Geospatial data representing that a combination of light, sound and bubbles deters juvenile Chinook salmon movement into Georgiana Slough to improve survival.

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 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 and riparian rehabilitation and floodplain infrastructure improvements. Together, these actions will increase and enhance 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 of the Trinity River between Lewiston Dam and the confluence with the North Fork of the Trinity River as well as flow releases and sediment transportation that benefit the entire riverine system.

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.

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 tons (7000 CY) 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

Table 6: FY 2012 Salmonid Production, Natural vs. Hatchery[1]

	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
2011	16,071	5,757	7,026	1,379	27,518	5,349	14,390	4,707
2012	52,687	17,730	14,666	7,939	17,461	6,712	5,737	7,356
Average	16,110	6,079	4,851	1,890	19,175	8,918	12,347	11,566

[1] 2013 data is not available until January 2014.

[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. Trinity River Basin estimate for 2001 - 2012 (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.

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 2013 ACCOMPLISHMENTS

In FY 2013, the Trinity River Restoration Program obligated $3,214,440 from the Water & Related Resources Fund (b)(23), $10,782,901 from the Water & Related Resources Fund (b)(1) "other", Restoration Funds of $1,997,143.

Flows – Water Year 2013 was a Dry Water Year. Water temperature, channel rehabilitation construction, juvenile salmonid numbers and available habitat and riparian vegetation issues were considered in flow scheduling. The ROD prescribed flow for a dry water year is 453,000 AF.

Water volume peak flow was modified from 5 days to a 2 day peak at 4,500 cfs to facilitate an extended springtime flow of 8 days at 2500 cfs to provide additional rearing habitat for a large year class of juvenile salmon.

Course Gravel and Channel Rehabilitation – The Trinity Management Council approved 200 CY of gravel be injected at the Lewiston Diversion Pool during the 4,500 cfs peak flow, and another 1500 CY for dry placement at the Sawmill rehabilitation site. Channel rehabilitation projects were implemented at

Lorenz Gulch and Douglas City encompassing 2 more sites contributing to the 47 sites included in the ROD for a total of 32 sites completed. The program also continued planning and engineering designs for the next four channel rehabilitation projects.

Five watershed projects including watershed condition assessments and educational outreach activities were completed in FY 2013 that kept approximately 15,500 CY of fine sediment out of the mainstem.

Monitoring and Assessment – Approximately $5 million was obligated in FY 2013 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 are shown in Table 6. 2013 data was not available as of the date when this report was developed.

Other results are included in the TRRP performance measures documents mentioned above as well as in reports located on the TRRP Online Data Portal (http://odp.trrp.net/).

Table 7: Annual ROD Flows and Peak Releases to Trinity River, 2006-2013

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
2012	Normal	647,000 AF	647,000 AF	6,080
2013	Dry	453,000 AF	453,000 AF	4,500

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

Strategic placement of large boulders in the Trinity River mainstem and constructed split flow channels creates additional fish holding habitat for adult salmon and steelhead.

Table 8: Placement of Coarse Gravel by Year (7,000 Cubic Yard Target), 2003-2013

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
2012	Upper Junction City	0	0
	Lower Steiner Flat	0	
2013	High Flow Injections	200	1,700
	Saw Mill Dry Placement	1,500	
		Total	**48,700**

* 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, 2005-2013

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
2012	Upper Junction City, Upper Steiner Flat	4	63,900	400	1.2	45
2013	Lorenz Gulch	2	56,400	525	1.4	52
	Total	**30**	**763,350**	**2,185**	**15.30**	**304**

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

Tracy (Jones) Pumping Plant Program

3406 (b)(4)

The Tracy (Jones) Pumping Plant's six pumps, each capable of pumping between 800 - 1000 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 10.

FY 2013 ACCOMPLISHMENTS

The program obligated $1,354,568 from Water & Related Resources fund for the Tracy Fish Collection Facility, with no funds contributed from the Restoration Fund.

Actions to Improve Tracy Fish Collection Facility

The program moved from design engineering and biological assessments into contracting in support of Action 17 which will improve the louver cleaner systems and allow the louvers to screen fish more efficiently. The contract for the Secondary Louver Replacement project was awarded September 6, 2013. Installation will take place in spring 2014, in effect becoming a prototype for Action 18. Also, work continued 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. Replacement of the secondary louvers (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. The project was funded with RAX Program funding.

The program continued assessments, search of land records and initial reconnaissance was 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 salmon, and evaluation of predatory impacts within the secondary system of the TFCF, and investigated 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.

Tracy Fish Facility Improvement Program Publication for FY2013:

Tech. Bul. 2012-1

Reyes, R., Z. Sutphin, and B. Bridges. 2012. Effectiveness of Fine Mesh Screening a Holding Tank in Retaining Larval and Juvenile Fish at the Tracy Fish Collection Facility. Tracy Fish Collection Facility Studies. Tracy Technical Bulletin 2012-1. U.S. Bureau of Reclamation, Mid-Pacific Region and Denver Technical Service Center. 20 pp.

Volume 48

Svoboda, Connie and M. Horn. 2013. Laboratory Design and Testing of an Electrical Crowder for Predator Reduction at the Tracy Fish Collection Facility. Volume 48. U.S. Bureau of Reclamation, Mid-Pacific Region and Denver Technical Service Center. 45 pp.

Table 10: 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

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. Section (b)(12) calls for 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 and upstream spawning.

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 at that time, the necessity for further work would be subject to future needs. Since that time, the Clear Creek watershed has experienced two major wildfires, the Moon Fire in 2008, and the Dale Fire of July 2012. The federal and state lands affected by the Dale Fire have been subject to some post-fire stabilization measures such as grass-seeding, straw mulching, replanting, and other erosion reduction efforts. The Clover Fire of September 2013 affected the Cottonwood Creek drainage and also burned a smaller area within the Clear Creek watershed. The potential impacts to Clear Creek are not yet fully known.

Gravel Placement (Creation of Spawning Habitat) – The CCRP attempts to replenish Clear Creek spawning habitat areas with 25,000 tons of gravel every year. Clear Creek spawning gravel replenishment goal was erroneously reported in the Final CPAR, 2009 as 17,000 tons annually. This unit of measure should have been cubic yards. Applying a conversion factor, 17,000 cubic yards of spawning gravel equates approximately to 25,000 tons. This correction first occurred in the 2012 Accomplishment Report and therefore, the percentage of annual goal for this year forward will appear smaller than past years of the same amounts of gravel. 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 various 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.

FY 2013 ACCOMPLISHMENTS

In FY 2013, the CCRP obligated $612,992 from the Restoration Fund and no funding from the Water and Related Resources fund.

Gravel Placement (Creation of Spawning Habitat) – Spawning gravel was not placed in Clear Creek during FY 2013 due to limited funding, but will resume in FY 2014.

The second annual evaluation of spawning gravel implementation and monitoring was previously submitted to NMFS as a requirement under the OCAP BO. As a result of studies in 2011 suggesting that gravel sizes specification should be modified in future years to improve use by spring Chinook, a new specification was developed and implemented for the 2012 injections. The FWS conducts on-going monitoring of the spawning gravel and documents the areas being used by salmonids for spawning. These efforts will evaluate the efficacy of the new criteria, and identify whether the criteria needs to be adaptively changed. The monitoring efforts also provides a scientifically-based basis for determining future injection locations and amounts.

Channel Restoration – Phase 3C, the last phase of the restoration project, will be considered for implementation in future years. FWS and BOR began initial efforts to garner funding support from the CVPIA program managers, and the approval of the Clear Creek Technical Team (CCTT) to begin planning efforts for this final phase. The FWS and BOR will start by working on the feasibility design aspects of the project. Thereafter, FWS and BOR will develop a Performance Work Statement to begin the process of securing a contractor to work on the NEPA/CEQA environmental compliance requirements.

Instream Flows and Temperature of Flows – The CCRP met its goal of providing base flows of 200 cfs between October 1–May 31. Although the spring-run population numbers have been in decline, the numbers of spring-run Chinook increased from 8 in 2011 to 68 in 2012, and 652 were observed in 2013, the highest since monitoring efforts began in 1998.

The pulse flows conducted in Clear Creek are beneficial in attracting fish and promoting upstream movement. In the spring of 2013, two pulse flows were provided to help attract spring-run Chinook to Clear Creek. Pre- and post-flow event surveys conducted by FWS indicate that the pulse flows were successful in attracting adult fish; the data is currently undergoing finalization. The strong return of Spring Chinook in 2013 and their response, particularly to the second pulse event (400 pre-pulse, 561 post-pulse; 40% increase) provided an objective means to demonstrate the importance of pulse flow events in benefitting upstream movement. Similar flows will occur each year as directed by the NMFS OCAP BO.

Water temperature targets were met 99% of the time due to the large amount of water brought over from the Trinity River through Whiskeytown Reservoir. The 60°F target from June 1 through September 14 was achieved 100% of the time and the 56°F target from September 15 to October 31 was met 96% of the time.

In 2012, the juvenile salmonid flow habitat relationships Instream Flow Incremental Methodology (IFIM) draft report was released for peer review. Work continued on bio-validation of the models. The resulting 14 IFIM flow-habitat models is being synthesized (integrated) as the "synthesis report" 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. This "synthesis report' is currently in draft form, and upon its completion, the CCTT will provide the report and its recommendations to Reclamation. Reclamation will then submit their recommendations to NMFS for review and approval.

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. Three workshops were conducted during FY 2012. During FY 2013, draft technical documents were provided to the CCRP for initial review. FWS, Reclamation, and CDFW will need to complete formal reviews of these documents to enable their finalization. Thereafter, it is expected that Reclamation will begin formal development of the NEPA/CEQA process.

Adaptive Management and Monitoring

Spawning gravel-size specifications improved based on monitoring – Past spawning ground surveys and spawning habitat suitability surveys identified that Chinook were no longer using the spawning gravel provided by the program in the reach directly downstream of Whiskeytown Dam. Gravel-size distributions suggested that only smaller size gravel was being delivered to spawning areas due to reduced high flows from Whiskeytown Reservoir, and that the size specifications being used for restoration in this area did not contain enough larger material. Therefore gravel size specifications were increased for projects implemented in 2012. Further monitoring will be needed to complete the adaptive management cycle and verify if Chinook use the new gravel. Spawning studies conducted by FWS and geomorphic studies conducted by Graham Matthews and Associates (GMA) also indicated that some spawning gravel projects performed better than others. These results were used to improve projects conducted in 2012 and to prioritize sites for future spawning gravel augmentations. As gravel placement did not take place in 2013, future project efforts will be monitored to evaluate the efficacy of the size criteria which was developed in concert with the CCTT.

Phase 3b restoration, pedestrian bridge, and Lower Clear Creek Aquatic Habitat and Mercury Abatement Project (formerly long-term gravel supply project) – In 2013, planning activities continued to obtain permits to conduct decommissioning of roads used during habitat restoration activities within the Phase 3B areas, and planting riparian and upland areas. The future decommissioning of roads will reduce the amount of habitat fragmentation. Also, the Horsetown pedestrian bridge was completed. The long-term gravel supply project planning and environmental compliance activities for this project continued in 2013. The final EA/EIS is nearing completion, and is expected to be released to the public in early 2014. In addition, the final proposal for this project was greatly improved by the significant learning that has occurred in Clear Creek since 1996. This has included monitoring of birds, riparian vegetation, wetlands, mercury, and benthic macro-invertebrates in addition to geomorphology and fish. Funding from the Ecosystem Restoration Program will allow completion of project construction.

Monitoring the impacts of wildfire will guide erosion control – The aforementioned 2008 wildfire in the South Fork Clear Creek tributary, and subsequent salvage logging and road building contributed to a significant instream sediment problem. These observations led to topographic surveys to quantify the amount of fine sediment delivered to the creek, bulk sampling to estimate changes in sediment size, and snorkel surveys to locate the downstream extent of sand deposition in pools. These actions indicated that the fine material has been progressively moving downstream and out of the Clear Creek system. It appears possible that the amount of fine sediment has been decreased, perhaps by the multiple pulse flows that have occurred since the fire. Since the 2008 fires, the juvenile productivity of steelhead

and spring and fall Chinook had decreased, although it is was not understood why. Recent monitoring by the FWS has indicated that productivity of juvenile salmonids may be increasing. Since the recent 2012 Dale Fire, and the Clover Fire of 2013, monitoring efforts need to continue in Clear Creek system to guide future restoration actions.

Fish and geomorphic monitoring results may improve future pulse flows – Results of past and recent pulse flows suggested that higher flows would provide more favorable geomorphic outcomes. In addition, it was determined that higher flows could have been provided without impacting the ability of the Clear Creek Community Services District to receive water. The CCTT has assisted in adaptively modifying pulse flows in an effort to move more sediment downstream, as well as attracting Spring-run Chinook and stimulating their upstream movement. Therefore in 2013 both higher and lower pulse flows were provided. The Clear Creek Technical Team requested that NMFS modify the OCAP RPA I.1.1 to provide more flexibility and aid in adaptive management. The proposal would allow the Clear Creek Technical Team to recommend to NMFS and Reclamation, changes in the timing, magnitude and duration of the spring attraction flows to better meet objectives of the Clear Creek RPA actions, additional ecosystem goals, operational constraints, and adaptive management. This proposal was prompted by the results from on-going fish, geomorphic, avian and riparian monitoring.

Fish Population Monitoring Suggests Program Success – Monitoring continues to document the overall success of the Clear Creek Restoration Program. No other Central Valley watershed has survived the Chinook fishery collapse nearly as well as Clear Creek. This may be due to increased resilience of the watershed due to CVPIA's habitat restoration. In 2011, fall-run Chinook escapement was 4,841 compared to the average baseline escapement of 1,689 between 1967 and 1991. Escapement appeared lower in 2011 than in the previous 10-years (average of 8,825), in part because the method for estimating escapement was changed. The 2012 fall-run estimate was 7,631. The 2013 escapement is not yet available.

In addition, populations of threatened spring-run Chinook and steelhead have been re-established in the Clear Creek watershed. The recent CDFW Central Valley Steelhead Monitoring Plan and Central Valley Chinook Monitoring Plan recommended that a counting weir be used in Clear Creek to monitor adult populations of salmon and steelhead. In 2012 CVPIA partnered with CDFW to build and install a fish counting weir in Clear Creek near the confluence with the Sacramento River. The weir was in operation during 2013 by CDFW, using video and DIDSON sonar technology for fish counts.

EDM Total Station (digital survey apparatus) was used to map streambed elevations in Clear Creek.

Geomorphologists performing bedload sampling at the Clear Creek Igo site using a cataraft vessel.

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 potential to increase the quality and quantity of spawning and rearing habitat. Two criteria guide the identification of gravel placement sites: the need for spawning and rearing habitat; and accessibility to the river by heavy equipment, helicopter or sluice to deliver gravel or modify the channel.

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, topographic surveys, spawning surveys and rearing surveys. Once the gravel is placed, the SRHP monitors the spawning and rearing occurring at and near the restored sites and makes comparisons to pre-project conditions and control 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 (all Reclamation funded) conducted by the California Department of Fish and Wildlife (CDFW) in the Sacramento, American and Stanislaus rivers; juvenile production monitoring conducted by FWS in the Sacramento River (Reclamation funded), FWS and the Pacific States Marine Fisheries Commission in the American River (CVPIA funded), and private contractor in the Stanislaus River (CVPIA funded). 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 (see Table 11). 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 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 fish are successfully finding suitable sites to spawn and are spawning (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 2013 ACCOMPLISHMENTS

In FY 2013, the SRHP obligated $620,753 from the Restoration Fund.

Sacramento River – In 2013, the program placed 14,000 tons of gravel just below Keswick Dam, or 140% of the annual target of 10,000 tons. This gravel is distributed downstream with high flows. Redd surveys funded separately by Reclamation showed that 75% of the winter-run Chinook salmon spawning occurred upstream of the Anderson Cottonwood Irrigation District diversion dam in 2013. This is the reach affected by gravel injections at Keswick Dam and the section of river with the coolest water to support egg to fry survival.

Stanislaus River – In 2013, no projects were implemented by the program in the Stanislaus River. Monitoring conducted by the program consisted of redd surveys and surveys of downstream movement of previously placed gravel During redd surveys in November and December of 2012, 285 Chinook salmon redds were mapped on the gravel placed in Goodwin Canyon at the float tube pool and cable crossing sites. The peak river-wide redd count was 1,023 redds. The redds on the Goodwin Canyon sites made up 28% of the peak river-wide count. In addition, high densities of rearing juvenile rainbow trout/steelhead, a threatened species in the Stanislaus, were documented rearing at the Goodwin gravel placement sites during snorkel surveys throughout the year. The primary source of gravel to Goodwin Canyon since Goodwin Dam was built has been the recent gravel placements (over the last 15 years or so) so the cumulative movement of this material can be visually monitored with snorkel surveys in the canyon. A 2013 survey showed gravel accumulations creating spawning habitat 0.2 mile downstream of the placement reach. No gravel has reached the downstream end of the large pool at the old stream gauge site located 0.5 mile downstream of the gravel placement site and one mile downstream of Goodwin Dam.

American River – In 2013, the SRHP placed 6,000 tons of gravel and improved a 400-yard long side channel at River Bend Park. The gravel placement represented 86% of the annual target of 7,000 tons. This project was funded by SRHP and AFRP and included participation by multiple agencies including Reclamation, Fish and Wildlife Service, the Water Forum, City of Sacramento, CDFW, and Sacramento County Regional Parks. The project included a designed channel spanning gravel placement (creating approximately 5500 square yards of improved spawning habitat) and enhanced a side channel to reduce stranding of juvenile salmonids at low flows and improve juvenile rearing habitat by incorporating woody material and widening the side channel.

The program continued development of a decision-support model using the Structured Decision Making approach to help determine the most efficient use of management resources to maximize the number and condition of juvenile salmonids leaving the American River. We improved on the predictive model created in FY12 by quantifying the model functions using data and empirical models and will continue to update the model through focused project monitoring. The finished model is intended to be used as a decision support tool to assist in prioritization of sites for restoration (in-channel, side channel, and floodplain) and the type of restoration action (gravel injection, gravel placement, in-channel or out-of-channel rearing habitat restoration) that will provide the greatest benefit to increase the number of juvenile outmigrants.

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. In addition to reports submitted to the (b)(13(program, monitoring activities resulted in publication of a peer-reviewed paper: Zeug, S. C., Sellheim, K., Watry, C., Rook, B., Hannon, J., Zimmerman, J., Cox, D. and Merz, J. (2013), GRAVEL AUGMENTATION INCREASES SPAWNING UTILIZATION BY ANADROMOUS SALMONIDS: A CASE STUDY FROM CALIFORNIA, USA. River Res. Applic.. doi: 10.1002/rra.2680.

Table 11: Gravel Placed by Year in CVP Streams, and Percent of Target, 1997-2013

	Sacramento River (10,000 Ton Target)	% Target	Stanislaus River (3,000 Ton Target)	% Target	American River (7,000 Ton Target)	% Target
1997	31,000	310	2,000	67		0
1998	23,000	230	3,000	100		0
1999	25,000	250		0	6,000	86
2000	32,000	320	1,300	43		0
2001		0	500	17		0
2002	15,000	150	4,000	133		0
2003	8,800	88		0		0
2004	8,500	85	1,200	40		0
2005	7,200	72	2,500	83		0
2006	6,000	60	2,500	83		0
2007	6,000	60	4,100	137		0
2008	8,300	83		0	7,000	100
2009	9,900	99		0	10,600	151
2010	5,500	55		0	16,000	229
2011	5,000	50	5,000	167	20,770	297
2012	15,00	150	3,000	100	24,510	350
2013	14,000	140		0	6,000	86
TOTAL	**220,000**	**130**	**29,100**	**57**	**90,880**	**76**

Chinook salmon spawning in a gravel enhancement site in the Stanislaus River with excited juvenile steelhead/rainbow nearby.

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 AFRP's fish production targets. 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 2012 CAMP Annual Report provides data for 22 Central Valley watersheds, and a broader area that includes San Pablo Bay, Suisun Bay, and the Sacramento-San Joaquin River Delta.

The CAMP depends on other programs and agencies that provide information that the CAMP then synthesizes and summarizes in its annual report. To optimize its program budget, CAMP works with partners whenever possible to complete high-priority monitoring projects.

The CAMP Implementation Plan was developed in 1997. That document describes methods for monitoring nine anadromous fish taxa in California's Central Valley, and provides procedures for assessing the biological results and effectiveness of different categories of restoration activities. The nine anadromous fish taxa in the Plan are: 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 – Establish 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 has one performance measure. That measure requires that the program produce one report each year.

The CAMP Implementation Plan identifies 82 monitoring elements that are required to assess progress toward the AFRP fish production targets (CAMP Objective #1). The Plan also provides a framework to assess the biological response to, and effectiveness of, restoration actions (CAMP Objective #2). The program's goals have recently been expanded to consolidate, standardize, and enhance the collection of data related to the CVP ecosystems (CAMP Objective #3).

FY 2013 ACCOMPLISHMENTS

In FY 2013, the CAMP received $1,386,732 from the Restoration Fund.

The CAMP accomplishments that were completed in FY 2013 are listed below; the accomplishments have been grouped according to the three CAMP

objectives. For the CAMP-funded project activities referenced below where a report was completed, the reports can be accessed on the CAMP website at: http://www.fws.gov/sacramento/Fisheries/CAMP-Program/Documents-Reports/Documents.

CAMP Objective #1

CAMP Annual Report – CAMP produced its 2012 annual report assessing the overall effectiveness of actions implemented pursuant to CVPIA section 3406(b) in meeting AFRP fish production targets.

Constant Fractional Marking Program – Marking and tagging of juvenile fall-run Chinook salmon at the Nimbus Fish Hatchery and Coleman National Fish Hatchery was completed during the spring of 2013. A final report describing this activity was produced. The data from the marking and tagging program is used to quantify the origin of adult salmon (hatchery vs. wild) observed during escapement surveys, and therefore yields more accurate natural production estimates for Chinook salmon.

Quantify the Proportion of Hatchery vs. Wild-Origin Adult Salmon - Cottonwood Creek – A report quantifying the relative contribution of hatchery- vs. wild-origin adult salmon in Cottonwood Creek in 2012 was completed. These data are used to produce more accurate natural production estimates for fall-run Chinook salmon in the Cottonwood Creek watershed.

Quantify Escapement of Adult Steelhead and Spring-run Chinook salmon - Battle Creek – A report documenting the escapement levels of adult steelhead and spring-run Chinook salmon in Battle Creek at the Coleman National Fish Hatchery weir in 2012 was produced.

CAMP Objective #2

CAMP Rotary Screw Trap Platform – Work continued on the development of the CAMP rotary screw trap platform. That product has a database and programming code that will store/process rotary screw trap (RST) data, and be used to develop juvenile Chinook salmon production estimates for different Central Valley watersheds. A final database structure for storing RST data has been created, a user interface with various forms for entering new RST data into the database is finished, the migration of historical data from four watersheds to the database is complete, and the development of computer programming code that will produce juvenile salmon production estimates based on the raw data in the database is nearly complete.

Monitor Juvenile Chinook Salmon Production - Stanislaus River (Caswell State Park) – Rotary screw traps were operated at Caswell State Park on the Stanislaus River during the 2013 rotary screw trap field season; a report documenting those operations will be completed in the fall of 2013. A report documenting the results from the 2012 rotary screw trap field season at Caswell State Park was completed.

Monitor Juvenile Chinook Salmon Production - American River – Rotary screw traps were operated on the American River during all of the 2013 rotary screw trap field season.

Monitor Juvenile Chinook Salmon Production - Clear Creek – A report documenting the production of juvenile Chinook salmon and steelhead on Clear Creek during the 2012 rotary screw trap field season was completed.

Monitor Juvenile Chinook Salmon Production - Sacramento River (Red Bluff Diversion Dam) – A draft document summarizing rotary screw trap operations on the Sacramento River at the Red Bluff Diversion Dam during the 2012 rotary screw trap field season is being developed.

CAMP Objective #3

Develop a Data Management Plan and Associated Data Documentation Forms – The program continued development of the CVPIA data acquisition and management plan (DAMP). In addition to a plan describing laws, requirements, and associated protocols, the program has designed and created a DAMP Excel workbook as an aid in documenting CVPIA data sets. Meetings were held presenting the workbook to program managers to obtain feedback and guidance. Program managers' recommendations are currently being reviewed for implementation.

Performance Goals and Accomplishments – The various program goals and annual accomplishments were compiled and included in a central Excel workbook. The information was reviewed by program managers.

Develop a Science Based Management Framework – Staff from the U.S. Geological Survey were hired and several meetings were held to assist with the development of tools and a framework that will be used to: (1) revisit CVPIA Program objectives and performance measures with State and Federal agencies as well as other stakeholders. Reframe the objectives and performance measures where appropriate, with explicitly stated hypotheses with measurable criteria; (2) update/develop a system-wide conceptual/quantitative model for an area that includes the Bay-Delta and Central Valley headwater tributaries to help guide Program decisions; (3) reassess monitoring and evaluation efforts within the context of revised objectives and a system-wide model; and (4) incorporate scientific reviews into the organizational structure of the Program to evaluate the Program's progress.

USFWS Fisheries Technician Duane Linander releasing a White Sturgeon implanted with an acoustic transmitter. Under the direction of AFRP biologist Zac Jackson, tracking of adult White Sturgeon will continue for the ten year life of the transmitter. Data from this project is critical for resource agencies to protect and manage sturgeon habitat.

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 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 at priority water diversions.

The AFSP can provide matching cost share funds for state and local funding, providing up to 50% of the cost of a fish screen project. The AFSP conducts monitoring at many diversions and fish screens to determine the critical factors related to fish losses, and to assure the effectiveness of constructed fish screens. Fish screen projects are often complex and are sometimes constructed in phases over several years. The three key project phases include feasibility, 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 have conducted fish entrainment monitoring at representative unscreened diversions on the Sacramento River to evaluate potential fish screening benefits and to help determine the highest priority diversions for screening.

FY 2013 ACCOMPLISHMENTS

The AFSP obligated funding from the Restoration Fund in the amount of $5,169,957 and $2,800,000 from Bay-Delta funds.

Screening Diversions

Construction was completed on the 389 cfs Natomas Mutual Sankey Fish Screen on the Sacramento River that replaced two existing diversions on the Natomas Cross Canal. This project also resulted in the removal of an anadromous fish migration barrier (seasonal diversion dam) on the Natomas Cross Canal.

The AFSP also completed construction of four fish screens on the Sacramento River at River Garden Farms #3 -Townsite (62 cfs), Alamo Farms #1 (36 cfs), Tisdale Irrigation District #2 (44 cfs), Cranmore Farms #2 (40 cfs), and one fish screen in the Sacramento-San Joaquin Delta at Joe Sanchez Farms (24 cfs), involving installation of state-of-the-art retractable cylindrical fish screens. Fish entrainment monitoring was also conducted in 2011 and/or 2012 at these five diversion locations. This contributed to an effort to assess the biological benefits of fish screening on the Sacramento River and to help prioritize future fish screening efforts. A final report documenting the results of this monitoring effort ("Evaluation of Fish Entrainment in 12 Unscreened Sacramento River Diversions") was issued in July 2013.

Construction continued on the Yuba City Fish Screen consisting of a 74 cfs diversion on the Feather River. This project will be completed in FY 2014.

The AFSP continued to support design, environmental compliance, and permitting activities for the following fish screen projects: RD 2035/Woodland Davis Clean Water Agency Joint Intake (400 cfs), Lake Pritchard (150 cfs), and Colusa Indian Community Council (22 cfs) on the Sacramento River; : Feather Water District North (78 cfs) and South (40 cfs) diversions on the Feather River; South Sutter #1 (80 cfs) on Auburn Ravine , and West Stanislaus Irrigation District (347 cfs) on the lower San Joaquin River.

See Table 12 for fish screen projects constructed by watershed using AFSP cost share funding.

Table 12: AFSP Projects by Watershed and Cubic Feet per Second (cfs) Screened, 1994-2013

Watershed	Number of Fish Screens	Flow (cfs)
Sacramento	26	4,779
American	1	310
Yuba	1	65
Butte	4	257
Delta	7	137
San Joaquin	2	455
TOTAL	**41**	**6,003**

Completed River Garden Farms #3 (Townsite) Fish Screen.

San Joaquin River Restoration Program

Public Law 111-11

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 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 Wildlife (CDFW). Actions to implement the Settlement are anticipated to be funded using four different funding sources in FY 2014. These include mandatory and appropriated funds in the San Joaquin River Restoration Fund, funds from the State of California, and funds from the CVPIA Restoration Fund. Actions to implement the Settlement will also be accomplished with in-kind services conducted by the State of California through the Department of Water Resources and Department of Fish and Wildlife. This description of program goals and objectives is intended to focus on those activities that are anticipated to be implemented using funds from the CVPIA Restoration Fund. See the Annual Report published by the San Joaquin River Restoration Program for a description of all of the Program's activities (annual reports are available at 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 main stem 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 2013 ACCOMPLISHMENTS

The Program obligated $1,922,015 from the CVPIA Restoration Fund to achieve the following:

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 process to identify study needs and monitoring activities and providing timely release of all quality controlled

monitoring data. In FY 2013, Reclamation funded the Annual Technical Report (ATR) and Monitoring and Analysis Plan (MAP) efforts. These efforts include coordinating the SJRRP's Restoration Goal Technical Feedback Group meetings that facilitate the timely public release and discussion of monitoring data, upcoming monitoring efforts, and provide for early input to the Program's high priority construction projects. The outputs from these efforts were the 2012 ATR in March 2013 and the Final 2013 MAP in November 2012.

Mendota Pool Bypass and Reach 2B Improvements Project – In FY 2013 and in support of the Restoration Goal, Reclamation funded ongoing work towards development of the Environmental Impact Statement/Environmental Impact Report for the Program's Mendota Pool Bypass and Reach 2B Improvements Project. The Purpose of this project is to construct the Mendota Pool Bypass to convey flows at 4,500 cubic feet per second from River Reach 2B downstream to River Reach 3 and ensure fish passage downstream.

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

Trap and Haul Study on the San Joaquin River upstream of the Merced River confluence

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 2013 ACCOMPLISHMENTS

The Modeling Program obligated $863,020 from the Restoration Fund and $180,840 from the Water and Related Fund in FY13.

CalSim II accomplishments for FY13 include (1) modifications of CalSim II codes to use with new WRIMS2 engine and to develop the study results for the 2013 Delivery Reliability Report, (2) modifications of the CalSim II codes to incorporate the D1485, D1641, B2, and BO RPAs and then investigation of the effects of these regulations on water supply and Delta outflow, (3) development of several baseline CalSim II models for the COA negotiations and the COA Agreement re-evaluations, (4) application of CalSim II model to study the feasibly of North Bay Aqueduct (NBA) Alternative Intake for EIR and EIS reports, (5) application of CalSim II model to study the feasibility of raising the dam of San Luis Reservoir and for seismic analysis, (6) modification of CalSim II model to evaluate the proposed flow standards in the San Joaquin Basin under the SWRCB's "Review of the San Joaquin River Flow and Southern Delta Water Quality Objectives", (7) modification of the CalSim II model to evaluate the SWRCB Supplemental Environmental Document and to evaluate proposals being made under the associated settlement process, (11) evaluation of new BDCP alternatives and (12) development of more user-friendly automated data processing packages for input/output analysis and display. These developments and modifications facilitate the use of the model for numerous studies by Reclamation and others which ultimately lead to increased understanding referenced in §3406(g)

CalLite accomplishments for FY13 include (1) implementation of North Delta Diversion option (a.k.a. Isolated Facility), (2) development of a dynamic San Joaquin, (3) addition of an enlarged Shasta Dam option, and (4) addition of an enlarged Sisk Dam option. This involved developing WRESL code, corroborating results with CalSim II, and implementing the new options in the GUI.

CalSim 3.0 accomplishments for FY13 include (1) QA/QC of the model, calibration and validation of hydrology, and stabilization of the model for Sacramento Valley for the beta release, (2) updated precipitations from PRISM in the Sac valley, (3) updated land uses for current and future levels in the Sac valley, (4) refinement of the CalSim 3.0

schematic/presentation tools, and (5) updated model debugging toolbox.

HEC-5Q based water temperature model accomplishments for FY13 include the addition of the American River and the Feather River.

C2VSIM (California Central Valley Groundwater-Surface Water Simulation Model) accomplishments for FY13 include (1) completion of C2VSIM final report for the historical simulation 1922-2009 and associated appendixes and released to the public in July, 2013, (2) holding a two day public workshop on the C2VSIM model in January 2013, (3) participation in the CWEMF Peer Review Public workshop on integrated hydrological models in April, 2013, (4) publication of a DWR-UC Berkeley joint paper on the impact of extended droughts on Central Valley water resources and cropping which appeared in the July-Sep issue (vol. 3 issue 3) of the British Journal of Environment and Climate Change, and (5) implementation of the San Joaquin portion of C2VSIM into CalSim 3.

ANN Model accomplishments for FY13 include incorporation of the turbidity estimation in the Delta channels.

DSM2 model accomplishments for FY13 include (1) recalibration of DSM2 version 8.1 for beta release, (2) improvement of applying DETAW to DSM2 Historical Simulation, (3) supporting Delta emergency response, (4) developing visualization tools to analyze effects of Delta Barriers on water quality, (5) updating the historical X2, and (6) adding fish behaviors to PTM module of DSM2.

inSALMO accomplishments for FY13 include (1) updating the model to versions inSALMO 1.5 and inSALMO-FA including developing user manuals and help files;, (2) publishing a report documenting model validation and calibration (Railsback, S. F., B.C. Harvey, and J. L. White; 2013), (3) organizing a 2-day training session on September 24-25 in Sacramento, CA; and (4) developing a document discussing recommendations for future developments and applications of inSALMO.

HydroGeoSphere (HGS) accomplishments for FY13 include (1) calibration of the HydroGeoSphere (HGS) San Joaquin Valley model, (2) analysis of the sensitivity of land subsidence to different spatiotemporal distributions of groundwater pumping around the Delta-Mendota Canal (DMC), and (3) completion of a final report on the model's development and possible application.

The 3406 (g) program also prepared publications and provided support to model applications for stakeholders. Table 13 presents the nine model types/areas and FY13 accomplishments.

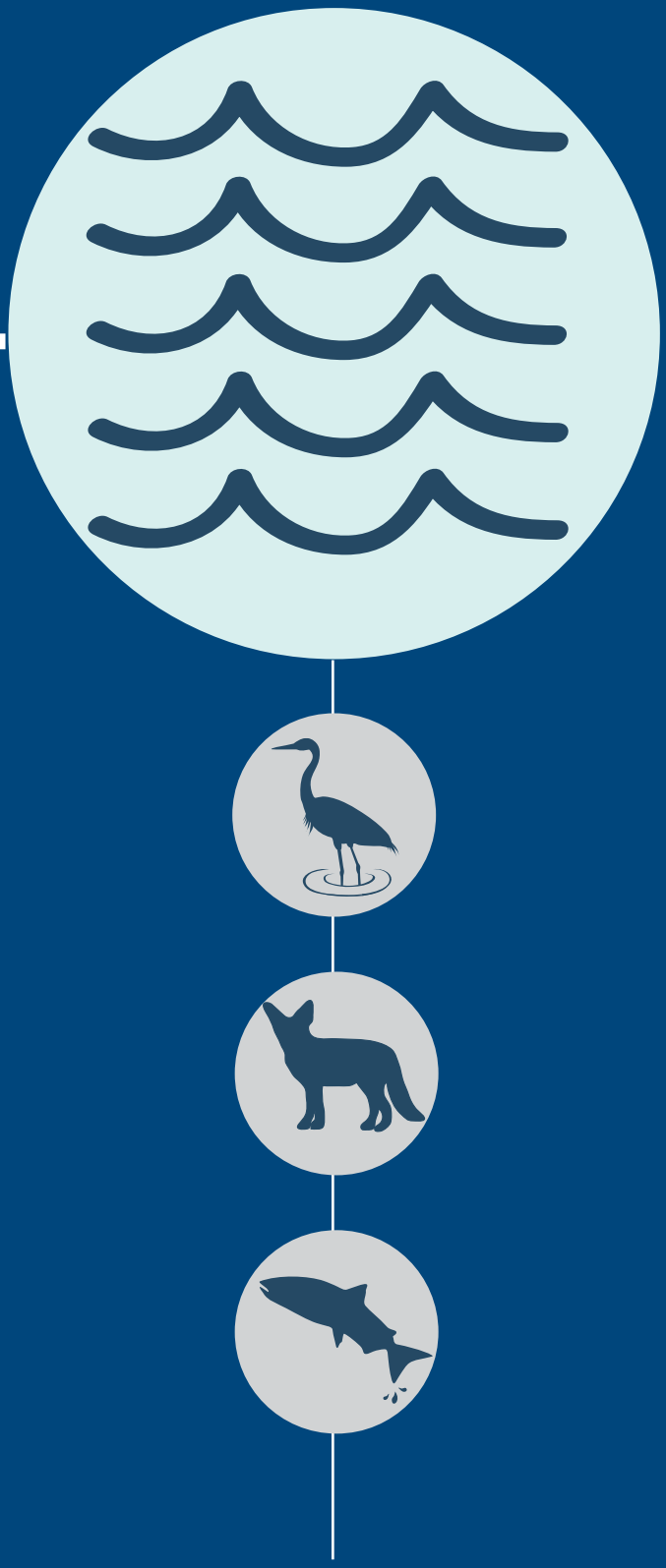
All of the projects that were undertaken in FY2013 met or exceeded the performance targets.

Table 13: Ecosystem and Water System Operations Models Developed To Date

Model Type	Models Developed To Date
Comprehensive water budget of surface and groundwater supplies	CalSim II, CalSim 3.0 CalLite, HGS, ANN, ECOSIM-W, C2VSIM and DSM2
Related water quality conditions, including temperature dynamics related to storage	Upper Sacramento River Water Quality Model (SRWQM). San Joaquin Basin Temperature Model HEC-5Q
Surface-ground and stream-wetland interactions	HydroGeoSphere, CVHGSM (Central Valley HydroGeoSphere Model), C2VSIM
Ecosystem modeling - flow needs to meet restored carrying capacity of streams	inSALMO
Ecosystem modeling - flow to store and maintain natural channel and riparian habitat values	RHEM
Water operations models - CVP and SWP operations	CalSim II, CalSim 3.0 CalLite and ECOSIM-W
Ecosystem modeling in support of sustainable fish harvest levels, including tradable harvest rights	None
Ecosystem modeling to identify opportunities to protect and restore wetland and upland habitat	inSALMO
Water management modeling to include firm CVP yield	CalSim II, CalSim 3.0, CalLite and ECOSIM-W

Chapter 3

CVP WATER OPERATIONS RESOURCE AREA



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. 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. 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 is reduced by up to 100,000 AF. In critically dry years, the target is reduced by up to 200,000 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 2013 ACCOMPLISHMENTS

The program obligated $551,887 from the Restoration Fund in FY 2013.

The Water Year (WY) 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 largely determined by precipitation and is therefore indicative of local and regional conditions that influence climate, snowpack and runoff.

WY 2013 started off much wetter than normal with October – December precipitation values ranging from 150-170% of the 15-year average and reservoir inflow values ranging from 100-180% of the 15-year

average at CVP controlled reservoirs. The wet start was followed by the driest January – June period on record resulting in WY 2013 precipitation values ranging from 70-90% of the 15-year average and reservoir inflow values ranging from 50-70% of the 15-year average at CVP controlled reservoirs. The final WY 2013 classification was Dry for the Sacramento Valley and Critical for the San Joaquin Valley.

700,000 AF of (b)(2) water was available for fish actions in water year 2013. Table 14 presents the historic allocation and use of (b)(2) water. Specific uses for 2013 (b)(2) water was not available at the time of printing.

This program activity partially funds 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, CDFW, 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 14: Allocation Target and Use of (b)(2) Water, 2001-2013

		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	
2012	Below Normal	800,000	800,000		
2013	Dry	700,000	700,000		

* Water Year Type is based on the Sacramento Valley Index.
** 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.

Keswick Dam Gate House

Water Acquisition Program – Instream Water

3406 (b)(3)

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.

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 2013 ACCOMPLISHMENTS

The Instream WAP obligated $2,940,055 from the Restoration Fund and $2,565,077 from the Water and Related Fund. The Instream WAP used this funding for the availability and ability to use up to 25,000 acre feet of supplemental water to help meet the Vernalis spring flow target.

Central Valley rivers and streams were defined in the January 9, 2001, Final Restoration Plan (FRP) 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. The 22 rivers and streams are specifically called out within Appendix B of the FRP and are listed in Appendix B of this report.

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.

Table 15 shows the instream water acquisitions from 1994-2013.

Table 15: Annual (b)(3) Instream Water Acquisitions, Toward 200,000 Acre-Feet Target, 1994-2013

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
2012	25,714	13
2013	0	0
Average	**74,646**	**37**

Sunset at Yolo Bypass

Flow Fluctuations and Reservoir Storage

3406 (b)(9) & (b)(19)

River and stream flow fluctuations can result in fish losses through 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 meet the reasonable and prudent alternatives (RPAs) contained in the 2009 NMFS OCAP BO, the 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 Wildlife (CDFW) 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 2013 ACCOMPLISHMENTS

The FFP obligated $96,965 from the Restoration Fund in FY 2013.

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 2012-2013 on Clear Creek, the American River, and the Sacramento River. Surveys began in mid-December and continued through the end of the spawning season (mid-April). Insights gained will help make informed decisions pertaining to flow fluctuations as well as the potential use of (b)(2) dedicated yield.

Sacramento River – In coordination with the Golden Gate Salmon Association under their project B.11, Sacramento River Stranding, the agencies developed a project description, public draft Environmental Assessment, and a draft agreement to reduce incidents of fall Chinook salmon redd dewatering following the conclusion of irrigation season. Although biological conditions prevented implementation of the project in fall of calendar year 2013, the agencies will continue to prepare to implement the project in 2014.

American River –Three salmonid isolation pool surveys were conducted in January, March, and April of 2013 and multiple steelhead redd surveys took place December 2012 through April 2013. In the isolation pool surveys, a small number of steelhead and Chinook salmon were observed. No rescue measures were implemented. 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 CDFW. 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 2013 with 1.906 MAF and 1,303 TAF, respectively (see Table 16). 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 16: Carryover Storage at Shasta and Trinity Reservoirs, 1998-2013

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
2012	Below Normal	2.6 MAF	1,800 TAF
2013	Dry	1.9 MAF	1,303 TAF

* million acre-feet
** thousand acre-feet

Late afternoon view of Shasta Lake.

Contract Renewals and Water Transfers

3404 (c) & 3405

The CVPIA authorizes and imposes terms on contract renewals and water transfers.

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, 100 long term renewal contracts and 28 interim-renewal contracts have been executed within the various divisions of the CVP. 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. Long term execution of the interim-renewal contracts and the remaining unexpired contracts is pending completion of final biological opinions required to support operation of the CVP. 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, upon which time, Reclamation intends to complete long term contract renewal.

WATER TRANSFERS (3405)

Water transfers are a means by which water supplies under contract can be reallocated from one user to another on a short term or long term basis, to assist in meeting existing and future water needs within California. Water transfers create flexibility in the place and timing of water deliveries that sustain agriculture, municipal and industrial health and safety and provide environmental and recreational benefits. Section 3405 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 a total of 472,393 acre-feet of CVP water for transfer for FY 2013 :

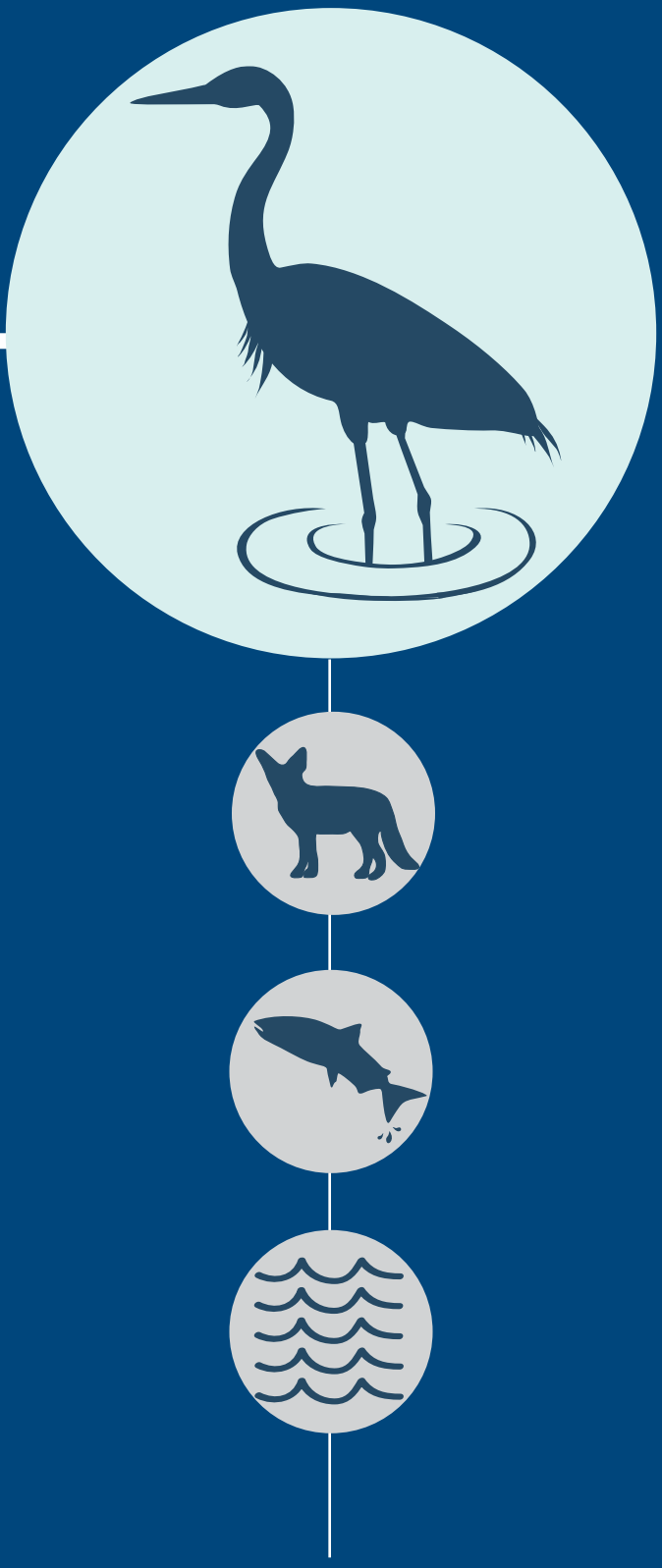
- A total of 412,710 acre-feet of CVP agricultural water was approved for both agricultural and municipal & industrial (M&I) purposes;
- A total of 40,183 acre-feet of CVP M&I water was approved for both agricultural and M&I purposes.

Of the amount of water approved for transfer in FY2013, 19,500 acre-feet was made available to Reclamation's Refuge Water Supply Program.

Dos Amigos Pumping Plant

Chapter 4

REFUGES RESOURCE AREA



Refuge Water Supply Program

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

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

- **3406 (d)(2) 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 7).

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: CDFW, 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, CDFW, 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

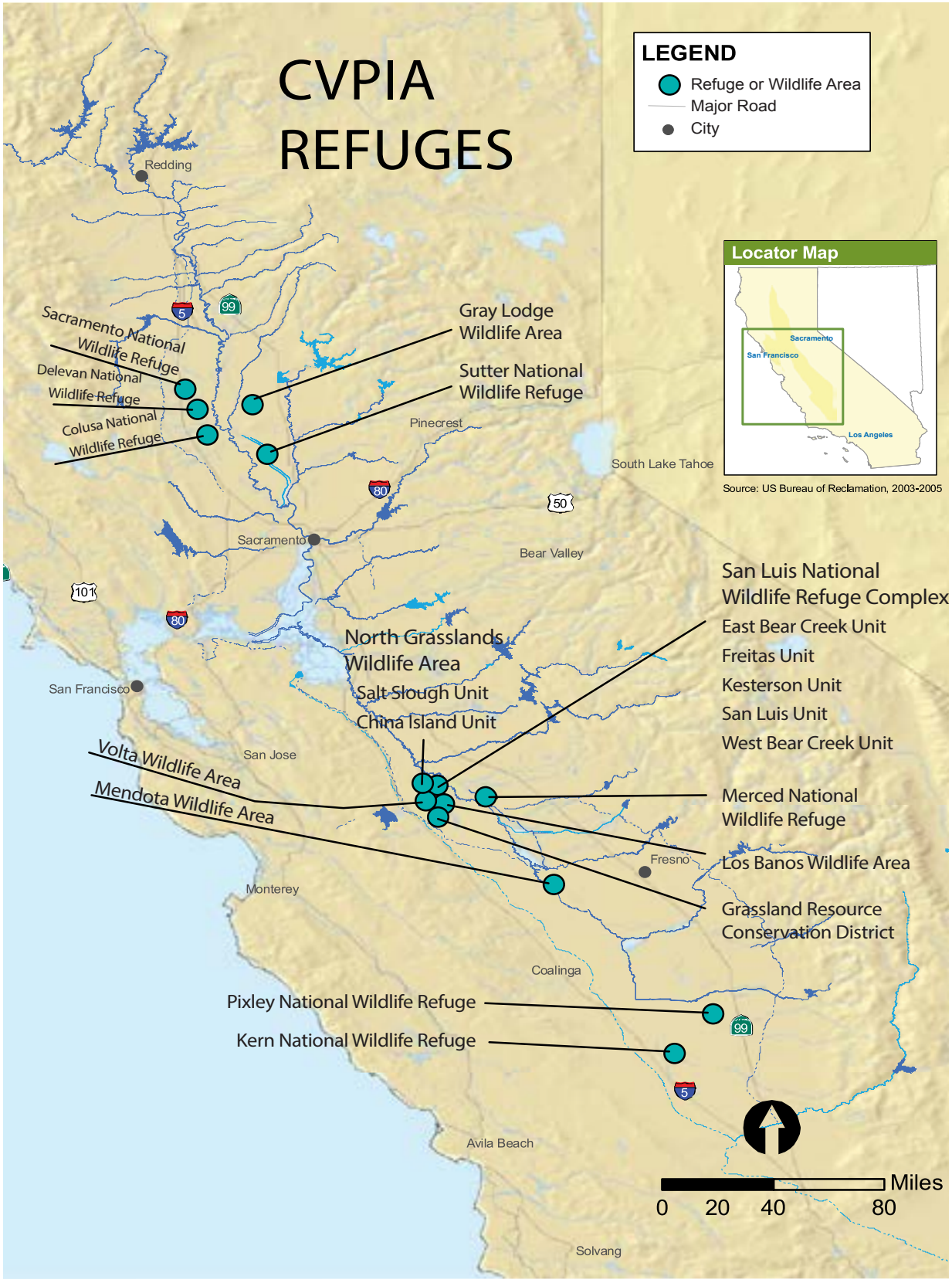
The RWSP strives to diversify its water sources. For example, the RWSP pursues groundwater projects in partnership with local water districts because groundwater does not require external conveyance if the source can be located at or near a refuge. The lower cost of groundwater is also an advantage, 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 2013, 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 2013, 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 (GRCD).

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.


CVPIA
REFUGES
LEGEND
Refuge or Wildlife Area
Major Road
City
Locator Map
Sacramento
San Francisco
Los Angeles
Source: US Bureau of Reclamation, 2003-2005
Redding
Sacramento National Wildlife Refuge
Delevan National Wildlife Refuge
Colusa National Wildlife Refuge
Gray Lodge Wildlife Area
Sutter National Wildlife Refuge
Pinecrest
South Lake Tahoe
Sacramento
Bear Valley
San Luis National Wildlife Refuge Complex
East Bear Creek Unit
Freitas Unit
Kesterson Unit
San Luis Unit
West Bear Creek Unit
North Grasslands Wildlife Area
Salt Slough Unit
China Island Unit
San Francisco
San Jose
Volta Wildlife Area
Mendota Wildlife Area
Merced National Wildlife Refuge
Los Banos Wildlife Area
Fresno
Grassland Resource Conservation District
Monterey
Coalinga
Pixley National Wildlife Refuge
Kern National Wildlife Refuge
Avila Beach
Solvang
Miles
0 20 40 80

Refuge Water Acquisition

3406 (d)(2)

The Refuge Water Acquisition Program (RWAP) is responsible for the acquisition of 133,264 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 (IL4) water consists of annual purchases from willing sellers from both surface and groundwater supplies. In 1998 and 2005 the RWAP acquired a total of 9,300 AF of permanent IL4 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 other groundwater wells including two new groundwater wells constructed at the Volta Wildlife Area under the American Recovery and Reinvestment Act. The groundwater wells will increase water supply reliability and help to diversify Level 2 Water. It is anticipated that together these wells will produce up to 10,000 AF annually.

PERFORMANCE MEASURES

Acquisition - The RWAP's goal is to acquire enough water to deliver 133,264 acre-feet (AF) of IL4 water to refuge boundaries annually (i.e. 33,264 AF plus any additional water needed to cover conveyance losses), excluding replacement water.

FY 2013 ACCOMPLISHMENTS

The RWAP obligated $5,250,711 from the Restoration Fund and $350,000 from the Bay-Delta Fund in FY 2013. Funds were used for water purchases, ground water assessment, program administration and the South-of-Delta (SOD) coordinator.

The RWAP entered into contracts to purchase up to 40,596 AF of IL4 water. This water was acquired for delivery in the 2013 water year, which covers a portion of calendar year 2013 and a portion of calendar year 2014 (March 1 – February 28). The up-to amount (40,596 AF) of purchased water was acquired from a variety of surface and ground water sources. In addition, permanent surface water of up to 9,300 AF and mitigation water of 2,500 AF were acquired at no cost and increased the up-to amount of IL4 to 52,396 AF, which includes water to account for conveyance losses such as seepage and evaporation (see Table 17).

In fiscal year 2013 approximately 48,096 AF of IL4 water was delivered to the refuges: 43,596 AF to nine SOD refuges and 4,000 AF to Delevan NWR, a North-of-Delta (NOD) refuge. See the next section on Conveyance for more information on water deliveries.

Table 17: Incremental Level 4 Acquisitions by Fiscal Year, 2002-2013

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
2012	54,013	41
2013	52, 396	39
Average	**63,833**	**47**

* 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.

Snow Geese: lit by a break in the fog...and preparing for a watery rest with landing gear deployed.

Refuge Water Conveyance

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

The Refuge Water Conveyance (Wheeling) Component (RWCC) 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 RWCC has two primary performance goals, specifically, starting with Water Year 2002 forward:

- Annually provide/deliver Level 2 (L2) water supplies by specified amounts to the refuges totaling 422,251 acre-feet; and
- Annually deliver Incremental Level 4 (IL4) acquired water supplies by specified amounts to the refuges totaling 133,264 acre-feet.

The RWCC delivers L2 and IL4 water supplies to the refuges through agreements with water conveying entities. Established refuge allocations for L2 and IL4 water supplies serve as the Program's goals for water conveyance quantities.

Reclamation entered into five long-term water supply contracts with GWD (1), the Service (2), and CDFW (2) which established Reclamation's commitment to the CVPIA delivery mandates.

Reclamation currently has eight long-term (15-50 years) conveyance agreements that are administered by the RWCC, along with one FWS 40-year conveyance agreement, also administered under the RWCC. The RWCC utilizes cooperative agreements to reimburse delivering entities for costs of conveying L2 and IL4 water supplies through federal, state, and private water distribution systems to the refuges.

PERFORMANCE MEASURES

Delivery – The RWCC goal is to deliver L2 water supplies of 422,251 acre-feet (AF) per year (includes 26,007 AF of replacement water); and IL4 water of 133,264 AF per year.

A portion of L2 water supplies is provided from non-CVP diverse sources, which assist in minimizing possible adverse effects on other CVP contractors.

FY 2013 ACCOMPLISHMENTS

The program obligated $11,360,280 from the Restoration Fund.

Delivery – In 2013, an estimated 389,343 AF of L2 water was delivered to the refuges, representing 92% of the target (Table 18).

Approximately 48,096 AF of IL4 water was delivered, representing 36% of the target. Table 19 shows the targets and deliveries for each refuge for the 2013 Fiscal Year.

Diversification – Of the total of 389,343 AF of L2 water delivered in 2013, a total of 51,879 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.

Table 18: Level 2 (L2), Incremental Level 4 (Inc L4) and Full Level 4 Delivery Water by Year, 2002-2013

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
2012	402,454	95	55,515	42	457,969	82
2013	389,343	92	48,096	36	437,439	79
Average Deliveries	**383,603**	**91**	**66,588**	**50**	**450,190**	**81**

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

** L2 goal includes approximately 26,000 AF of replacement water.

*** Inc L4 goal does not include replacement water.

Great Egret at Delevan NWR.

Table 19: Water Targets and Deliveries for Each Refuge (FY 2013)

	WATER ALLOCATION TARGETS			2013 DELIVERIES			% TARGET ACHIEVED***	
Refuge Name - Region	Level 2 Water (AF)*	IL4 Water (AF)**	Full level 4 Water (AF) (= L2+IL4)	Level 2 Water (AF)	IL4 Water (AF)	Total Delivered (AF) (= L2+IL4)	Level 2 Water (%)	IL4 Water (%)
Grassland Water District (private) — San Joaquin Valley								
Grassland RCD	125,000	55,000	180,000	133,281	25,552	158,833	107	46
CA Department of Fish and Wildlife — Sacramento Valley								
Gray Lodge WA	35,400	8,600	44,000	29,959	0	29,959	85	0
CA Department of Fish and Wildlife — San Joaquin Valley								
Volta WA	13,000	3,000	16,000	10,706	0	10,706	82	0
Los Banos WA	16,670	8,330	25,000	17,787	1,909	19,696	107	23
Salt Slough Unit	6,680	3,340	10,020	7,227	2,882	10,109	108	86
China Island Unit	6,967	3,483	10,450	4,488	2,760	7,248	64	79
Mendota WA	27,594	2,056	29,650	28,345	934	29,279	103	45
U.S. Fish and Wildlife Service — Sacramento Valley								
Sacramento NWR	46,400	3,600	50,000	37,221	0	37,221	80	0
Delevan NWR	20,950	9,050	30,000	16,094	4,000	20,094	77	44
Colusa NWR	25,000	0	25,000	15,254	0	15,254	61	N/A
Sutter NWR	23,500	6,500	30,000	13,432	0	13,432	57	0
U.S. Fish and Wildlife Service — San Joaquin Valley								
San Luis Unit	19,000	0	19,000	19,184	0	19,184	101	N/A
Kesterson Unit	10,000	0	10,000	9,539	0	9,539	95	N/A
West Bear Creek Unit	7,207	3,603	10,810	7,582	0	105	105	0
Freitas Unit	5,290	0	5,290	5,068	N/A	5,068	96	N/A
Merced NWR	13,500	2,500	16,000	12,644	2,500	15,144	94	100
East Bear Creek Unit	8,863	4,432	13,295	7,776	0	7,776	88	0
U.S. Fish and Wildlife Service — Tulare Lake Basin								
Kern NWR	9,950	15,050	25,000	12,976	7,559	20,535	130	50
Pixley NWR	1,280	4,720	6,000	780	0	780	61	0
TOTAL	**422,251**	**133,264**	**555,515**	**389,343**	**48,096**	**437,439**	**92**	**36**

* 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 Component

3406 (d)(5)

The Refuges Facilities Construction Component (RFCC) 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 Act. The RFCC is responsible for the delivery of water to those lands identified in the Report on Refuge Water Supply Investigations (March 1989)(Report) and the San Joaquin Basin Action Plan/Kesterson Mitigation Action Plan (December 1989)(Plan).

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 RFCC is to have the necessary facilities in place for delivery of Full Level 4 (FL4) water supplies to the CVPIA refuges, meeting their timing and scheduling requirements. A FL4 water supply will support optimum wildlife habitat over a broad range of species including targeted Threatened and Endangered species.

The RFCC identified a total of 46 major structures and/or actions (Projects) necessary to provide needed capacity for the delivery of FL4 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 refuge lands indentified in the Plan and 26 Projects are associated with refuges identified in the Report. Those refuges still requiring conveyance facility improvements are: Gray Lodge and Mendota WAs, and Sutter and Pixley NWRs.

An Implementation Plan for refuges identified in the Plan was completed in April 1998, and cooperative agreements with the San Luis Canal Company, GWD, and Central California Irrigation District to convey water to these refuges were completed in summer 1998. Reclamation is currently administering the cooperative agreements, which include construction and rehabilitation of facilities to accommodate the needs of these refuges.

RFCC activities include project integration and coordination with the associated Refuge Water Conveyance Component (RWCC) and Refuge Water Acquisition Component (RWAC) to ensure continuity of methodologies and approaches towards executing and achieving RFCC objectives. Interagency coordination activities are included in this element as well as budget formulation, tracking, and management activities. Additional activities are coordinating planning, design, and construction efforts between agencies and water purveyors (water districts). Reclamation's Mid-Pacific Construction Office (MPCO) provides assistance to the RFCC by administering 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 RFCC is to ensure that all 19 CVPIA refuges have the external conveyance capacity to receive FL4 Water, totaling 555,515 acre-feet (AF), on an annual basis.

FY 2013 ACCOMPLISHMENTS

In FY 2013, the RFCC obligated $31,985 from the Restoration Fund in support of refuges identified in the Plan. In addition, the RFCC obligated $9,583,686 from the Restoration Fund in support of refuges identified in the Report.

In FY 2013, the RFCC contracted for services to provide ongoing repairs to the East Bear Pumping Plant located at the East Bear Creek Unit of the San Luis National Wildlife Refuge.

In FY 2013, the RFCC, in conjunction with the RWCC, completed modification of Gray Lodge and Pixley Groundwater Wells, which included Pixley NWR Alfalfa Valve Erosion Repairs; installation of transducers, timers and oil lube systems.

A contract for a feasibility study was executed for the Sutter National Wildlife Refuge. The study is to assess both an interim solution and identify a long-term comprehensive solution for a permanent reliable water supply conveyance system. The study is expected to be completed in FY14.

In addition, for the Gray Lodge WA, the final design of the Biggs-West Gridley Water District (BWGWD) Facilities Improvement Project will be completed by the end of 2013. Construction of this project is expected to commence in FY 2014. When completed, BWGWD will have sufficient conveyance capacity for FL4 water deliveries to the Gray Lodge WA.

For each of the 19 CVPIA refuges, the conveyance target and actual conveyance capacity are shown in Table 20.

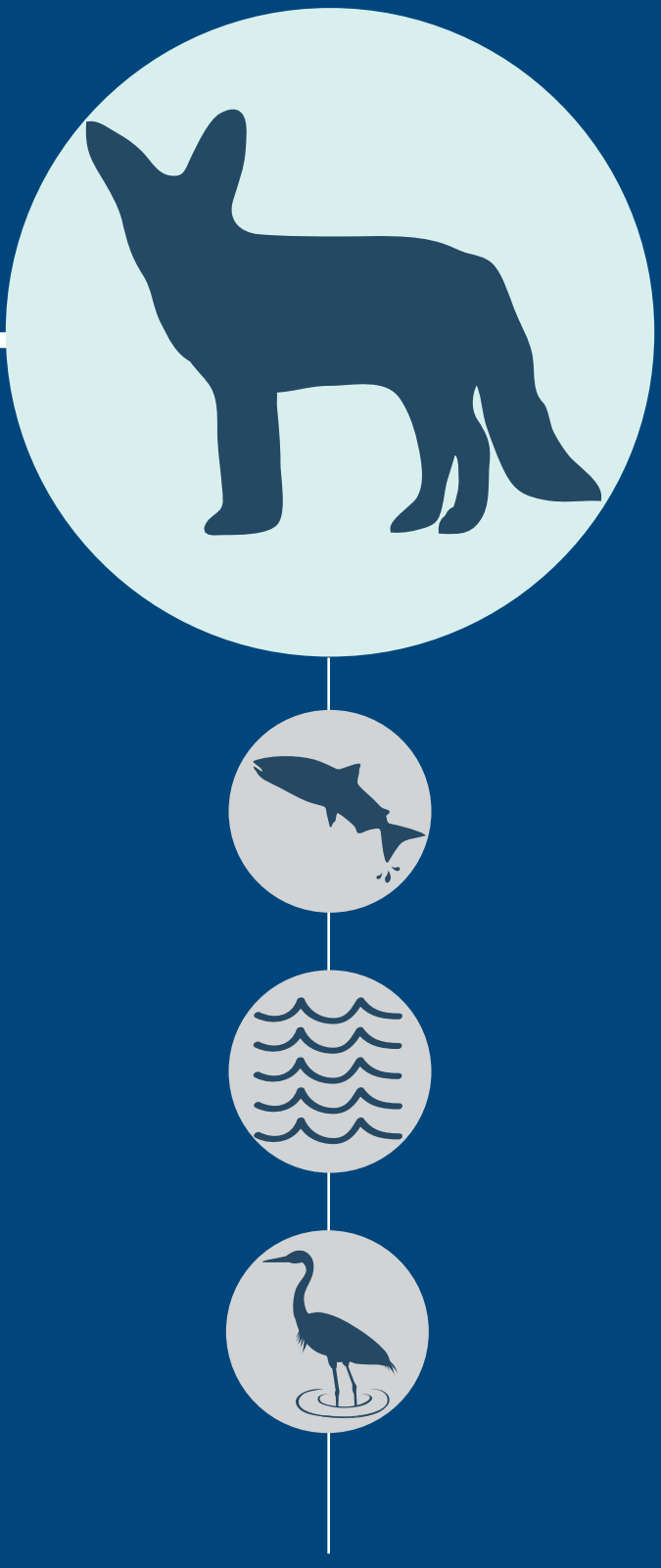
Dragonfly at Sacramento NWR.

Table 20: Target FL4 Conveyance Capacity vs. Actual by Refuge

Refuge Name - Region	Target FL4 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 Wildlife – Sacramento Valley				
Gray Lodge Wildlife Area	44,000	18,000	41	2016
CA Department of Fish and Wildlife – 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	1,280	21	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 a large part of the Central Valley as a result of CVP construction and operation, 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 to listed species are significant. The program also focuses on restoration of CVP-affected habitats, and research to facilitate species recovery. In addition, the HRP supports captive propagation and reintroduction of federally listed species affected by the CVP.

PERFORMANCE MEASURES

Since fiscal year 1996, the HRP has provided significant contributions by funding about 120 diverse and valuable projects to benefit a multitude of federally listed and other special status species that were impacted by the CVP. Federally listed species which have benefitted include the San Joaquin kit fox, giant kangaroo rat, riparian brush rabbit, blunt-nosed leopard lizard, giant garter snake, bay checkerspot butterfly, Lange's metalmark butterfly, vernal pool plant and invertebrate species, and gabbro and serpentine soils species. The HRP provides leveraging of funds by attracting additional funding partners which decreases the amount of HRP funds needed to implement a project; partners have contributed about 85 percent of total project costs. Land acquisition projects currently have the highest priority and receive at least 50 percent of the available funding.

Protection and Restoration – The program contributes to the protection and restoration of threatened and endangered species habitats affected by the construction and operation of the CVP. Protection includes acquisition of lands through fee title or conservation easements. Since 1996, over 15,000 acres have been acquired and restored with HRP funds (see Table 21). Various habitat types throughout the Central Valley have benefitted including alkali sink/scrub, valley grassland, riparian, vernal pools and other wetlands, serpentine soils, and chaparral.

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 be addressed. The HMP identifies acquisition, maintenance, and restoration of 45,391 acres needing to occur as mitigation related to the CVP Consolidated Place of Use. To date, the program has protected and restored 954 acres within the CVP Consolidated Place of Use.

Research and Captive Propagation and Reintroduction – The program also supports the recovery of threatened and endangered species through stabilization and improvement of species populations by funding research and captive propagation and reintroduction activities. In part, research projects ultimately contribute important information towards increasing current and future protection and/or restoration of species or habitats impacted by the CVP. Research has included vernal pool mapping, assessing the potential for listed species reintroductions, and numerous genetics analyses. Captive propagation and reintroduction have benefitted two critically endangered species as well as other federally listed species.

FY 2013 ACCOMPLISHMENTS

In 2013, $1,604,246 was allocated to the program from the Restoration Fund to achieve the following:

Protection and/or Restoration – The HRP funding helped protect 1,953 acres of land through fee title acquisitions of 76 acres of vernal pools habitat in Butte County; 1,552 acres of grassland habitat in Fresno County; and 325 acres of scrub-shrub habitat in Tulare County. (See Table 21 for approximate acres protected and restored from 1996 through 2013 using HRP funds). One thousand eight hundred and seventy-seven of these acres also count towards the SWRCB's D-1641 requirements.

Other Activities – The HRP provided funds for one research project to develop the definitive and requisite data on population genetic structure to help develop and guide management options for the endangered

Riparian brush rabbit with Kim Forrest USFWS
Photo: U.S. Fish & Wildlife Service

riparian brush rabbit in San Joaquin County.

Table 21: Approximate Acres of Habitat Protected and Restored by the (b)(1) "Other" Program, 1996-2013, using HRP Funds

Year	Acreage Protected	Acreage Restored	Cumulative Acreage of Protection and Restoration
1996	488	0	488
1997	149	743	1,380
1998	3,179	0	4,559
1999	497	0	5,056
2000	365	78	5,499
2001	559	0	6,058
2002	122	0	6,180
2003	459	0	6,639
2004	129	106	6,874
2005	58	727	7,659
2006	22	1,649	9,330
2007	16	51	9,397
2008	0	404	9,801
2009	2,050	13	11,864
2010	359	28	12,251
2011	930	139	13,320
2012	912	0	14,232
2013	1,953	0	15,262
Total	**12,247**	**3,938**	**16,185**

Giant Kangaroo Rat habitat protected in the Ciervo Hills of western Fresno County.

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.

The LRP will complete land acquisition and restoration at the Atwell Island site in 2014. This site will be transferred to BLM for management and the program will not receive CVPIA Restoration funds after this transaction.

FY2013 ACCOMPLISHMENTS

The program obligated $500,000 from the Restoration Fund, and $47,000 from the Water and Related Resources Fund.

Retire agricultural land – Over 9,300 acres of drainage impaired land have been acquired to date from willing sellers for the Land Retirement Demonstration Project (LRDP). Contacts with the multiple land owners were made for the acquisition of the remaining 750 acres at the Atwell Island project. However, no land was acquired from willing sellers by the program during FY 2013. Table 22 lists the cumulative accomplishments of land retirement and the annual restoration and agricultural drainage reduction accomplishments.

Restore Habitat – 5,900 pounds of locally grown seed from desert adapted salt tolerant native plant species were planted on 197 acres of previously acquired land at the Atwell Island site in fiscal year 2013. A good response of annual flora was observed at one restoration site in the spring of FY 2013 and a fair response in another, contributing to the ongoing restoration of alkali sink habitat at the site.

Reduce agricultural drainage volume – The program reduced the amount of agricultural drainage water on LRDP lands by approximately 3,600 acre-feet in FY 2013. Cumulative drainage reduction estimates were revised based on LRDP land use data provided by BLM.

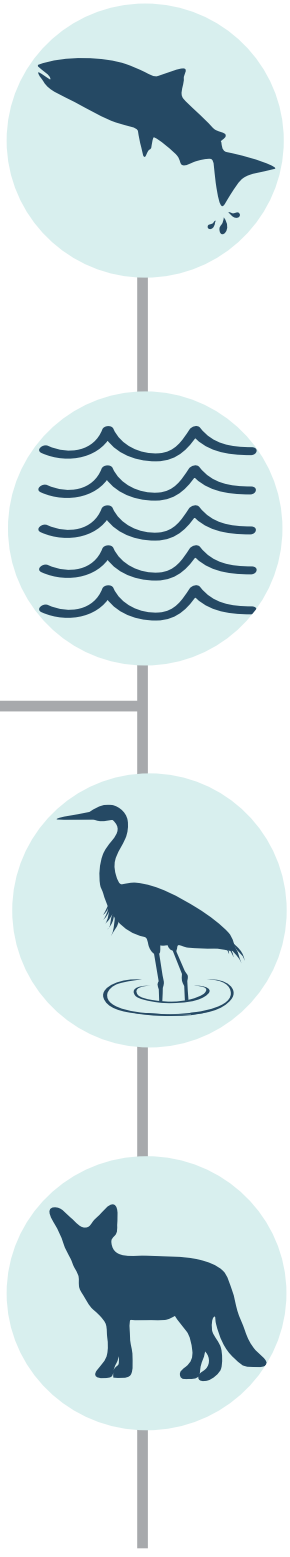
Table 22: Land Acquired and Restored, and Drainage Reduction by Year, 1995-2013

	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	2,962
2005	625	0	349	3,275
2006	38	0	416	3,275
2007	213	0	475	3,275
2008	0	0	390	3,275
2009	0	0	380	3,275
2010	50	0	400	3,320
2011	0	0	260	3,361
2012	0	0	260	3,465
2013	0	0	197	3,585
Total	**7,266**	**2,090**	**6,868**	**44,220****

* 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 1995-2013.

Successful restoration of annuals at Atwell Island.



CHAPTER 6
PROGRESS TO DATE TOWARD CVPIA ACCOMPLISHMENTS

Chapter 6 - Progress to Date Toward CVPIA Performance Goals

The CVPIA Program tracks performance targets from several sources including CPAR (goals based upon CVPIA), Interior goals (Performance Assessment and Rating Tool or PART) and program-defined goals. Listed below are goals by program for ongoing programs. The 2013 Accomplishment status is based upon the specific FY 2013 actions, cumulative Program to Date accomplishments, or a yearly average over the life of the program. At the bottom of the listing are completed or inactive programs and their status. Detailed assessments of progress toward the Central Valley fish doubling goals are found in the CAMP Annual Report at: http://www.fws.gov/sacramento/fisheries/CAMP-Program/Documents-Reports/fisheries_camp-program_documents-reports.htm.

Performance Goal Description	Target	Reporting Period (Annual, Cumulative, or Average)	To Date (Cumulative or Average)	% of Target	2013 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 - 2012 average	356,780	48	293,985	
Double the number of naturally produced, Central Valley wide, Late Fall-run Chinook	68,000 fish	1992 - 2012 average	17,218	25	5,539	
Double the number of naturally produced, Central Valley wide, Winter-run Chinook	110,000 fish	1992 - 2012 average	6,191	6	3,900	
Double the number of naturally produced, Central Valley wide, Spring-run Chinook	68,000 fish	1992 - 2012 average	18,397	27	30,522	
Double the number of Central Valley wide Green Sturgeon	2,000 fish	1992 - 2009 average	2,948	147	10,272	Last data submission was 2009
Double the number of Central Valley wide 15-year old, White Sturgeon	11,000 fish	1992 - 2009 average	6,237	57	6,258	Last data submission was 2009
Double the number of Central Valley wide Striped Bass	2,500,000 fish	1992 - 2011 average	964,033	39	894,606	Data from 2011
Double the number of Central Valley wide American Shad	4,300 fish	1992-2011 average	2,389	56	892	Data from 2011
Cubic Yards of Spawning gravel placed in the American, Merced, and/or Tuolumne rivers.	unspecified	Annual	N/A	N/A	55,496	
Complete 105 structural actions	105 actions	Cumulative	72	68	6	Caprini Low Flow Crossing Fish Passage Project was completed
Contribute towards completion of 128 High and Medium Priority Actions	128 actions	Cumulative	46	36	0	
DEDICATED PROJECT YIELD, 3406 (b)(2)						
Provide instream flow, specified based on Wet, Dry, or Critically Dry year.	Dry Year target is 700,000 acre-feet	Annual	N/A	100	700,000	2013 Water Year was classified Dry

Performance Goal Description	Target	Reporting Period (Annual, Cumulative, or Average)	To Date (Cumulative or Average)	% of Target	2013 Accomp-lishments	Comments
WATER ACQUISITION - INSTREAM, 3406 (b)(3)						
Provide supplemental (b)(2) instream flow water	200,000 acre-feet	Average from 1994 - 2013	74,646	0	0	
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	
CLEAR CREEK RESTORATION, 3406 (b)(12)						
Restore stream channel	2 miles	Cumulative	1.5	75	0	
Place spawning gravel annually	25,000 tons (1)	Annual	N/A	0	0	
Meet variable flow target	Variable (cfs)	Annual	N/A	100	200	Ongoing operation
Maintain water temperature for optimum anadromous fish production	Maintain proper temperature 100% of the time	Annual	N/A	100 96		100% for 60°F 1-Jun to 14-Sep 96% for 56°F 15-Sep to 31-Oct 2012 data
SPAWNING GRAVEL, 3406 (b)(13)						
Place 10,000 tons of spawning gravel annually in the Sacramento River.	10,000 tons	Annual	N/A	140	14,000	
Place 3,000 tons of spawning gravel annually in the Stanislaus River	3,000 tons	Annual	N/A	0	0	
Place 7,000 tons of spawning gravel annually in the American River	7,000 tons	Annual	N/A	87	6,000	
Increase the percentage of spawning salmonids using placed gravel in the Sacramento River	25% usage	Annual	N/A	304	76%	
Increase the percentage of spawning salmonids using placed gravel in the Stanislaus River	10% usage	Annual	N/A	280	28%	
Increase the density of redds on emplaced gravel in the American River	0.03 redds/sq. meter	Annual	N/A	33	0.01	
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	41	Undefined	6	
TRINITY RIVER RESTORATION PROGRAM (TRRP), 3406 (b)(23)						
Increase the escapment of Hatchery produced Fall-run Chinook Salmon	9,000 fish	1992 - 2012 Average	19,175	194	17,461	2013 data not available until January 2013
Increase the escapment of Naturally produced Fall-run Chinook Salmon	62,000 fish	1992 - 2012 Average	16,110	85	52,687	2013 data not available until January 2013
Increase the escapment of Hatchery produced Spring-run Chinook Salmon	3,000 fish	1992 - 2012 Average	8,918	224	6,712	2013 data not available until January 2013
Increase the escapment of Naturally produced Spring-run Chinook Salmon	6,00 fish	1992 - 2012 Average	6,079	296	17,730	2013 data not available until January 2013
Increase the escapment of Hatchery produced Coho Salmon	2,100 fish	1992 - 2012 Average	11,566	350	7,356	2013 data not available until January 2013
Increase the escapment of Naturally produced Coho Salmon	1,400 fish	1992 - 2012 Average	1,890	567	7,939	2013 data not available until January 2013
Increase the escapment of Hatchery produced Steelhead	10,000 fish	1992 - 2012 Average	12,347	57	5,737	2013 data not available until January 2013
Increase the escapment of Naturally produced Steelhead	40,000 fish	1992 - 2012 Average	4,851	37	14,666	2013 data not available until January 2013
Improve Infrastructure to allow ROD flows (369 TAF - 815 TAF)	Unspecified	Annual	Within target	100		




Performance Goal Description	Target	Reporting Period (Annual, Cumulative, or Average)	To Date (Cumulative or Average)	% of Target	2013 Accomp-lishments	Comments
Provide minimum annual flows. The program releases between 369,000 and 815,000 AF each year, in accordance with the ROD	453,000	Annual	N/A	100	453,000	Based on 2013 as a dry 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	30	64	2	
Place 10,000 cubic yards of coarse sediment annually	10,000 cubic yards	Annual	N/A	17	1,700	
Reduce fine sediment delivery from tributary watersheds	10,000 to 20,000 cubic yards	Annual	N/A	78-155	15,500	
SAN JOAQUIN RIVER RESTORATION PLAN (SJRRP), 3406 (c) (1)						
Reduce or avoid water supply impacts to Friant Division long-term contractors	Unspecified	Annual	0	Undefined	0	
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 model-types	Cumulative	8	89	0	(2)
CVP WATER OPERATIONS						
RESERVOIR STORAGE, 3406 (b)(19)						
Maintain minimum reservoir storage in Shasta Reservoir	19 MAF	Cumulative	14 of 16	88	1.9 MAF	
Maintain minimum reservoir storage in Trinity Reservoir	600 TAF	Cumulative	16 of 16	100	1,303 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	39	52,396	
REFUGE WATER SUPPLY PROGRAM - CONVEYANCE, 3406 (d)(1) & (d) (2)						
Provide Level 2 water supplies	422,251 acre-feet	Annual	N/A	92	389,343	
Provide incremental Level 4 water supplies	133,264 acre-feet	Annual	N/A	36	48,096	Full L4 delivery = 437,439 (79% goal)
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	491,145	88		
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	0	
OTHER						
HABITAT RESTORATION, 3406 (b)(1) Other						
Protect and/or restore habitat impacted by the CVP	Unspecified	Cumulative	16,185	N/A	1,953	
Protect and/or restore habitat areas specified by the SWRCB Decision 1641	45,391 acres	Cumulative	10,929	20	1,877	
LAND RETIREMENT, 3408(h)						
Retire 8,000 acres of Atwell Island land	8,000 acres	Cumulative, 1995–2013	7,266	91	0	

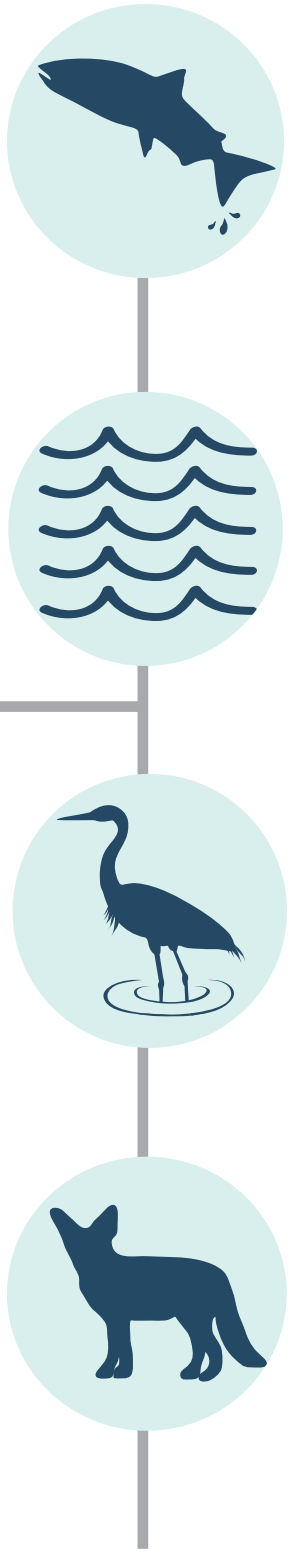
Performance Goal Description	Target	Reporting Period (Annual, Cumulative, or Average)	To Date (Cumulative or Average)	% of Target	2013 Accomp-lishments	Comments
Retire 7,000 acres of Tranquility land	Complete	Cumulative, 1995–2013	7,000	100	N/A	
Restore 400 acres of retired land annually	400 acres	Cumulative, 1995–2013	6,868	76	197	
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, 1995–2013	44,220	60	104	

(1) Clear Creek spawning gravel replenishment goal was erroneously reported in the Final CPAR, 2009 as 17,000 tons annually. This unit of measure for this goal should have been cubic yards. Applying a conversion factor, 17,000 cubic yards of spawning gravel equates to approximately 25,000 tons. This correction first occurred in the 2012 Accomplishment Report and therefore, the percentage of annual goal for this year forward will appear smaller than past years of the same amounts of gravel.

(2) The Modeling Program is reviewing procedures to provide a more comprehensive reporting metric. A new metric may be in place for FY 2014.

COMPLETE AND INACTIVE PROGRAMS

Program Name	Status
Modify CVP Operations, 3406 (b)(1)(B)	Incorporated into various programs
Contra Costa Canal Pumping Plant, 3406 (b)(5)	Complete
Shasta Temperature Control Device, 3406 (b)(6)	Complete
Meet Flow Standards and Objectives, 3406 (b)(7)	Complete
Short Pulse Flows, 3406 (b)(8)	Incorporated into various programs
Coleman National Fish Hatchery, 3406 (b)(11)	Complete
Delta Cross Channel and Georgiana Slough, 3406 (b)(14)	Inactive
Head of Old River Barrier, 3406 (b)(15)	Inactive
ACID Diversion Dam, 3406 (b)(17)	Complete
Glenn-Colusa Irrigation District Program, 3406 (b)(20)	Complete
Waterfowl Incentive Program, 3406 (b)(22)	Complete
Trinity River Restoration Program, 3406 (b)(23)	Complete
San Joaquin River Restoration Program, 3406 (c)(1)	Complete. Currently funded through Public Law 111-11
Stanislaus River Basin Water Needs Program, 3406 (c)(2)	Complete
Central Valley Wetlands Supply, 3406 (d)(6)	Complete
Supporting Investigations, 3406 (e)	Complete
Project Fisheries Impact Report, 3406 (f)	Complete
Water Conservation Program, 3408 (i)	Complete
Water Augmentation (Yield Study), 3408 (j)	Complete
Red Bluff Diversion Dam, 3406(b)(10)	Complete



APPENDICES




Appendix A: Acronyms

AF	acre-feet
AFRP	Anadromous Fish Restoration Program
AFSP	Anadromous Fish Screen Program
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
CDFW	California Department of Fish and Wildlife
cfs	cubic feet per second
CPAR	CVPIA Program Activity Review Report
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
FWA	Friant Water Authority
FY	Fiscal year
GCID	Glenn-Colusa Irrigation District
GWD	Grassland Water District
HGS	HydroGeoSphere
HRP	Habitat Restoration Program
IFIM	Instream Flow Incremental Methodology
Interior	Department of the Interior
IP	Implementation Plan
IRWMT	Interagency Refuge Water Management Team
LRP	Land Retirement Program
NMFS	National Marine Fisheries Service
NOAA	National Oceanic & Atmospheric Administration
NRDC	Natural Resources Defense Council
NWR	National Wildlife Refuge
OCAP	Operations Criteria and Plan
OMB	Office of Management and Budget
PART	Program Assessment Rating Tool
PEIS	Programmatic Environmental Impact Statement
POD	Pelagic Organism Decline
RBDD	Red Bluff Diversion Dam
RHEM	Riparian Habitat Establishment Model
ROD	Record of Decision
RPA	Reasonable and Prudent Alternative
RST	Rotary Screw Trap
RWSP	Refuge Water Supply Program
SDM	structured decision making
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 Refuge
SWP	State Water Project
TFCF	Tracy Fish Collection Facility
TRRP	Trinity River Restoration Program
USBR	Bureau of Reclamation

Appendix B: 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
- **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 occurring water course (e.g., caught in a water pump or diverted from the river into an irrigation channel)
- **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 oversee 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
- **Replacement Water**
  CVP Water that was provided to five refuges prior to CVPIA. It is to be replaced to the Project when available and acquired from willing sellers. Replacement water is delivered in addition to the Level 2 amounts specified in the CVPIA
- **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 of Delta**
  The area that includes the State Water Project authorized place of use downstream of Harvey O. Banks Pumping Plant and the Central Valley Project authorized place of use downstream of Jones Pumping Plant
- **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 runs from October 1-September 30

Appendix C: 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…"

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)

"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."

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."

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…"

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

"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;

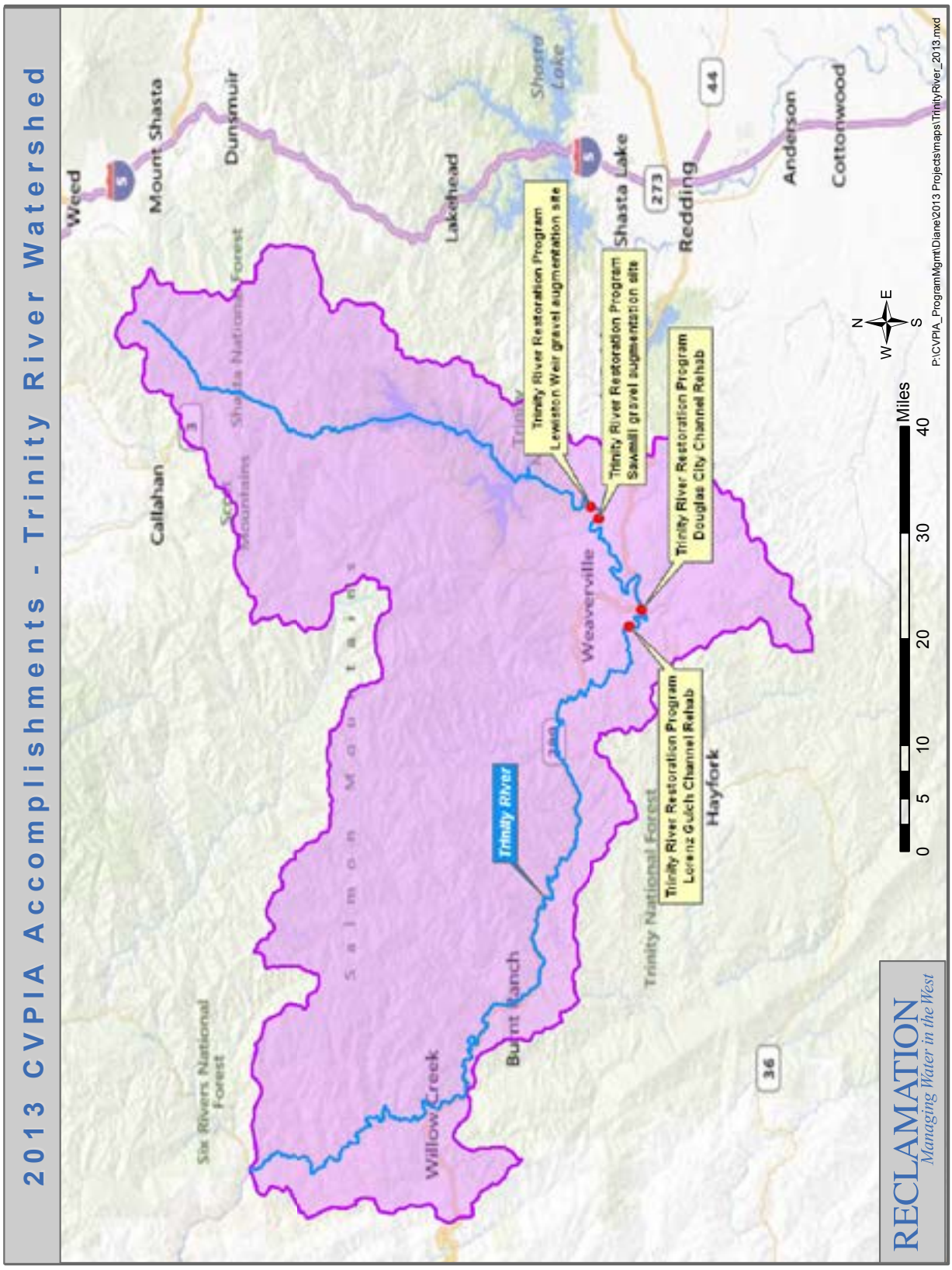
(9) measures to enhance the firm yield of existing Central Valley Project facilities, including improved management and operations, conjunctive use opportunities, development of offstream storage, levee setbacks, and riparian restoration."

Land Retirement – Section 3408 (h)

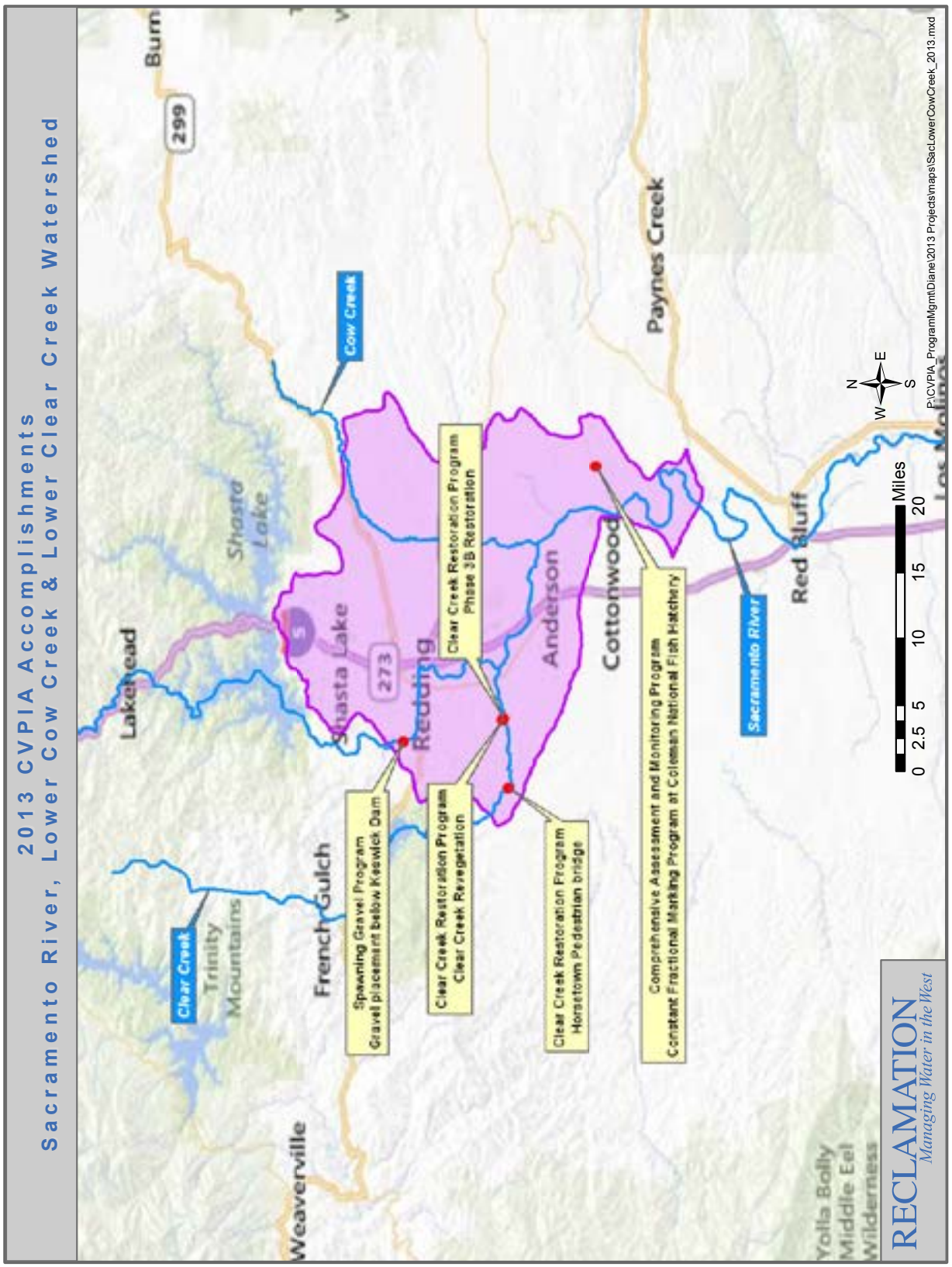
"The Secretary is authorized to purchase from willing sellers land and associated water rights and other property interests … which receives Central Valley Project water under a contract executed with the United States, and to target such purchases to areas deemed most beneficial to the overall purchase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

Appendix D: Maps

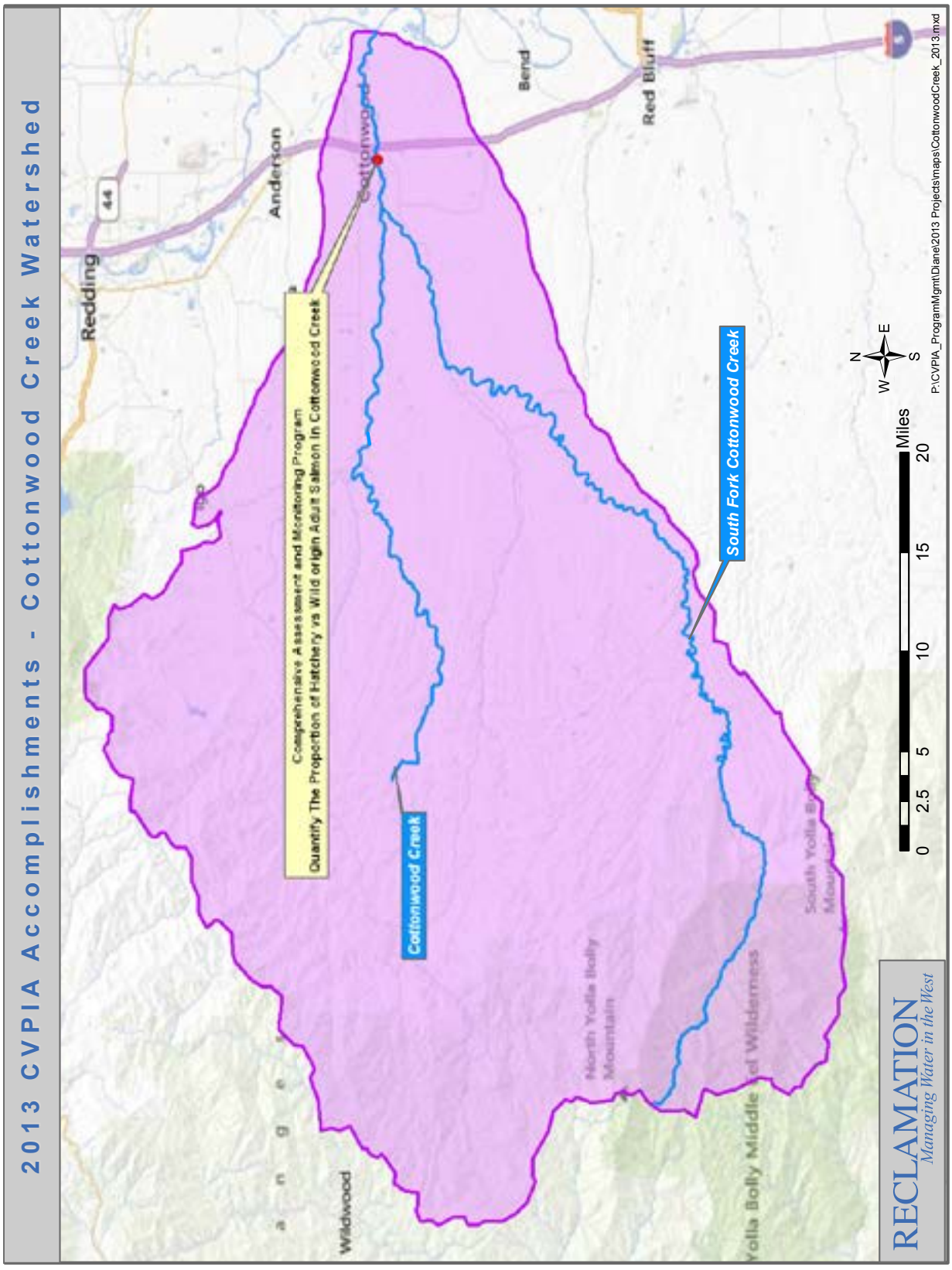
Central Valley Project (CVP) Service Area Boundary



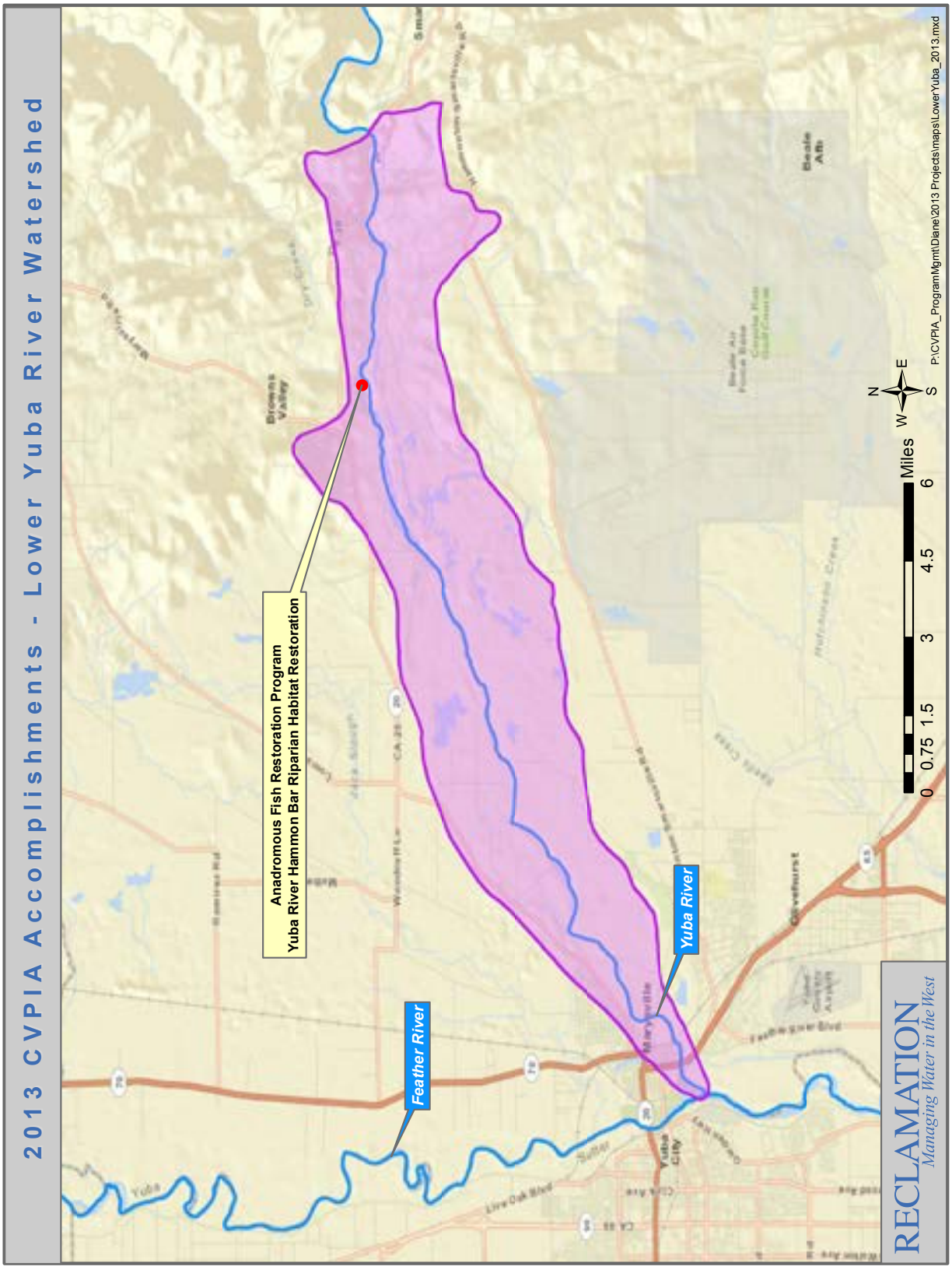
2013 CVPIA Accomplishments - Trinity River Watershed



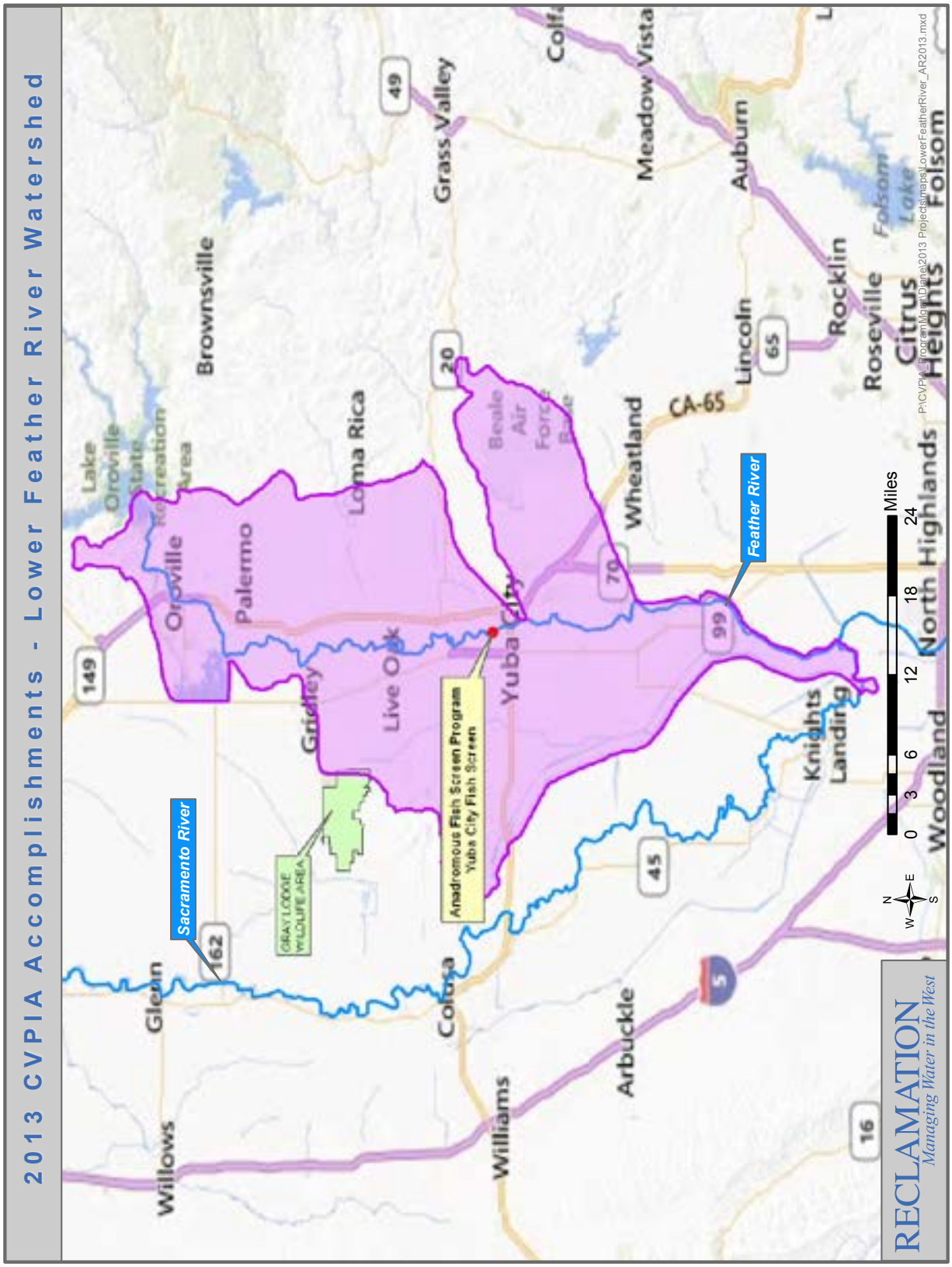
2013 CVPIA Accomplishments - Sacramento River, Lower Cow Creek & Lower Clear Creek Watershed



2013 CVPIA Accomplishments - Cottonwood Creek Watershed



2013 CVPIA Accomplishments - Lower Yuba River Watershed



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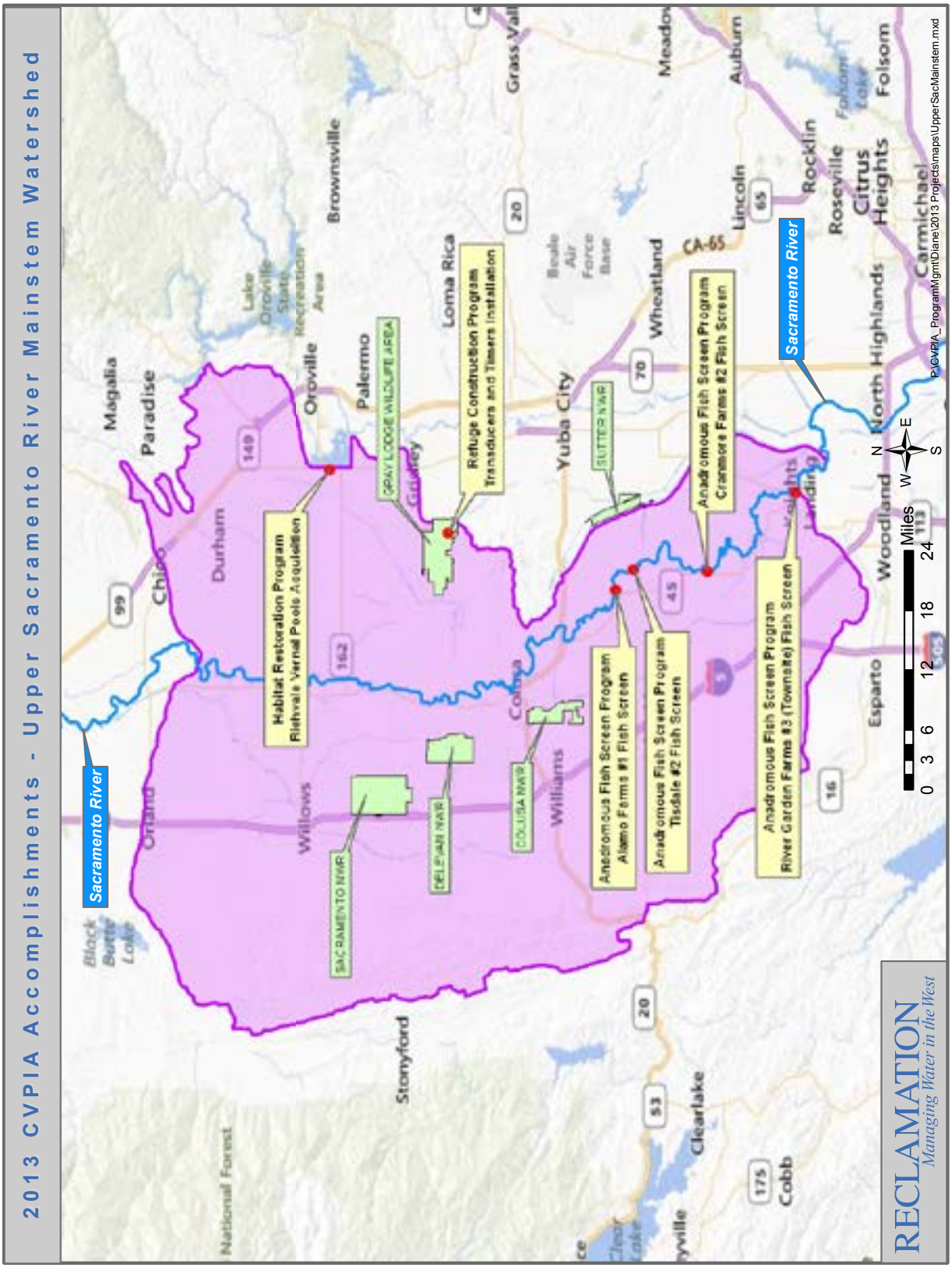
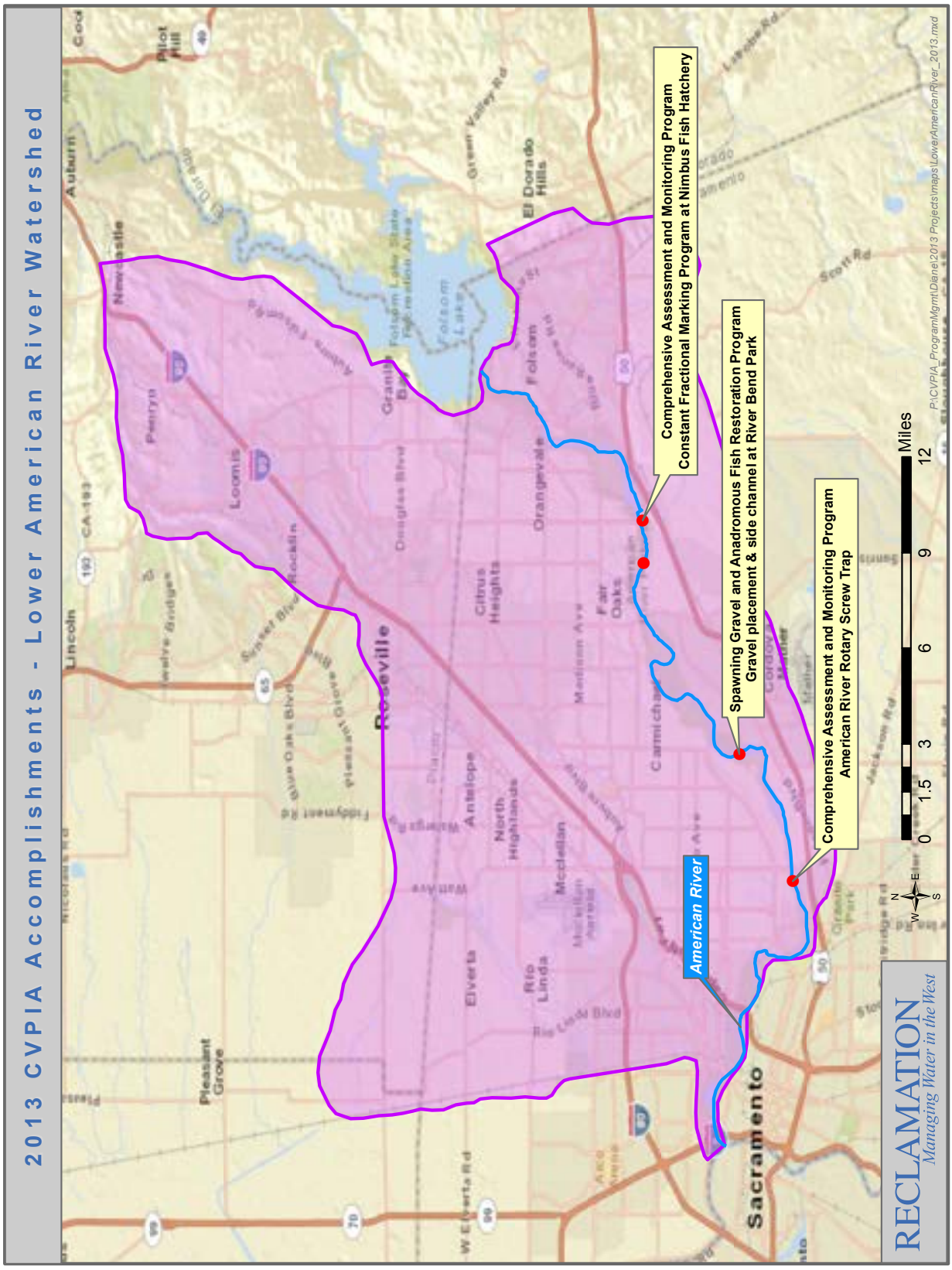
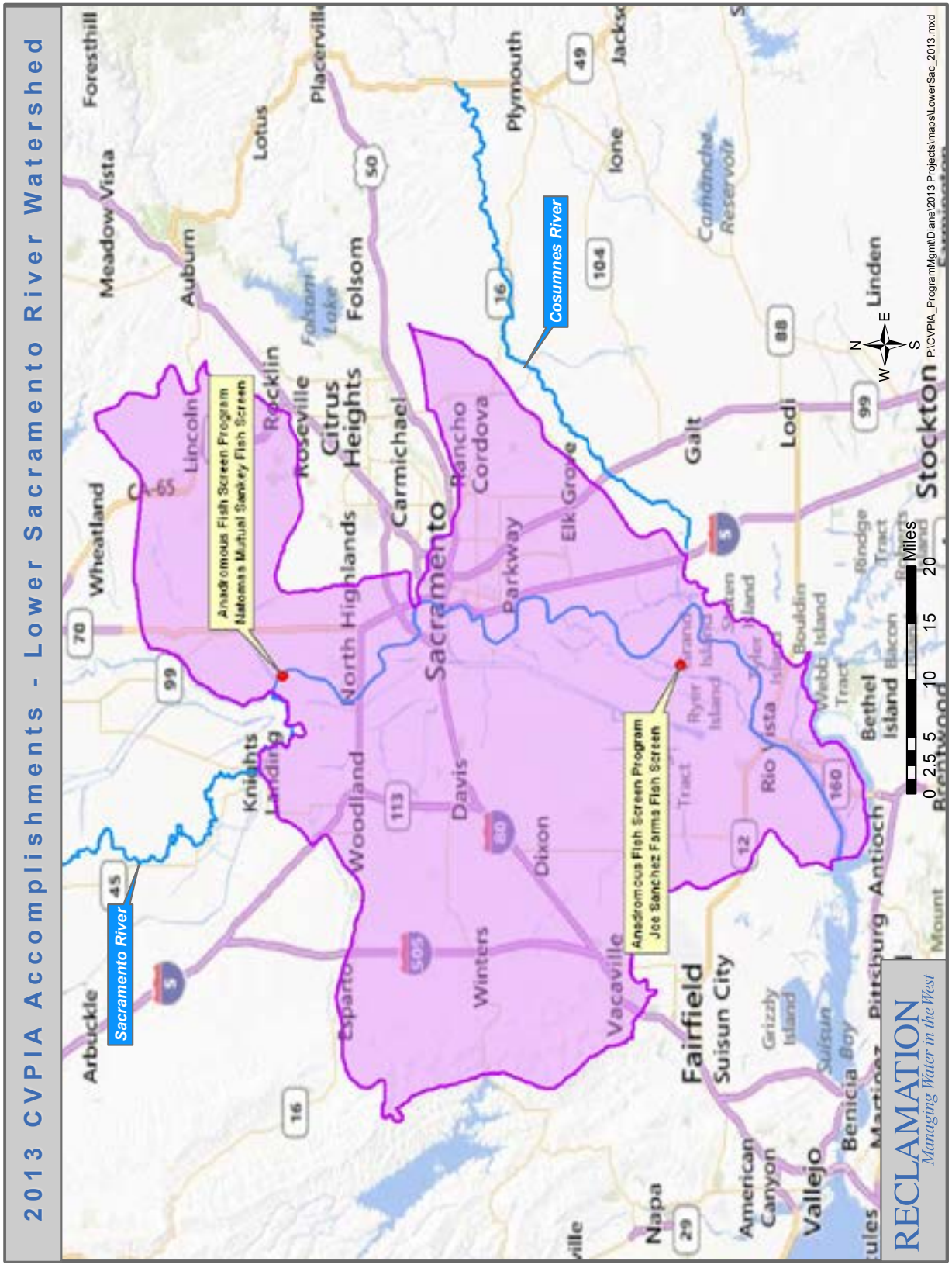


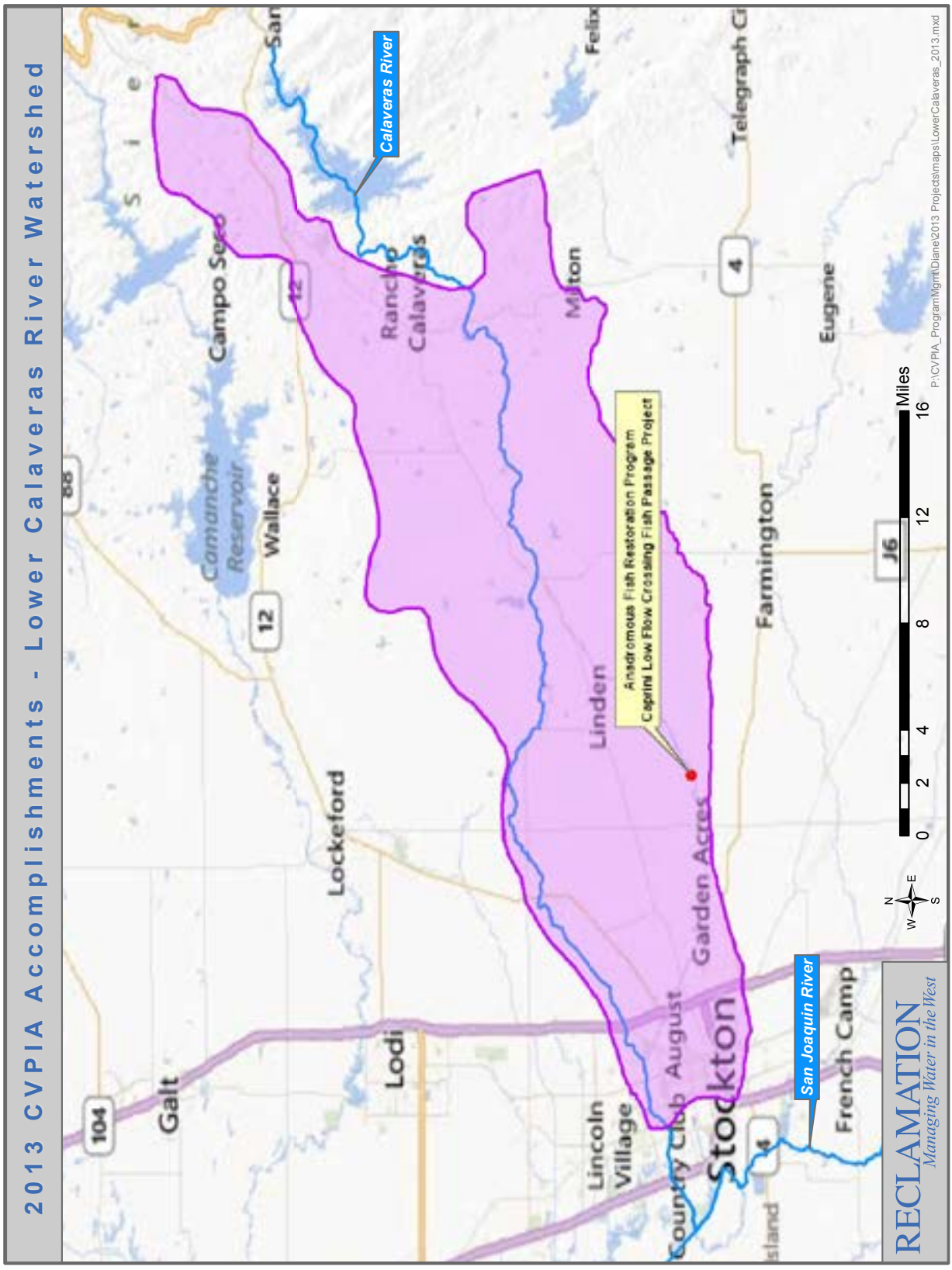
2013 CVPIA Accomplishments - Upper Sacramento River Mainstem Watershed



2013 CVPIA Accomplishments - Lower American River Watershed



2013 CVPIA Accomplishments - Lower Sacramento River Watershed



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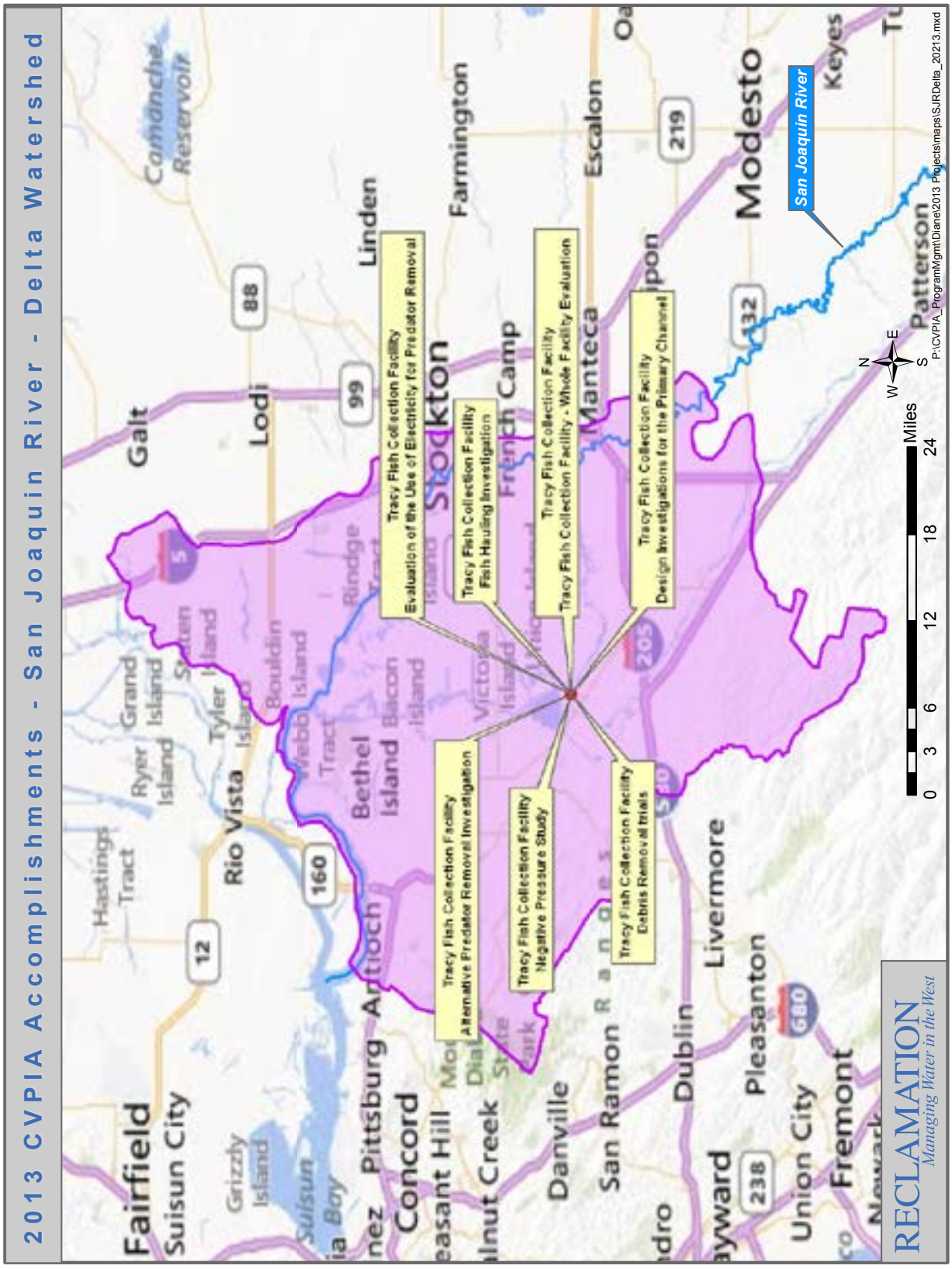
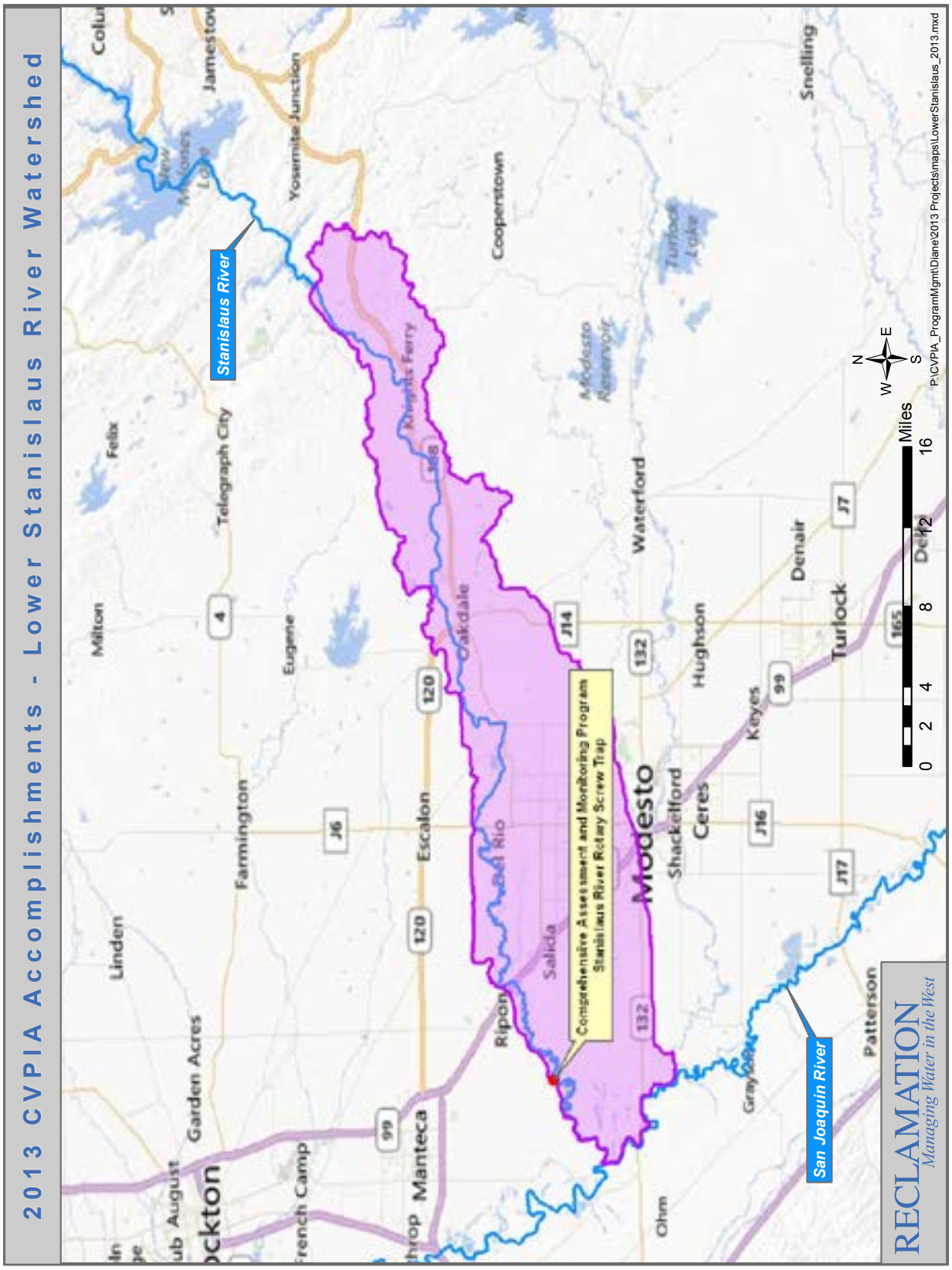
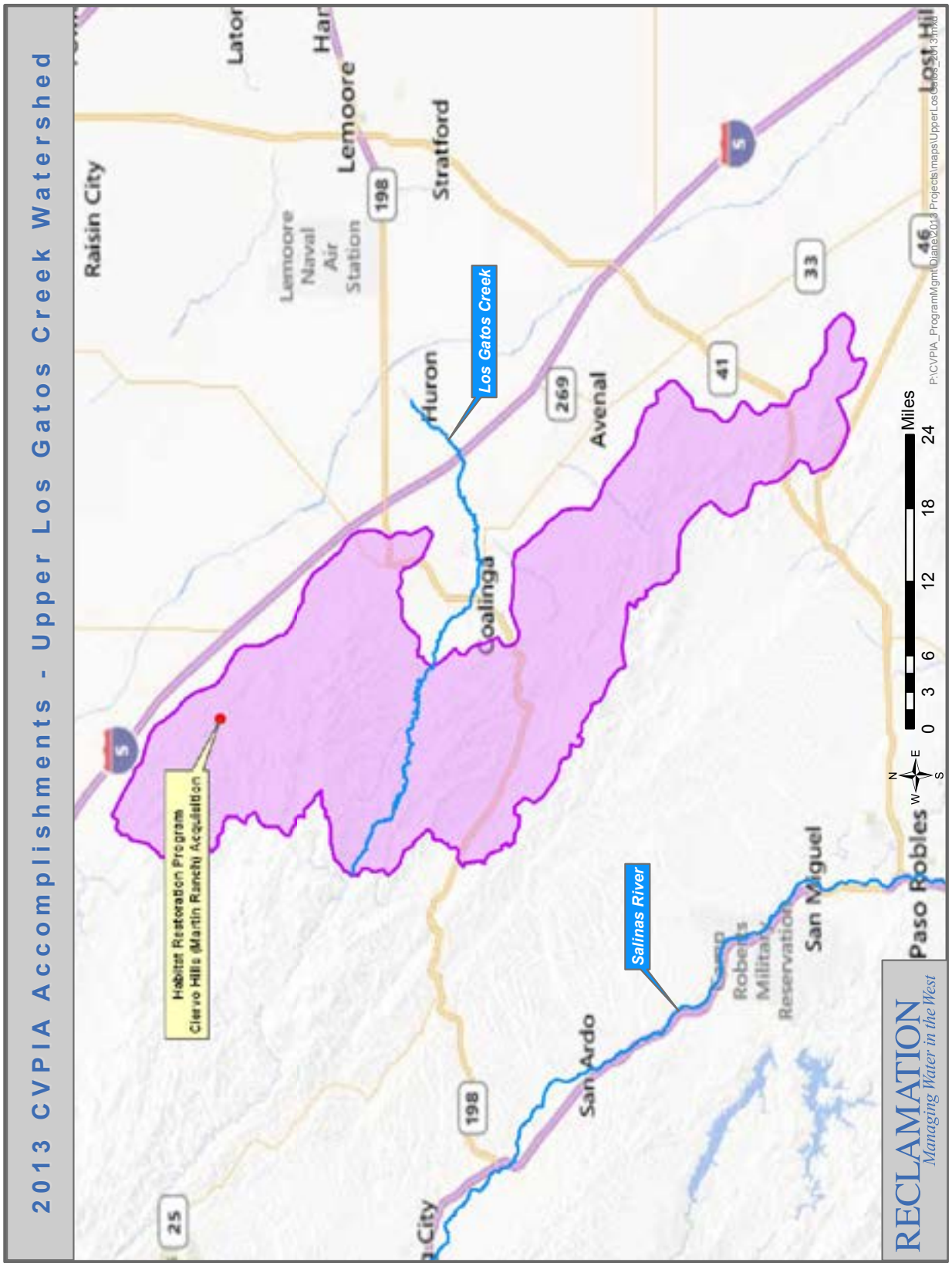


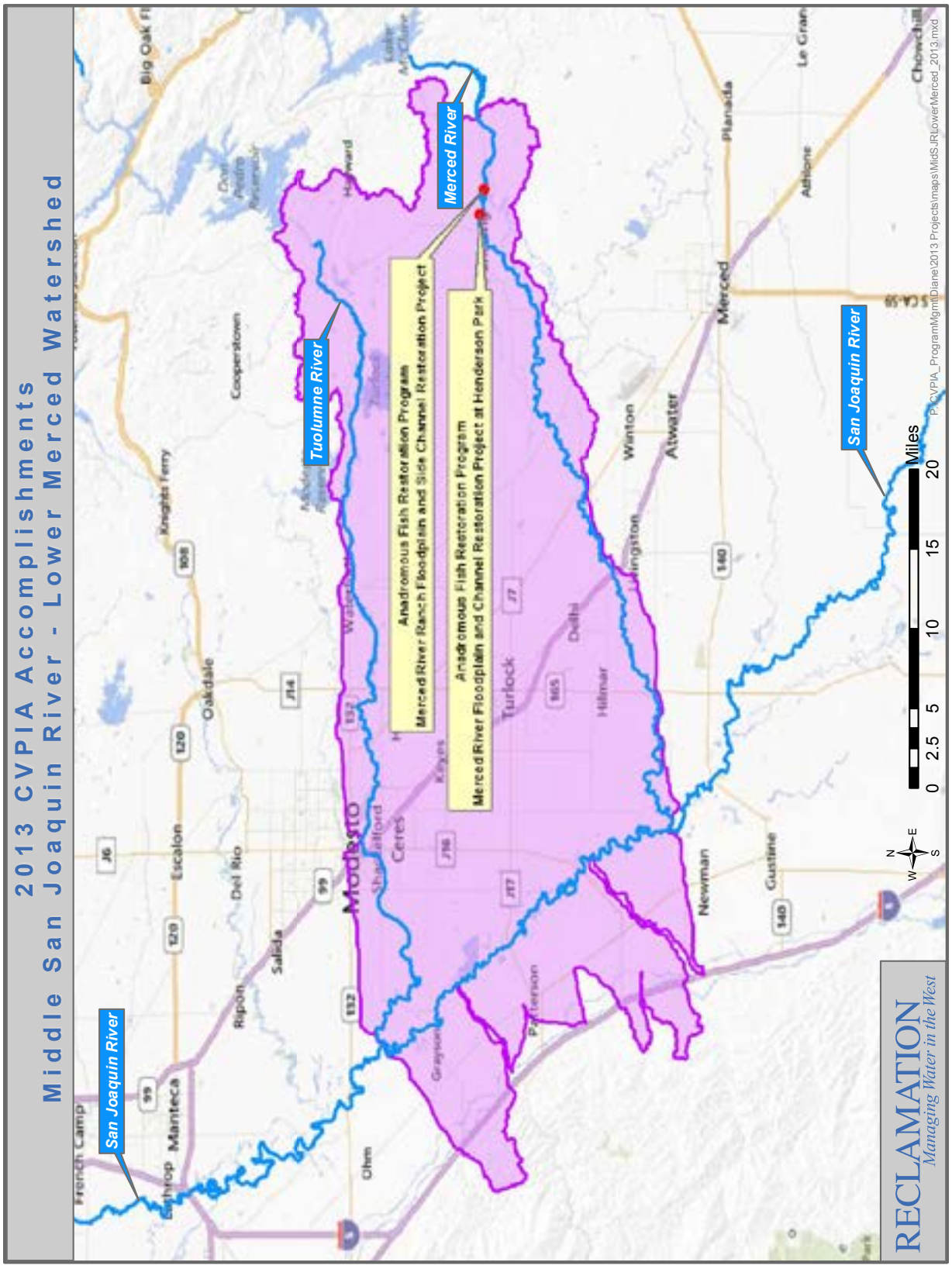
2013 CVPIA Accomplishments - San Joaquin River - Delta Watershed



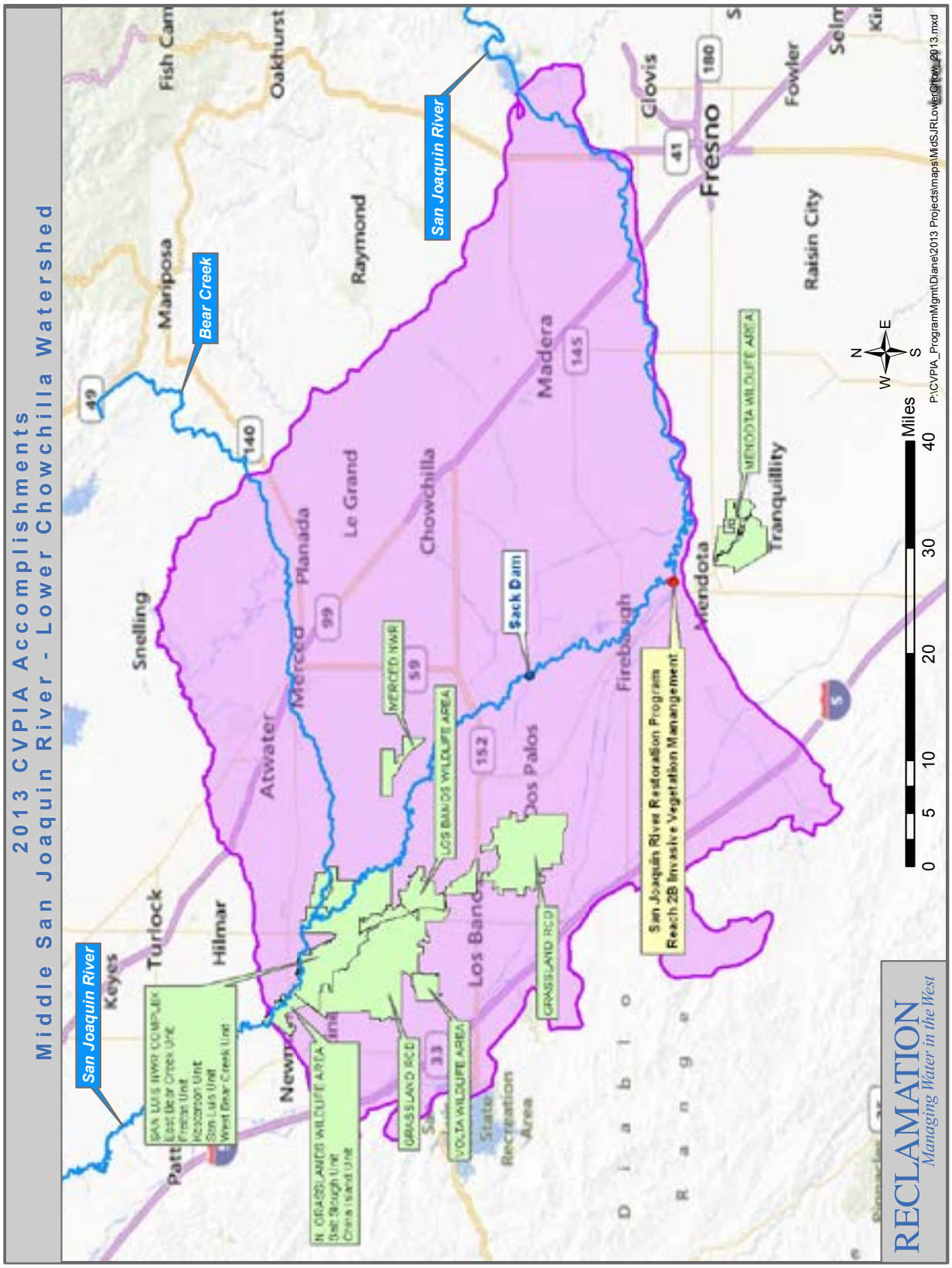
2013 CVPIA Accomplishments - Lower Stanislaus River Watershed



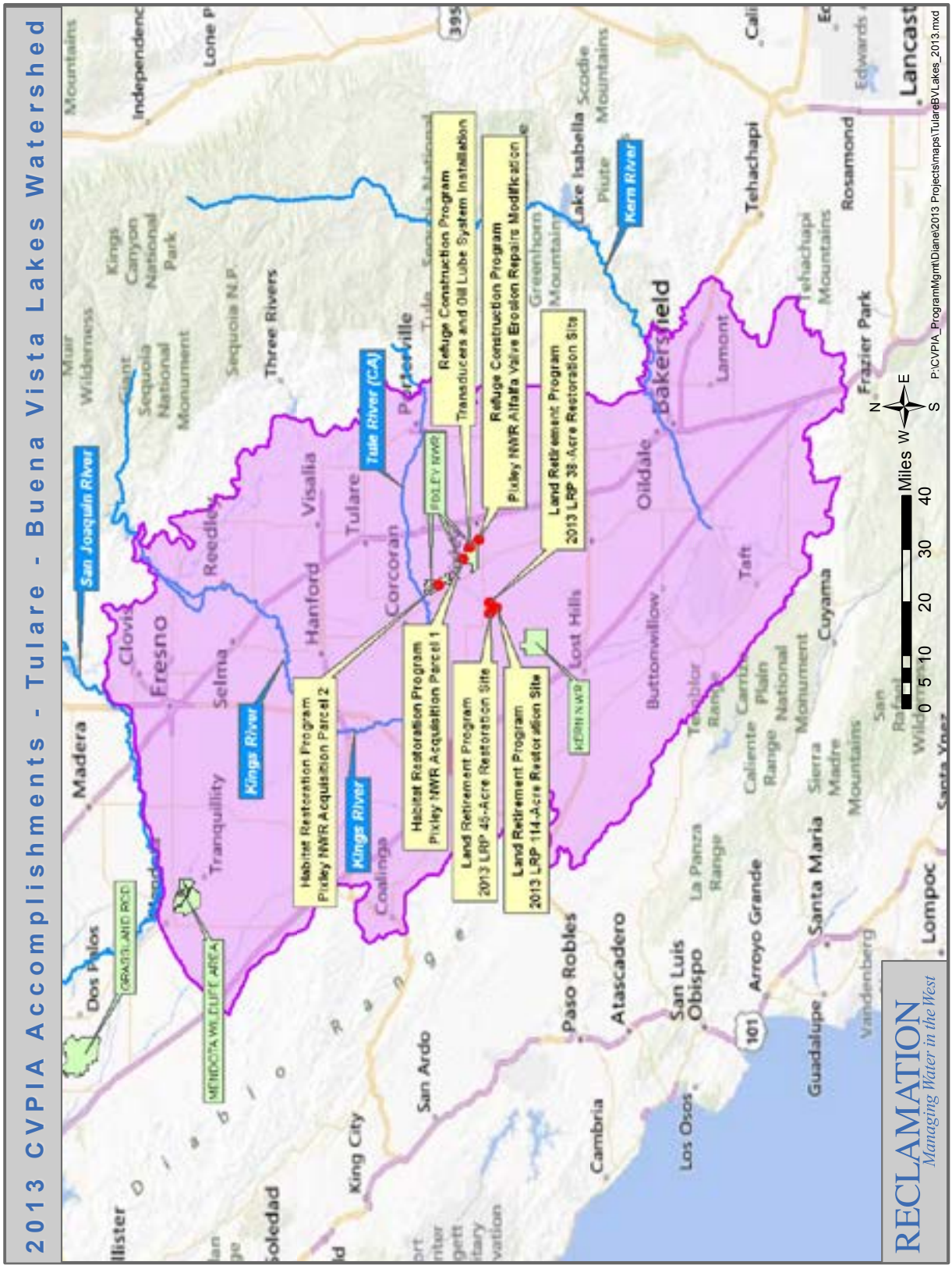
2013 CVPIA Accomplishments - Upper Los Gatos Creek Watershed



2013 CVPIA Accomplishments - Middle San Joaquin River - Lower Merced Watershed



2013 CVPIA Accomplishments - Middle San Joaquin River - Lower Chowchilla Watershed



2013 CVPIA Accomplishments - Tulare - Buena Vista Lakes Watershed