Central Valley Project Improvement Act

Public Law 102-575

Annual Report

Fiscal Year 2012

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

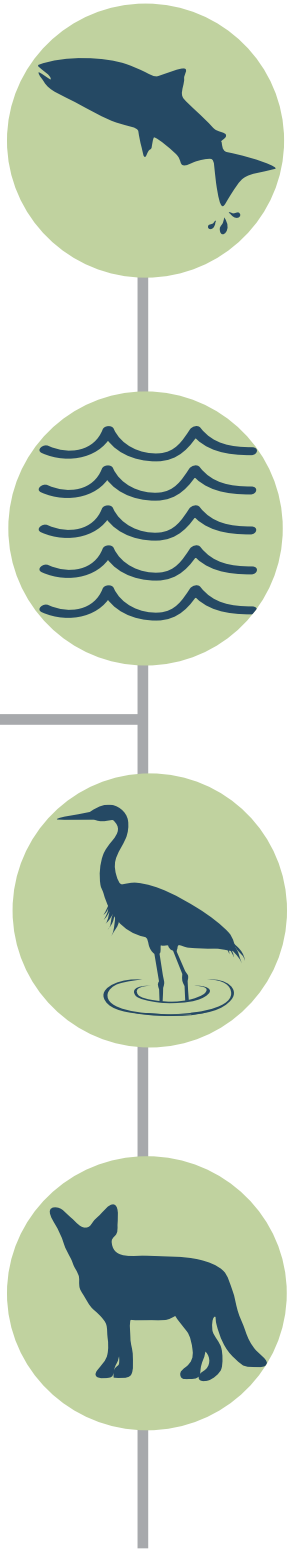
July 2013

Cover photographs:

Top: Red Bluff Diversion Dam - Gates Up. Photo courtesy of USBR.

Center: Black-tailed Jackrabbit, San Luis National Wildlife Refuge. Photo courtesy of USFWS.

Bottom: Spawning Chinook salmon and juvenile steelhead on gravel placed in 2012 in Goodwin Canyon. Photo courtesy of USBR.



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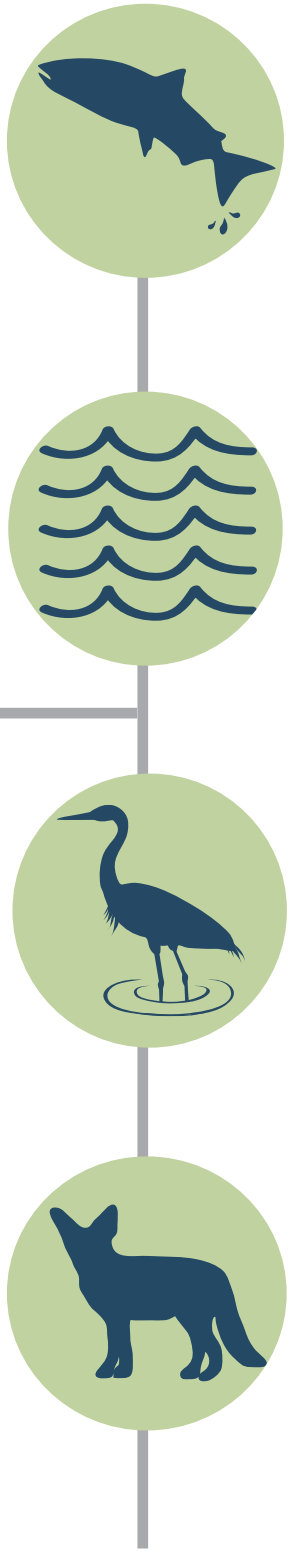


Executive Summary

Executive Summary

PURPOSE

This fiscal year (FY) 2012 CVPIA Annual Accomplishments Report summarizes the actions authorized under the Central Valley Project Improvement Act (CVPIA or Act) of 1992 and highlights FY 2012 accomplishments (October 1, 2011 - September 30, 2012). 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, 2012 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.

Ring-necked duck climbing up out of the water, Colusa 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. This legislation included Title 34, the Central Valley Project Improvement Act (CVPIA or Act). The CVPIA amends previous authorizations of the CVP to include fish and wildlife protection, restoration, and mitigation as project purposes having equal priority with irrigation and domestic uses, and fish and wildlife enhancement as a project purpose equal to power generation. The Department of the Interior, Bureau of Reclamation (Reclamation) and Fish and Wildlife Service (Service), in collaboration with State and local governments, Tribes, non-governmental organizations, and stakeholders, implement activities to meet the Act's purposes. The CVPIA also contributes to the State's interim and long-term efforts to protect the San Francisco Bay/Sacramento-San Joaquin River Delta Estuary.

2012 Water Year

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

type is determined by precipitation and is therefore indicative of local and regional conditions that influence climate, snowpack and runoff.

Water Year (WY) 2012 was the driest since the 2007-2009 drought. Near record dry conditions during the winter precipitation months were followed by an unseasonably wet late spring. The final Water Year 2012 classification was below-normal for the Sacramento Valley and dry for the San Joaquin Valley. Impacts of the dry year were somewhat minimized due to the good carry-over storage from WY 2011.

CVPIA GOALS AND FY 2012 ACCOMPLISHMENTS

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

Presented below are the Program goals by resource area along with 2012 accomplishments. These summaries offer a snapshot of the work accomplished in FY 2012. Chapters 2, 3, 4 and 5 of this report provide more information on the accomplishments of each program, while a synopsis of the programs targets, status to date and 2012 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 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.

2012 Accomplishments

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

Sacramento Basin

In 2012, the AFRP focused on actions within the Sacramento and San Joaquin basins that will contribute to the natural production doubling goal. Within these basins, the actions occurred within 18 watersheds. 2012 projects include channel and habitat restoration, fish passage, and operational flow management. Monitoring of projects, from pre-construction baseline conditions to post-construction

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

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

performance analysis, occurred using techniques such as acoustic telemetry, rotary screw traps, snorkel surveys and aerial photography.

In 2012, the program completed construction on the following projects: Budiselich Flashboard Dam boulder weir retrofit, improving access to 8 miles of anadromous fish habitat; Hammon Bar riparian planting project, restoring 1.25 acres of riparian habitat; Wildcat Dam and Canal project, opening up 42 miles of aquatic habitat; Antelope Creek Crossing Repair project, improving passage to 6.5 miles of spawning and holding habitat; American River at Lower Sailor Bar project, supplementing spawning habitat through the placement of 5,000 cubic yards of gravel; Merced River Floodplain project, enhancing spawning habitat through the placement of 20,000 cubic yards of gravel; Mokelumne River Spawning Habitat Improvement project, injecting 3,500 tons of spawning gravel; and the Honolulu Bar Floodplain Restoration project, restoring 2.47 acres of riparian floodplain, creating 0.7 acres of new floodplain, adding 12,500 cubic yards of spawning gravel and restoring 485 feet of side channel habitat.

In addition to construction projects, the program also provided technical expertise for FERC proceedings for the Don Pedro Hyrdoelectric Project, Merced Falls and Merced River Hydroelectric Projects.

Gravel injection at Keswick Site

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

The program completed a number of studies that will improve fish capture and reintroduction capabilities. The studies include salvage efficiency tests for delta smelt, evaluation of predatory impacts within the secondary system of the TFCF, and obligated schooling of threadfin shad during simulated transportation.

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

Construction of the new, 2,500-cfs permanent pumping plant and fish screen was substantially completed in 2012 with the installation of the pumps and motors, completion of the pumping station and fish screen contract and completion of the construction and planting phase of the Terrestrial Mitigation. The program also conducted green sturgeon sampling over a 94-river-kilometer range to determine spawning and larvae emergence timing.

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

The Clear Creek Restoration program placed 10,000 tons of gravel in four sites during 2012: Guardian Rock (aka belowNEED Camp), Placer Bridge, Clear Creek Road Crossing, and the Tule Backwater. The CCRP met its goal of providing base flows of 200 cfs between October 1–May 31. In the spring of 2012, two pulse flows were provided to help attract spring-run Chinook to Clear Creek. The program also conducted three Environmental Water Program workshops which aim 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.

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

The program created or improved spawning habitat by placing 15,000 tons of gravel below the Keswick Dam on the Sacramento River, 3,000 tons of gravel at Goodwin Camp Float Tube Pool on the Stanislaus River, and 24,510 tons of gravel and created a 400-foot side channel at lower Sailor Bar on the American River. Biological and physical conditions were monitored to evaluate the effectiveness of the completed gravel placement projects.




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

CAMP funded several salmon monitoring projects including constant fractional marking at Nimbus and Coleman Fish Hatcheries, video monitoring on Cottonwood and Cow Creeks, rotary screw traps at Caswell State Park on the Stanislaus River, and visual surveys on Battle Creek and the Sacramento River. The Program also created data management tools for the CVPIA including workplan data entry and performance accomplishment spreadsheets.

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

The AFSP completed construction of the Bella Vista Fish Screen and removed an existing RD 108 South Steiner diversion on the Sacramento River, replacing it with pipeline facilities to convey irrigation water from an existing RD 108 Wilkins Slough Pumping Plant and Fish Screen. The Program continued construction on the Natomas Mutual Sankey Fish Screen project. The AFSP completed a three-year (2010-2012) hydraulics and fish behavioral study to identify critical factors resulting in fish losses at water diversions.

Ecosystem and Water Systems Operation Models, 3406 (g)

The Models Program developed, modified and utilized the following models in support of 7 of the 9 integral areas: CalSim II, CalLite, CalSim 3.0, HEC-5Q, C2VSim, ANN Model, DSM2, inSALMO, and HydroGeoSphere. The Program finalized development of CalLite 2.0 and made it publicly available from California Department of Water Resources (DWR) website.

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 2012, the TRRP managed flows to facilitate geomorphic processes, especially at newly constructed channel rehabilitation sites. Channel rehabilitation projects were implemented at Upper Junction City and Lower Steiner Flat sites. Five watershed projects including feasibility studies and project designs were completed in FY 2012 that kept approximately 30,000 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

The CVPIA includes a provision to authorize activities for the San Joaquin River Restoration Program (SJRRP) under Section 3406 (c)(1) of the Act. On March 30, 2009, Congress enacted Public Law 111-11, Section 10007, Compliance with Central Valley Project Improvement Act. This law "finds and declares that the San Joaquin River Restoration Settlement (SJRRP) Act (Settlement) satisfies and discharges all of the obligations" stipulated under CVPIA Section 3406 (c)(1). Restoration implementation activities, including planning and environmental studies now carried out under PL 111-11 aim to to restore and maintain fish populations in "good condition" on the mainstem of the San Joaquin River while reducing or avoiding adverse water supply impacts to Friant Division long-term contractors. Specific actions to achieve these goals include reintroduction of spring-run Chinook salmon, restoration flow releases and recirculation of restoration flows back to Friant Division contractors. The SJRRP Act established the San Joaquin River Restoration Fund and authorizes up to $2 million a

year from the Central Valley Project Restoration Fund under the PL 111-11 to supplement the program's funding under the Settlement.

In FY 2012, the SJRRP began a project to monitor and control five riparian invasive species: red sesbania, salt cedar, giant reed, Chinese tallow, and sponge plant. The Program compiled the 2011 Annual Technical Report (ATR) in March 2012 and the Final 2012 MAP in November 2011. The Program also began modifying the Ecosystems Diagnosis and Treatment (EDT) modeling platform to support the continued development of the SJRRP Fisheries Management Plan.

CVP Water Operations Resource Area Goals

The CVPIA includes several programs in Section 3406 (b) that are designed to contribute to the biological resources by supplying optimal project water to resource locations in flow quantity, velocity and timing. Programs supporting this initiative include Section 3406 (b)(1)(B), Modified CVP Operations; 3406(b)(2) Dedicated Project Yield; 3406 (b)(3) Water Acquisition Program; 3406 (b)(9)/(b)(19), Flow Fluctuations and Reservoir Storage; and Section 3404 (c) and 3405, Contract Renewals and Water Transfers. Two ongoing programs, Flow Standards and Objectives and Short Pulse Flows are incorporated into the operations of overarching programs such as Cleark Creek and Flow Fluctuations.

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

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

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

The full 800,000 AF of (b)(2) water was available for fish actions in water year 2012. The program supported actions on the American, Sacramento and Stanislaus Rivers, Clear Creek, and at the CVP Jones Pumping Plant to augment base flows and provide pulse flows in support of fisheries, endangered species, and water quality requirements.

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

The Instream WAP acquired 25,714 AF in the Merced River for the Lower San Joaquin River.

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 two salmonid isolation pool surveys on the American River. Additionally, a Flow Fluctuation Study was conducted on the Stanislaus River. The RSP met the carryover targets for Shasta and Trinity reservoirs with 2.592 MAF and 1.800 MAF, respectively.

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, 88 long term renewal contracts and 28 interim-renewal contracts have been executed within the various divisions of the CVP. There are 4 contracts that have completed negotiation for a long term contract, and 1 currently in long term negotiations. In addition, 132 long term contracts have been renewed with the Sacramento River Water Right Settlement contractors and 1 is pending renewal upon expiration in July 2020.




Reclamation approved the transfer of 524,036 AF of CVP water in FY 2012. The majority of transfers stayed within current use from agricultural to agricultural and the second largest transfer classification was from agricultural to municipal and industrial use.

Refuges Resources Area Goals

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

In addition and in response to findings and recommendations of an independent scientific panel, a long-term strategy for achieving full Level 4 water supply reliability was drafted in 2011. The goal of this strategy is provide an approach, which includes completing construction of needed conveyance infrastructure and long-term measures for achieving full Level 4 reliability for all CVPIA designated refuges. In 2013, it is planned to further refine this strategy in cooperation with stakeholders including refuge agencies and managers and water users interest groups, and begin development of an implementation plan.

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

In 2012, the RWAP purchased 47,263 AF of water for Water Year 2012. The program also monitored the quality of the water after it is applied to refuges through the Real-time Water Quality Monitoring Project in the Grasslands Ecological Area.

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

The Program delivered an estimated 402,454 AF of Level 2 water and an estimated total of 55,515 AF of Incremental Level 4 water to the refuges during FY 2012. Of the Level 2 water sources, a total of 39,064 AF was delivered from diverse, non-CVP sources.

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

The RFCP provided operational repairs to the East Bear Creek Unit of the San Luis National Wildlife Refuge Complex (East Bear Creek) Pumping Plant. In conjunction with the RWCP, the RFCP completed construction of the Gray Lodge and Pixley Groundwater Well Projects. The Program also completed the construction of four new groundwater production wells at the Grasslands Resource Conservation District. In addition, the final design of the Biggs-West Gridley Water District (BWGWD) Facilities Improvement Project was completed and when fully constructed, BWGWD will have sufficient conveyance capacity for Full Level 4 water deliveries to the Gray Lodge WA.

Other Resources Area Goals

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

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

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

In 2012, the HRP protected 520 acres of alkali scrub, grassland, and riparian woodland habitats in Fresno County; 194 acres of alkali scrub and grassland habitats in Kern and San Luis Obispo counties; and 198 acres of grassland habitat in Tulare County. The HRP also provided funds for a Metcalf Canyon jewelflower captive propagation and reintroduction project in southern Santa Clara 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 2012, the LRP planted 9,500 pounds of locally grown seed from native plants on 300 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 4,100 acre-feet in FY 2012.

FUNDING

For FY 2012, $53.1 million was appropriated to the Restoration Fund. As shown in Figures ES-2 and ES-3, a total of $83.1 million was obligated on CVPIA projects from a combination of funding sources: Restoration Funds ($48.0 million), Water and Related Resources ($22.2 million), ARRA funds ($1.3 million), state cost share funds ($1.9 million), and Bay-Delta funds ($9.6 million). See Table ES-1 for a breakdown of funding for each CVPIA Program activity in FY 2012.

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. These Task Orders and Amendment No. 7 are expected to be in place for FY 2014.

RECENT DEVELOPMENTS

Refuges Independent Review

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

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

Fisheries 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. A Fisheries Independent Review panel assessed the implementation of the Central Valley fisheries activities (i.e. fish doubling). The panel's recommendations can be found in, "Listen to the River – An Independent Report on the CVPIA Fisheries Program" dated December 2008, which calls for a science-based adaptive management approach, increased focus on the Bay-Delta and increased flows for fish. Since the panel's recommendations




Table ES-1: FY 2012 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	94,348	0	94,348
3406(b)(1)	Anadromous Fish Restoration Program		507,224	6,326,848	0	8,004,939	0	14,839,011
3406(b)(1)	Habitat Restoration Program		0	1,485,765	0	0	0	1,485,765
3406(b)(1)	Trinity River Restoration Program		7,672,904	2,990,009	0	0	0	10,662,914
3406(b)(2)	Dedicated Project Yield		0	776,136	0	0	0	776,136
3406(b)(3)	Water Acquisition Program - Instream Water		175,000	1,983,287	0	0	0	2,158,287
3406(b)(4)	Tracy (Jones) Pumping Plant Program	Tracy (Jones) Pumping Plant[1]	1,346,838	0	0	0	0	1,346,838
		Two Gates	0	0	0	18	0	18
3406(b)(5)	Contra Costa Pumping Plant No. 1		9,309	0	0	0	744,350	753,660
3406(b)(9)	Flow Fluctuations		0	14,779	0	0	0	14,779
3406(b)(10)	Red Bluff Diversion Dam		5,041,473	0	3,472	0	492,451	5,537,396
3406(b)(12)	Clear Creek Restoration Program		32,020	986,495	0	0	0	1,018,514
3406(b)(13)	Spawning Gravel		0	758,228	0	0	0	758,228
3406(b)(16)	Comprehensive Assessment and Monitoring Program		0	3,621,718	0	0	0	3,621,718
3406(b)(20)	Glenn Colusa Irrigation District		294	0	0	0	0	294
3406(b)(21)	Anadromous Fish Screen Program		4,300,000	6,013,716	1,914,337	1,500,000	0	13,728,053
3406(b)(23)	Trinity River Restoration		2,974,468	0	0	166	0	2,974,633
PL 111-11	San Joaquin River Restoration Program		0	2,599,325	0	0	0	2,599,325
3406(d)(1)	Refuge Water Supply		Level 2 conveyance included in (d)(5)					
3406(d)(2)`	Refuge Water Supply Level 4		0	6,662,257	0	0	0	6,662,257
3406(d)(5)	Refuge Facilities Construction Program	Construction	76	493,849	0	0	89,746	583,671
		Wheeling	(32,901)	11,360,280	0	0	0	11,327,671
3406(d)(5)	San Joaquin Basin Action Plan		138,073	130,323	0	0	0	268,397
3406(g)	Ecosystem & Water System Operations Models		0	554,129	0	0	0	554,129
3408(h)	Land Retirement Program		21,209	494,162	0	0	0	515,372
3410	CVPIA Administration		(18,383)	794,243	0	0	0	775,860
	TOTAL FUNDING OBLIGATED		**22,167,605**	**48,045,549**	**1,917,809**	**9,599,471**	**1,326,547**	**83,056,981**

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

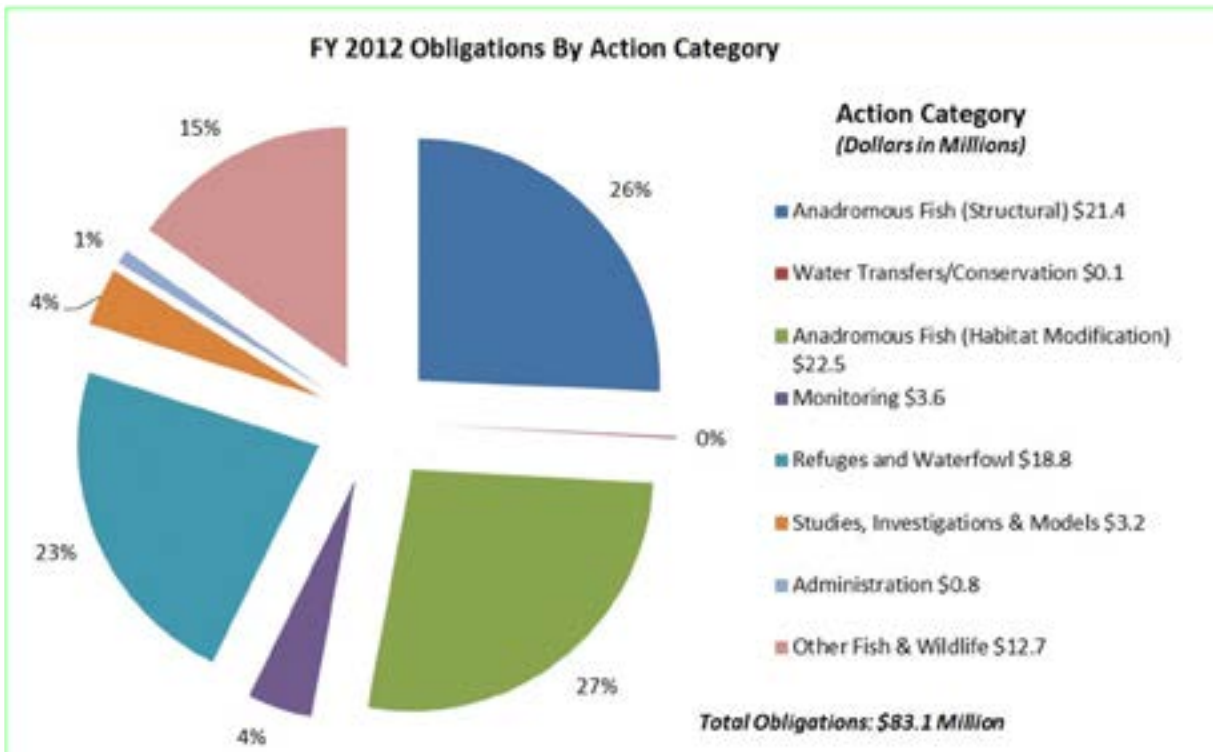


Figure ES-2: FY 2012 Financial Obligations By Action Category

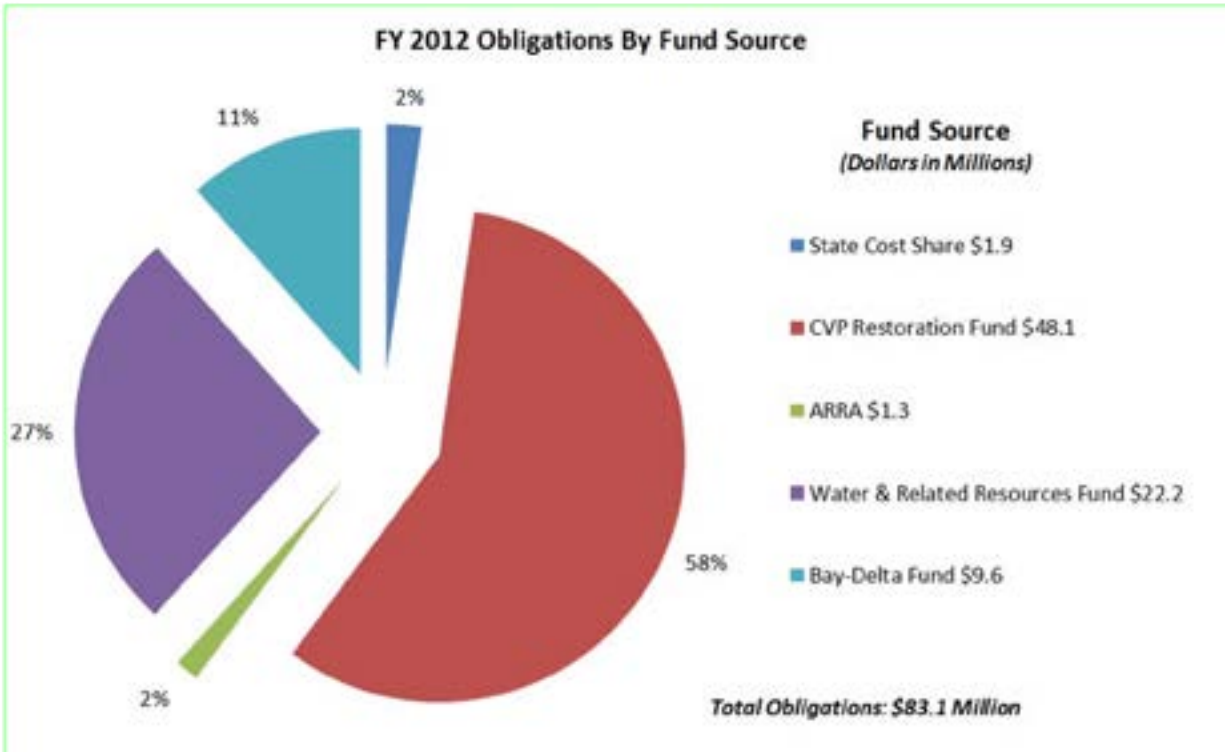


Figure ES-3: FY 2012 Financial Obligations By Fund Source




were released, the fifteen separate authorities that contribute to the "fish doubling" goal have been working together to implement improvements and to develop a fisheries resource area plan. This plan will articulate a reorganization strategy that places an emphasis on managing the fisheries related provisions as one program, rather than as individual program activities. This new structure will enable the program to articulate an overarching vision; utilize a science-based management framework to address problems at a system level; report accomplishments by watershed; and improve transparency by communicating the coordination and decision-making that occurs within the program.

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

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

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

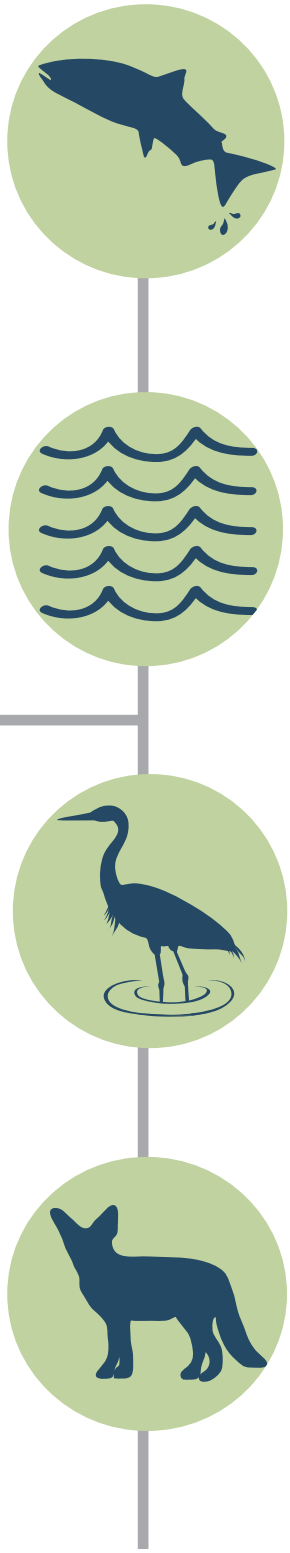
Operations Criteria And Plan (OCAP) And Biological Opinions In The Delta

In FY 2012, several key CVPIA activities contributed to meeting the RPA requirements. Examples include the implementation of a side-channel and floodplain restoration on the Stanislaus River by the Anadromous Fish Restoration Program. The Spawning and Rearing Habitat Restoration Program placed 3,000 tons of gravel in Goodwin Canyon on the Stanislaus River to increase and improve spawning habitat. And the Comprehensive Assessment and Monitoring Program used Rotary Screw Traps to monitor the production of juvenile Chinook salmon on the Stanislaus River, with the goal of assessing the effectiveness of habitat restoration in that watershed.

Red Bluff Fish Passage

Construction of the new, 2,500-cfs permanent pumping plant and fish screen was substantially completed in 2012 and the dam gates were not operated in 2012. Fish passage for all species was unimpeded.

Two cock pheasants fighting for territory, Sacramento NWR.



Chapter 1

Introduction

Chapter 1 - Introduction

PURPOSE

This fiscal year (FY) 2012 CVPIA Annual Accomplishments Report summarizes the actions authorized under the Central Valley Project Improvement Act (CVPIA or Act) of 1992 and highlights FY 2012 accomplishments (October 1, 2011 - September 30, 2012). 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, 2012 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. The relevant Sections of the Act are provided for reference in Appendix D.

BACKGROUND

Central Valley Project Improvement Act of 1992

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

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

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

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

CVPIA Background

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

Figure 1: Central Valley Project (CVP) System




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

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. Contract renewals (Section 3404) and water transfers (Section 3405) goals are also important CVPIA goals.

A synopsis of the programs targets, status to date and 2012 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 utilizes 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 State of California (State). The Act specifies 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(a) 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(d)(2)(A). The $30 million payment ceiling is calculated on a 3-year rolling average. In addition, 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 $1.5 billion has been obligated by the CVPIA Program over the past 19 years, as shown in Figures 2 and 3.

FY 2012

For FY 2012, $53.1 million was appropriated to the Restoration Fund. As shown in Figures 4 and 5, a total of $83.1 million was obligated on CVPIA projects from a combination of funding sources: Restoration Funds ($48.0 million), Water and Related Resources ($22.2 million), ARRA funds ($1.3 million), state cost share funds ($1.9 million), and Bay-Delta funds ($9.6 million). See Table 1 for a breakdown of funding for each CVPIA Program activity in FY 2012.

American Recovery and Reinvestment Act (ARRA) Funding

ARRA's funding in FY 2012 enhanced the CVPIA Program's capabilities to restore fisheries and wildlife refuges. To date, approximately $152 million has been awarded to Reclamation for CVPIA Program activities. In FY 2012, ARRA funds were obligated for the following: Contra Costa Canal Pumping Plant Program, 3406 (b)(5), obligated $0.7 million to complete construction on the Contra Costa Canal fish screen; Red Bluff Diversion Dam Program, 3406 (b)(10), obligated $0.5 million to complete construction on the permanent pumping plant for the fish passage project, and $0.09 million was obligated for refuge groundwater wells.

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 and extended SCAMPI for an additional 3 years to December 31, 2014.

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. These Task Orders and Amendment No. 7 are expected to be in place for FY 2014.

State Water Package

In FY 2010, the State legislature developed a measure known as the Safe, Clean, and Reliable Drinking Water Supply Act. The purpose of the law is to protect water quality and ensure safe, clean drinking water; meet the water supply needs of California residents, farms, businesses; expand water conservation and recycling; restore fish and wildlife habitat; reduce polluted runoff that contaminates rivers, streams, beaches, and bays; and protect the safety of water supplies threatened by earthquakes and other natural disasters. It includes State issuance of bonds totaling $11.140 billion paid from existing State funds. The measure contains funding for CVPIA Program activities such as Central Valley wildlife refuge water

and construction of fish passage improvements at Red Bluff Diversion Dam. The bond was originally slated to appear on the November 2, 2010, ballot as Proposition 18. However, on August 9, 2010, the California State Legislature decided to postpone the vote on the measure until the November 4, 2014, ballot.

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

RECENT DEVELOPMENTS

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

Antelope Creek wildlife area crossing

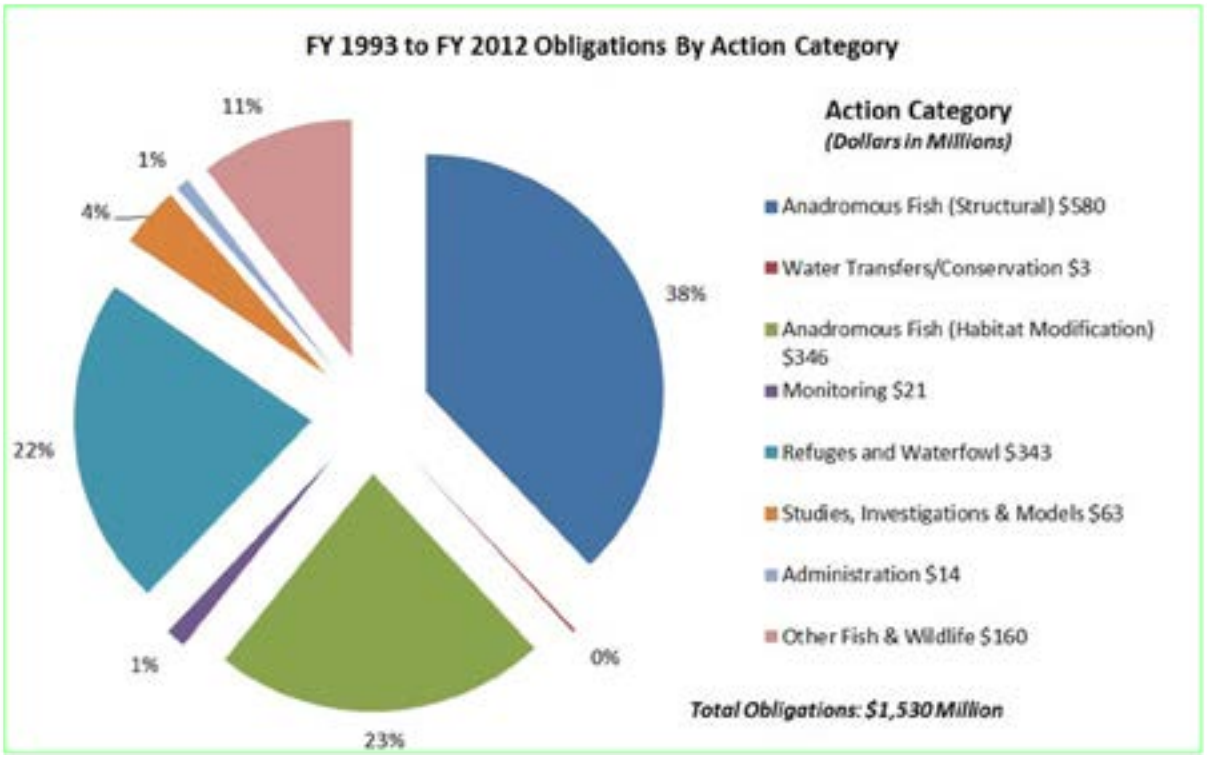


Figure 2: Program Financial Obligations By Action Category to Date

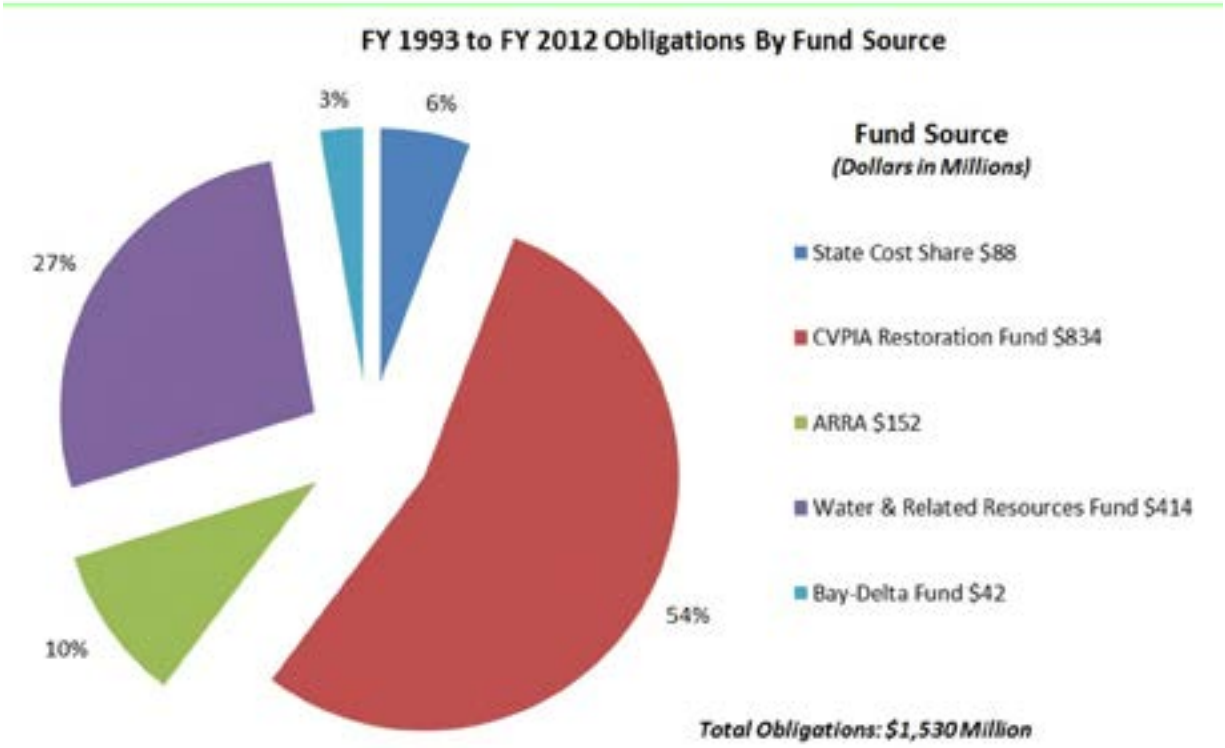


Figure 3: Program Financial Obligations By Fund Source to Date

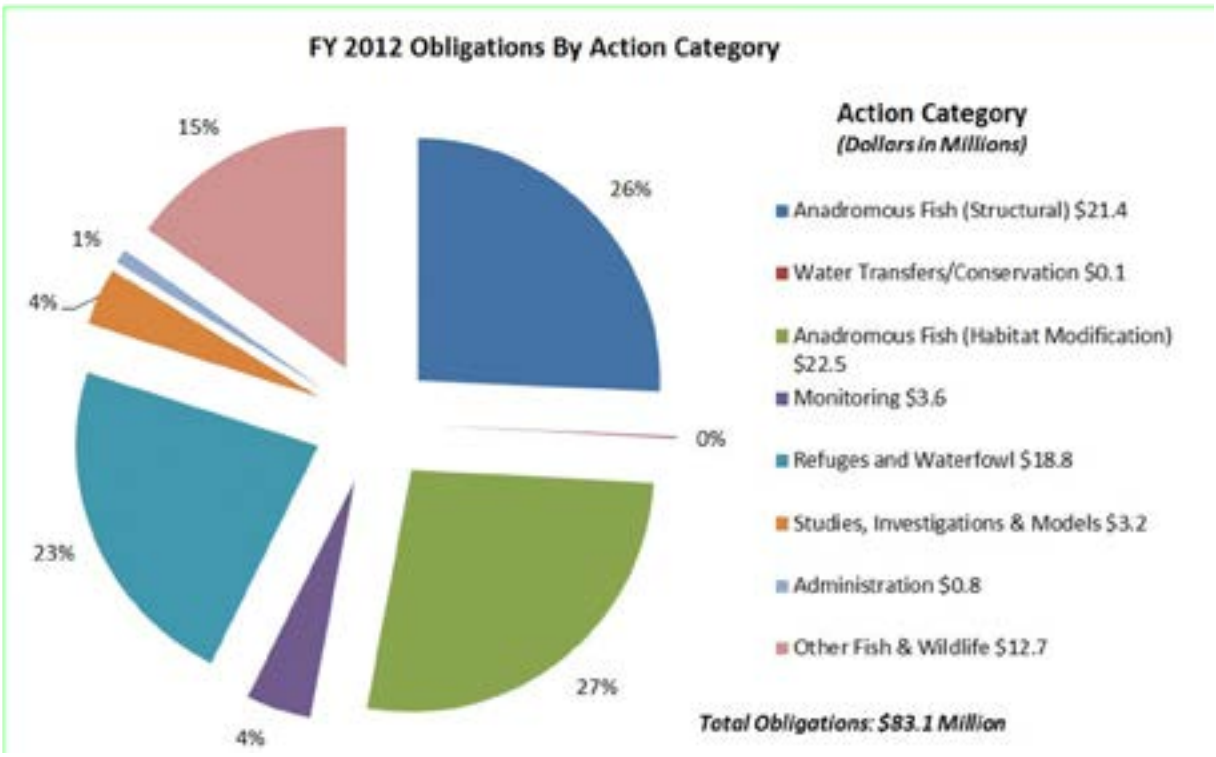


Figure 4: FY 2012 Financial Obligations By Action Category

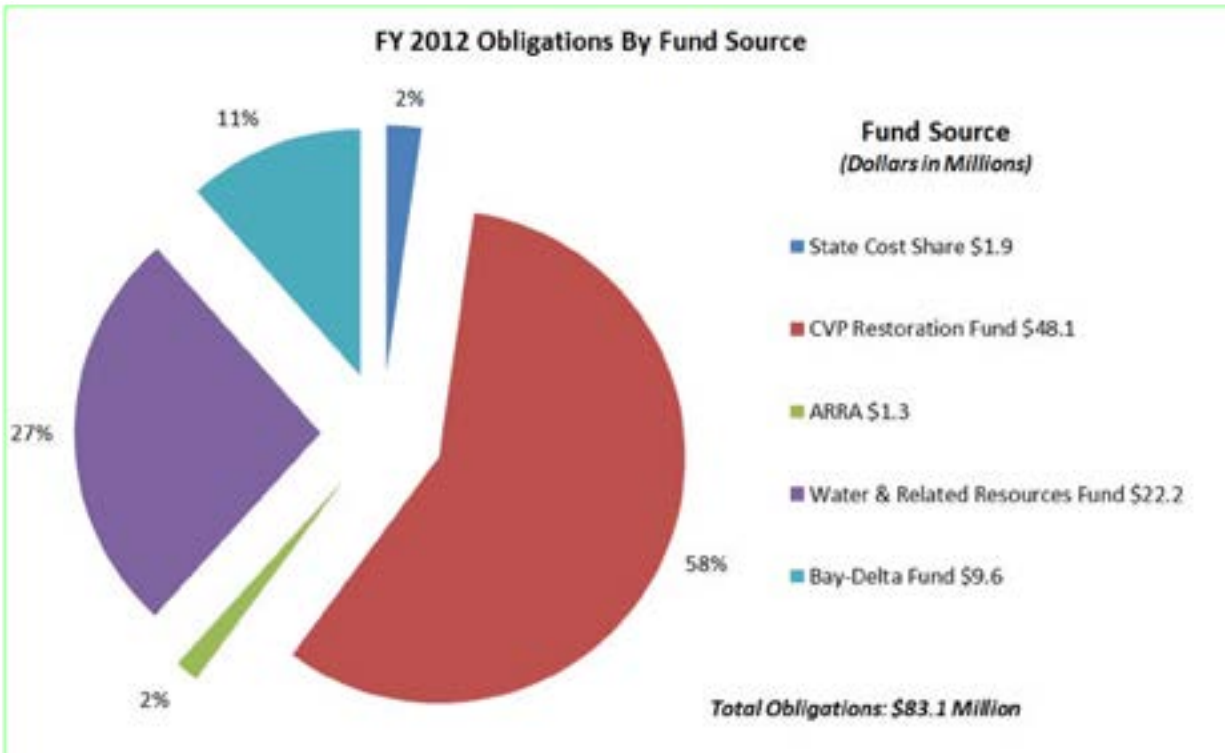


Figure 5: FY 2012 Financial Obligations By Fund Source

Table 1: FY 2012 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	94,348	0	94,348
3406(b)(1)	Anadromous Fish Restoration Program		507,224	6,326,848	0	8,004,939	0	14,839,011
3406(b)(1)	Habitat Restoration Program		0	1,485,765	0	0	0	1,485,765
3406(b)(1)	Trinity River Restoration Program		7,672,904	2,990,009	0	0	0	10,662,914
3406(b)(2)	Dedicated Project Yield		0	776,136	0	0	0	776,136
3406(b)(3)	Water Acquisition Program - Instream Water		175,000	1,983,287	0	0	0	2,158,287
3406(b)(4)	Tracy (Jones) Pumping Plant Program	Tracy (Jones) Pumping Plant[1]	1,346,838	0	0	0	0	1,346,838
		Two Gates	0	0	0	18	0	18
3406(b)(5)	Contra Costa Pumping Plant No. 1		9,309	0	0	0	744,350	753,660
3406(b)(9)	Flow Fluctuations		0	14,779	0	0	0	14,779
3406(b)(10)	Red Bluff Diversion Dam		5,041,473	0	3,472	0	492,451	5,537,396
3406(b)(12)	Clear Creek Restoration Program		32,020	986,495	0	0	0	1,018,514
3406(b)(13)	Spawning Gravel		0	758,228	0	0	0	758,228
3406(b)(16)	Comprehensive Assessment and Monitoring Program		0	3,621,718	0	0	0	3,621,718
3406(b)(20)	Glenn Colusa Irrigation District		294	0	0	0	0	294
3406(b)(21)	Anadromous Fish Screen Program		4,300,000	6,013,716	1,914,337	1,500,000	0	13,728,053
3406(b)(23)	Trinity River Restoration		2,974,468	0	0	166	0	2,974,633
PL 111-11	San Joaquin River Restoration Program		0	2,599,325	0	0	0	2,599,325
3406(d)(1)	Refuge Water Supply		Level 2 conveyance included in (d)(5)					
3406(d)(2)`	Refuge Water Supply Level 4		0	6,662,257	0	0	0	6,662,257
3406(d)(5)	Refuge Facilities Construction Program	Construction	76	493,849	0	0	89,746	583,671
		Wheeling	(32,901)	11,360,280	0	0	0	11,327,671
3406(d)(5)	San Joaquin Basin Action Plan		138,073	130,323	0	0	0	268,397
3406(g)	Ecosystem & Water System Operations Models		0	554,129	0	0	0	554,129
3408(h)	Land Retirement Program		21,209	494,162	0	0	0	515,372
3410	CVPIA Administration		(18,383)	794,243	0	0	0	775,860
	TOTAL FUNDING OBLIGATED		**22,167,605**	**48,045,549**	**1,917,809**	**9,599,471**	**1,326,547**	**83,056,981**

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

Moonbow at Friant Dam

Refuges Independent Review

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

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

program to articulate an overarching vision; utilize a science-based management framework to address problems at a system level; report accomplishments by watershed; and improve transparency by communicating the coordination and decision-making that occurs within the program.

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

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

On December 15, 2008, the Service issued its Biological Opinion (BO) analyzing the effects of the CVP and SWP operations on the threatened delta smelt and associated critical habitat. On June 4, 2009, NMFS issued its BO analyzing the effects of the CVP and SWP operations on threatened and endangered (T&E) salmonids, green sturgeon, and killer whale and associated critical habitat. The consultation resulted in determinations of "likely to jeopardize the continued existence of listed species and likely to result in the destruction or adverse modification of critical habitat. The CVP and SWP are currently operating under the two BO's, which set forth Reasonable and Prudent Alternatives (RPA's) to avoid jeopardy to species and adverse modification of critical habitat during operation of the CVP and SWP. The BOs were both challenged in Federal District Court. The Court issued rulings on both BO's requiring further analysis and reconsideration of specific RPA actions. In addition, the Court required that Reclamation conduct a review in accordance with NEPA of the effects of the RPAs on the human environment. We are currently in the process of completing the review, and the court-mandated deadline is December 1, 2013.

In FY 2012, several key CVPIA activities contributed to meeting the RPA requirements. Examples include the implementation of a side-channel and floodplain restoration on the Stanislaus River by the Anadromous Fish Restoration Program. The Spawning and Rearing Habitat Restoration Program placed 3,000 tons of gravel in Goodwin Canyon on the Stanislaus River to increase and improve spawning habitat. And the Comprehensive Assessment and Monitoring Program used Rotary Screw Traps to monitor the production of juvenile Chinook salmon on the Stanislaus River, with the goal of assessing the effectiveness of habitat restoration in that watershed.

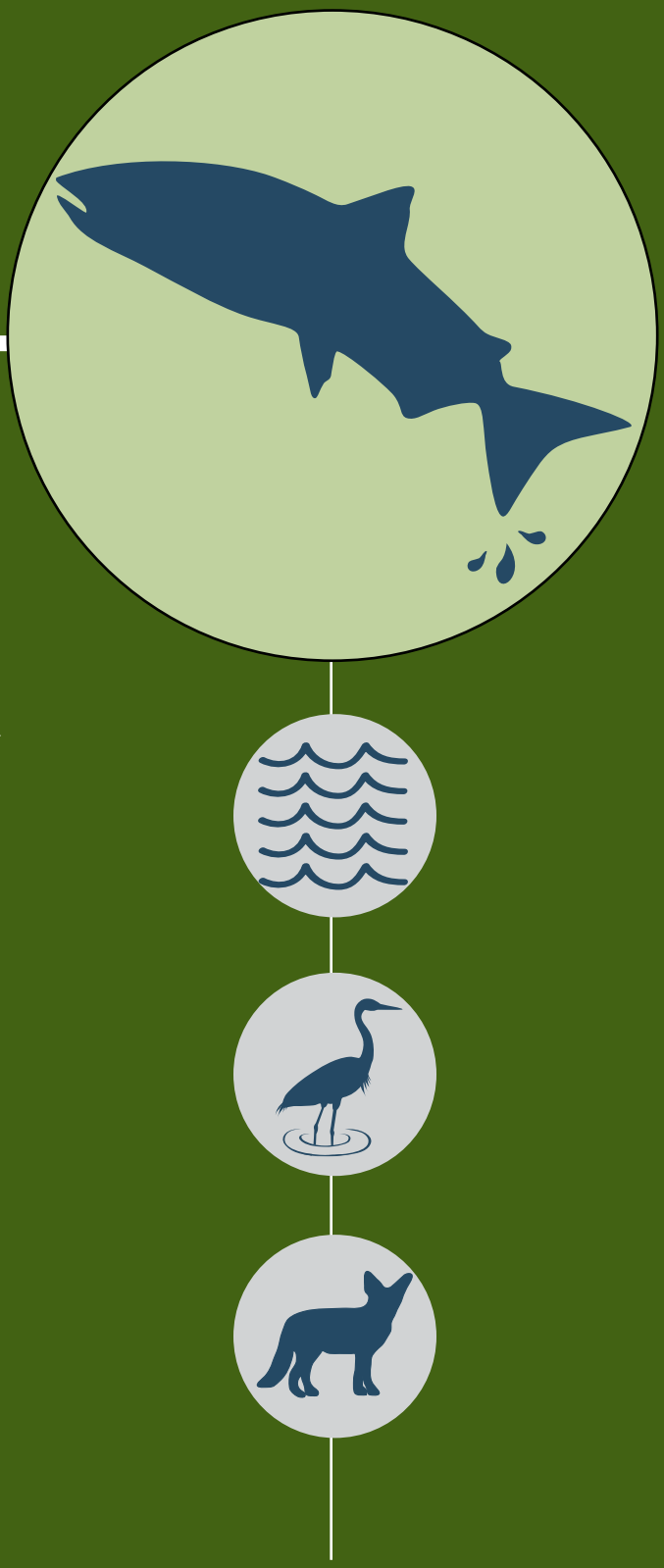
Red Bluff Fish Passage

Construction of the new, 2,500-cfs permanent pumping plant and fish screen was substantially completed in 2012 and the dam gates were not operated in 2012. Fish passage for all species was unimpeded.

Bridge and Siphon under Red Bank Creek. Looking from upstream of Red Bank Creek

Chapter 2

FISHERIES RESOURCE AREA



Anadromous Fish Restoration Program

3406 (b)(1)

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

"... implement a program which makes all reasonable efforts to ensure that, by the year 2002, natural production of anadromous fish in Central Valley rivers and streams will be sustainable, on a long-term basis, at levels not less than twice the average levels attained during the period of 1967-1991..."

Central Valley rivers and streams were defined in the January 9, 2001, Final Restoration Plan (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.

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

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

Table 2: Yearly Estimates of Natural Production of Anadromous Fish and the Average Natural Production by Species within Central Valley River and Streams, 1992-2011

						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	193,447	27,576	3,144	4,440
1993		5,153	656,506	68	692	320,533	2,369	1,024	4,157
1994		1,318	599,770	N/A	6,392	385,842	1,047	505	7,720
1995		6,803	N/A	N/A	N/A	714,930	764	4,182	36,474
1996		4,260	1,043,239	N/A	N/A	490,236	447	2,112	6,213
1997		2,591	N/A	1,306	11,689	604,049	1,344	2,010	3,866
1998		4,134	1,356,412	470	8,971	278,730	82,190	5,613	49,172
1999		715	N/A	N/A	N/A	403,023	17,243	5,439	11,130
2000		764	1,591,419	N/A	N/A	661,554	19,894	2,657	11,583
2001		761	N/A	7,098	5,129	530,504	27,717	9,916	18,401
2002		1,914	945,878	1,688	2,775	542,633	56,662	9,195	19,839
2003		9,342	829,111	N/A	N/A	528,336	9,106	10,882	13,269
2004		947	1,312,452	N/A	N/A	512,629	21,244	14,763	21,530
2005		1,741	1,058,679	2,557	2,898	397,755	20,838	21,511	26,099
2006		2,303	N/A	3,144	6,991	227,985	15,600	19,712	11,659
2007		551	252,275	1,530	10,559	107,253	30,509	4,142	13,138
2008		271	1,116,062	1,330	6,257	39,778	4,806	2,555	4,489
2009		624	830,641	10,272	6,258	30,604	4,350	4,070	2,492
2010		683	696,159	N/A	N/A	102,821	5,577	1,552	2,064
2011		892	894,606	N/A	N/A	170,273	5,669	897	3,687
Average	N/A	2,389	966,692	2,948	6,237	360,465	17,835	6,320	13,654
% of Goal	N/A	56%	39%	147%	57%	48%	26%	5.7%	20%

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, 1992-2011.

c Estimated abundance of adult striped bass in the Central Valley's anadromous waters, 1992-2011. Estimates for 2007, 2008, 2009, 2010, and 2011 are preliminary and subject to change. Years with missing data is due to CDFG survey frequency which is based upon funding.

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

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

Table 3: Summary of Progress Towards Completing 289 Final Restoration Plan Actions and Evaluations by Watershed, FY 1992-2012

Watershed	Total actions and evaluations in Final Restoration Plan	Actions and evaluations completed to date	Actions and evaluations addressed in 2012	% 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	1	0
Yuba River	14	0	3	0
All Watersheds[1]	**289**	**67**	**40**	**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 2012*	Number of structural actions completed since 1992	Number of non-structural actions completed in FY 2012*	Number of non-structural actions completed since 1992
American River		1		1
Battle Creek		3		2
Big Chico Creek		1		1
Butte Creek		13		17
Clear Creek		1		
Cosumnes River				1
Cottonwood Creek	1	1		
Mill Creek		1		
Stanislaus River				1
Thomes Creek				2
All Watersheds		**21**		**25**

* NOTE: Although structural or non-structural actions were not completed in FY 2012, work continued on 20 watersheds throughout the Central Valley.

FY 2012 ACCOMPLISHMENTS

The AFRP obligated $6,326,848 from the Restoration Fund and $507,224 from the Water and Related Resources Fund.

The AFRP continued progress toward the following actions and evaluations in the Sacramento and San Joaquin watersheds to enhance passage and habitat, and reduce loss of fish. Table 2 shows the average natural production by species since 1992. Fish count data is presented up to 2011. At the time this report was prepared, the 2012 data was not available.

The Central Valley Chinook salmon (all races) natural production average from 1992-2011 was 360,465 fish which dropped below the 1967-1991 baseline average Chinook salmon production of 497,054 as a result of the continued low returns of fall run fish in 2011 that totaled 170,273 fish (Table 2). Average Chinook salmon natural production for the period 1992-2011 has exceeded the watershed doubling goal target on Clear, Butte, and Battle Creeks and in 2011 the Mokelumne River observed high returns (14,857 naturally produced fish) (Table 5). Substantial gains in fish populations have been observed where investment in flow and passage has occurred (Butte, Battle, and Clear Creeks). Clear Creek and the Mokelumne River have also had a substantial investment in habitat restoration. Winter-run natural production numbers had continued to trend upward since 1994 until the poor returns from the last five years (2007-2011). Spring-run numbers have trended upwards since 1991, but production was reduced in 2008 to 2011. Fall-run natural production has decreased to the baseline levels due to the recent stock collapse observed in 2007-2010 though numbers have increased in some watersheds in 2011. Late fall-run production had increased greatly since the low period (1993-1997) but continued to decline in 2011.

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 1992-2011. Insufficient data are available 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

Table 5: Average Natural Production Numbers in Each Watershed Compared to the AFRP Doubling Goal Targets, 1992-2011

Watershed	Species	Doubling Goal Target	1992-2011 Average Natural Production Numbers	Percent of Target
American River*	Fall-Run	160,000	106,915	66.8
Antelope Creek	Fall-Run	720	0	0
Battle Creek*	Fall-Run	10,000	17,511	175.0
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	2,334	155.6
Clear Creek	Fall-Run	7,100	10,685	150.0
Cosumnes River	Fall-Run	3,300	737	22.3
Cottonwood Creek	Fall-Run	5,900	1,687	28.6
Cow Creek	Fall-Run	4,600	1,849	40.2
Deer Creek	Fall-Run	1,500	838	55.8
Feather River*	Fall-Run	170,000	88,563	52.1
Merced River*	Fall-Run	18,000	6,637	36.9
Mill Creek	Fall-Run	4,200	1,880	45.0
Miscellaneous Creeks	Fall-Run	1,100	78	7.1
Mokelumne River*	Fall-Run	9,300	8,372	90.0
Paynes Creek	Fall-Run	330	N/A	N/A
Sacramento River	Fall-Run	230,000	72,595	31.6
Stanislaus River	Fall-Run	22,000	5,158	23.4
Tuolumne River	Fall-Run	38,000	6,909	18.2
Yuba River	Fall-Run	66,000	31,906	48.3
Central Valley Wide	Fall-Run	750,000	398,273	53.1
Battle Creek*	Late-fall-Run	550	684	124.0
Sacramento River	Late-fall-Run	68,000	18,054	26.5
Central Valley Wide	Late-fall-Run	68,000	17,835	26.2
Butte Creek	Spring-Run	2,000	9,713	485.6
Deer Creek	Spring-Run	6,500	2,024	31.1
Mill Creek	Spring-Run	4,400	1,199	27.2
Sacramento River	Spring-Run	59,000	718	1.2
Central Valley Wide	Spring-Run	68,000	13,654	20.0
Calaveras River	Winter-Run	2,200	0	0
Sacramento River*	Winter-Run	110,000	6,320	5.7
Central Valley Wide	Winter-Run	110,000	6,320	5.7
TOTAL	**All races**	**990,000**	**360,465**	**40.2**

* Watersheds that contain a fish hatchery.

midwater trawl index for juvenile American shad in the Sacramento-San Joaquin River Delta and San Pablo and Suisun bays suggests the AFRP production target for this species was met in three of 19 years between 1992 and 2011. The 2011 midwater trawl index for this species (892) increased slightly from 2009 (624), but the 2011 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 15 out of 20 years between 1992 and 2011 and the AFRP production target has not been met.

About 23% of all Restoration Plan actions and evaluations (289) have been completed in the 1992 to 2012 time period (Table 3). Of the 128 time certain high and medium priority actions, forty-six (46%) have been completed since 1992 (Table 4). Although non-structural actions were not completed in FY2012, 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.

Accomplishments in the Sacramento Basin

American River - A structured decision making (SDM) prototype model was developed to assist in selecting the best actions for restoration given existing conditions, e.g., spawning versus rearing habitat. The model currently is being refined. Additional spawning and side channel habitat was restored in FY2012 with the addition of 5,000 cubic yards of gravel. 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 FY2012, the Tehama County Resource Conservation District completed an alternatives analysis for juvenile fish passage. The Technical Advisory Committee has met with the diverters to determine the most feasible alternative. Design is expected to begin in FY2013.

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. This project improved passage to 6.5 miles of spawning and holding habitat. This project was a cooperative effort between the USFWS and CDFW.

A draft report on the Lower Antelope Creek Geomorphic Analysis in Tehama County was completed in 2012 (Evaluation 1). Additional funding was also secured in FY2012 to collect data gaps that were identified in the draft report. The modification to the agreement was finalized in August 2012 and work will begin in the fall of 2012 on the new tasks. 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). This project is a cooperative effort among the U.S. Department of Interior, USBR, USFWS, NMFS, CDFW, and the Pacific Gas and Electric Company (PG&E).

Bear River – AFRP collected additional temperature data in 2012 in the Spenceville Wildlife Area in Dry Creek, a tributary to the Bear River. Also, reconnaissance level habitat assessments and snorkel surveys were implemented farther upstream. 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. 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 longitudinal and cross sectional profiles and turbidity testing occurred in FY2012. The USFWS also identified and established index sites to track changes in anadromous fish habitat over time. The USFWS also completed fish passage surveys on the South Fork and North Forks of Cottonwood Creek in 2012 and identified the uppermost natural barriers within the two tributaries. The field study also documented spring-run Chinook salmon holding in the North Fork, where they were not known to occur. A final report on the sediment budget project is anticipated to be completed in 2013.

The National Environmental Policy Act (NEPA) environmental permitting on the Nonnative Invasive Plant Management and Control Project (Action 5) was completed in August 2012. The initial treatment to remove nonnative invasive plants in Cottonwood Creek began in September 2012. 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 2012, the Alternatives Analysis (Phase 1) for the South Fork Cottonwood Creek fish passage improvement project was initiated (Central Valley Evaluation 11). Reconnaissance surveys upstream of the Hammer diversion and hydropower dam were completed this year documenting excellent habitat for anadromous fish, therefore, justifying the need to improve fish passage at this site. A technical team representing the USFWS, CDFW, USBR, NMFS, and the landowner were convened to review the fish passage alternatives with the contractor.

Cow Creek – The initial designs were completed in FY12 for the Clover Creek Fish Passage/Millville Diversion Dam Restoration Project. Fifty percent designs and the environmental compliance documents will be completed by spring 2013. 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, and 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. 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. A public meeting was held in 2012 to inform landowners of the project and surveys have begun in some parts of the creek. This is a cooperative project with the USFWS, CDFW, Cow Creek Watershed Group, and the Western Shasta Resource Conservation District.

Deer Creek – The agreement was finalized for the Lower Deer Creek Falls Fish Passage Improvement Project (Phase 1) to 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 and CDFW.

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. 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 FY2012. Future work may include additional video surveys and egg collection to verify spawning. Reports on sturgeon habitat surveys/detection methodology and the 2011 observations were finalized.

Mill Creek – The Mill Creek fish passage assessment and restoration project was funded in FY2011 (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 a draft alternatives report was submitted to the Technical Advisory Committee for review. 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. This is a cooperative project with the USFWS, CDFW, and the Mill Creek Conservancy.

Sacramento River – Redd stranding surveys were implemented between October 2011 and March 2012 in the upper mainstem Sacramento River. Eighty-three redds were surveyed of which 25 were identified in areas of "concern" due to being so close to being dewatered and/or completely dewatered. 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 – Cottonwood and willow pole cuttings were planted on 1.25 acres on Hammon Bar in FY2012. Overall plant survival after 9 months was 87%. An additional 3.75 acres is scheduled for planting in FY2013. The planting area is intended to flood periodically under moderate flows and thus provide juvenile salmonids with improved rearing habitat. The cuttings also captured fine sediment and woody material during inundation in March 2012 thus enhancing floodplain processes at the site (Evaluation 4). This project is a cooperative effort between the USFWS, CDFW, Bureau of Land Management (BLM), and the South Yuba River Citizens League.

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 2011 data were presented at the Lower Yuba River Accord Symposium on July 9th, 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, Yuba County Water Agency, and the Pacific States Marine Fisheries Commission.

Accomplishments in the San Joaquin Basin

Calaveras River – The Budiselich Flashboard Dam boulder weir retrofit was completed this fiscal year on October 2011. This project restored access to about 8 miles of habitat (Action 3). Final designs were completed for the Caprini Low Flow crossing and the California Central Traction Railroad bridge sites. Permitting for these two sites is nearly finalized and both sites are expected to be implemented in summer 2013. This project is a cooperative effort between the USFWS, CDFW, CDWR, Stockton East Water District, Fisheries Foundation of California, and the University of the Pacific.

Cosumnes River – Post-project monitoring for the Cosumnes River Passage Improvement Project was continued in 2012. Although the Cosumnes River did not connect in time for returning adult Chinook salmon to enter the system, the Fishery Foundation of California monitored the site during 2012 and reported that the site withstood substantially high flows

encountered during spring 2012 and was performing well above design standards for physical stability and fish passage parameters. This project improved fish passage at Rooney Dam and restored access to about 10 miles of habitat (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). Additional habitat assessments specifically targeting aquatic and terrestrial habitats and species were also completed in 2012. This project is a cooperative effort between the USFWS, Ducks Unlimited, ACOE, and BLM.

Merced River – AFRP staff developed a new agreement for rotary screw trap monitoring of outmigrant juvenile salmon. This project documented the number of juvenile salmon and steelhead that outmigrated from the Merced River in 2012. Estimates of juvenile salmonid production were calculated and the existing outmigration database was updated. A fish health and condition study on juvenile Chinook salmon from the Merced River was also implemented to evaluate temperature effects and the incidence of Proliferative Kidney Disease (PKD) from March to May 2012. Additional data to assess effectiveness of flow management and habitat restoration projects was collected.

Outreach, planning, designs, and permitting for the Merced River floodplain and channel restoration project at Snelling (Action 3) was initiated in 2012. Preliminary designs for channel improvements, including improvements to benefit operations and maintenance to an existing diversion within the project footprint were completed. The environmental compliance and permitting was initiated with the completion of a Draft Environmental Assessment/Initial Study and submission of environmental documents to meet requirements under Section 404 of the Clean Water Act and Section 106 of the National Historic Preservation Act. Pre-project monitoring which included a cultural resource assessment, 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 for the Merced River floodplain and channel restoration projects this year.

The second year of construction activities on the Merced River Ranch Project was completed on October 2011 where approximately 87,222 cubic yards of material were excavated and sorted to restore the floodplain and channel. An estimated 19,746 cubic yards of gravel were placed in the Merced River to enhance spawning habitat. Additionally, one front-end loader spent eight workdays removing material from the head of the south bank side-channel. Once completed, the Merced River Ranch Floodplain Enhancement Project will restore up to 6 acres of riparian floodplain and 1.23 miles of spawning habitat. 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 FY2012. Staff provided study proposals and provided detailed comments on study plans for channel armoring, IFIM habitat modeling, temperature models, 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 – AFRP purchased and placed 3,580 tons of spawning gravel 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 will be available after the project is completed in 2012.

In FY2012, 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 (approximately 90,000 acre feet) with Delta Cross Channel (DCC) operations in an effort to improve adult Chinook salmon returns (Delta Evaluation 5). In FY2012, the

DCC gates were closed for 10 days in October 2011. Preliminary results of this experiment found that straying of Mokelumne River origin fish can be reduced considerably and therefore contribute toward the watershed doubling goal for this river.

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 to identify 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 white sturgeon were captured and implanted with acoustic transmitters. 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. Physical habitat mapping efforts were focused on areas where white sturgeon adults and eggs were collected to refine our understanding of habitat preferences of this important species.

Stanislaus River – FY 2012 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 Chinook salmon juvenile acoustic study was completed this year. Preliminary results documented an estimated 7% (SE ± 3%) survival of juvenile Chinook salmon through the lower reaches of the Stanislaus River. AFRP also partnered with CDFW to implant acoustic transmitters in O. mykiss captured in screw traps or other sampling activities to evaluate outmigration and survival. These studies assist with evaluating benefits resulting from habitat restoration actions.

The Lancaster Road Floodplain and Side-channel Restoration Project was completed and restored 640 feet of riparian side channel habitat. Substantial post-project assessments were conducted at the Lancaster Road project site, including both physical and biological monitoring to evaluate project effectiveness.

The Honolulu Bar Floodplain Restoration Project restored 2.47 acres of riparian floodplain, created 0.7 acres of new floodplain, added 12,500 cubic yards of clean spawning gravel to the river, and restored 485 feet of side-channel habitat. 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, and CDFW.

The Third Annual Stanislaus River Salmon Festival was held on November 5th, 2011 at the Knights Ferry Recreation Area, with AFRP staff heavily involved in 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 collected 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. 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 FY2012. Staff provided study proposals and provided detailed comments on study plans for IFIM habitat modeling, temperature modeling, water balance operations modeling, O. mykiss age and growth, and juvenile Chinook salmon and predator acoustic telemetry studies. 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.

Honolulu Bar Side Channel before (top) and after (bottom).

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 2012 ACCOMPLISHMENTS

The BDO obligated $8,004,939 from the Bay-Delta Fund in FY12.

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 '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 manuscript is in preparation.

The BDO also funded (1) a six-year study of juvenile steelhead survival in the south Delta (required under the NMFS Biological Opinion); (2) a NMFS study of the genetic impacts of hatcheries on wild stocks; (3) a NMFS study on how large intake structures affect predators and predation on juvenile salmonids; (4) 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 (5) the analysis of salmon movement past the Delta Cross Channel and Georgiana Slough using hydroacoustically tagged hatchery salmon smolts.

Non-physical barrier at Head of Old River

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 rehabilitation and floodplain infrastructure improvements. Together, these actions will increase habitats for all life stages of anadromous salmonids, increase juvenile production and lead to increased spawning escapement and harvest opportunities of dependent fisheries. Since the ROD was signed, the TRRP has focused its physical restoration activities—such as gravel placement and channel rehabilitation activities—on the upper 40 miles[1] of the Trinity River between Lewiston Dam and the confluence with the North Fork of the Trinity River 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), on average, of coarse sediment annually.

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

Channel rehabilitation – The goal of the channel rehabilitation component of the program is to restore

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

Table 6: FY 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	2,145	19,175	8,918	12,347	11,566

[1] Data compiled by California Department of Fish and Game. Means are from 1992 to 2012 unless otherwise noted.

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

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

[4] Fall Chinook estimates upstream of Willow Creek weir. 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.

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

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

FY 2012 ACCOMPLISHMENTS

In FY 2012, the Trinity River Restoration Program obligated $2,974,468 from the Water & Related Resources Fund (b)(23), $7,672,904 from the Water & Related Resources Fund (b)(1) "other", and Restoration Funds of $2,990,009.

Flows – Water Year 2012 was a Normal Water Year. Water temperature, channel rehabilitation construction, and riparian vegetation issues were considered in flow scheduling.

Water volume peak flow was modified to a 6,050 cfs release to facilitate geomorphic processes, especially at newly constructed channel rehabilitation sites. The ROD prescribed flow for a normal water year is 647,000 AF.

Course Gravel and Channel Rehabilitation – Channel rehabilitation projects were implemented at Upper Junction City and Lower Steiner Flat sites, encompassing 4 of the 47 sites included in the ROD. Stakeholder concerns about pool fill and

scour affecting adult salmonid habitat and Program technical experts recommendations led to no coarse sediment (gravel) being added to the river in 2012. The program also continued planning and engineering designs for the next four channel rehabilitation projects.

Five watershed projects including feasibility studies and project designs were completed in FY 2012 that kept approximately 30,000 CY of fine sediment out of the mainstem.

Monitoring and Assessment – approximately $5 million was obligated in FY 2012 to include stream gaging, sediment transport, course and fine sediment budgets, smolt outmigration population size and timing, adult spawning escapement separated by natural and hatchery, sport and tribal harvest, system wide habitat assessment, evaluation of habitat produced through construction, riparian vegetation recruitment and encroachment and system wide bird abundance. Results from salmon production monitoring is below in Table 6. 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, 2006-2012

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

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

Table 8: Placement of Coarse Gravel by Year (7,000 Cubic Yard Target), 2003-2012

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	
		Total	**47,000**

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

Table 9: Rehabilitation Site Construction Summary, 2005-2012

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
	Total	**28**	**710,950**	**1,660**	**13.90**	**252**

* 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 767 cfs into the Delta Mendota Canal, are powerful enough to alter stream flow in the Delta and the San Joaquin River Basin. This disorients migratory fish and draws them toward the pumps where they can become entrained, or trapped.

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

PERFORMANCE MEASURES

The Tracy (Jones) Pumping Plant program (TPPP) develops and implements actions to mitigate impacts to fisheries, targeting the 23 actions included in The Tracy Fish Facility Improvement Program Plan, as shown in Table 10.

FY 2012 ACCOMPLISHMENTS

The program obligated $1,346,838 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 continued engineering and biological assessments in support of Actions 17 and 18, which will improve the louver cleaner systems and allow the louvers to screen fish more efficiently. Also, continued to work on design details towards eventual completion of Action 19, which will result in the development of land to better Reclamation's ability to conduct research onsite and improve fish protection at the TFCF. 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. This year we completed the NEPA and ESA documentation and drafted the NOAA fisheries variance. Engineering was on track this year. Design was completed to the 90% level and ready to be incorporated into a bid package. Funding is short; therefore we will likely be delayed for a year (to 2015). Continued assessments and search of land records were also conducted in support of Action 23.

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

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

Table 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

Red Bluff Diversion Dam

3406 (b)(10)

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

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

Red Bluff Diversion Dam – Gates Up

Aerial view of Red Bluff Diversion Dam and completed pumping plant and fish screen (looking upstream)

The NMFS' 1993 BO on operation of the CVP/SWP required that the gates be raised September 15th to May 14th, beginning in 1994. The BO effectively moved the beginning date back from November 1 to September 15th to encourage spawning activity further upstream and moved the ending date forward from April 30th to May 14th to reduce predation losses at the gates (NMFS 1993b, p. 54). Central Valley spring-run Chinook salmon were listed under the Endangered Species Act in 1999. Operation of the RBDD gates also impaired the spawning migration of spring-run, and additional gates-in period adjustments were made. In 2006, green sturgeon that spawn in the Sacramento River were listed as threatened under the Endangered Species Act. The RBDD gates prevented green sturgeon from migrating above the dam to spawn, and a new BO addressing operation of the CVP/SWP was completed in 2009. The 2009 BO acknowledged that a new pumping facility was planned to replace the function of the RBDD.

Two temporary pumping plants allowed the gates to remain open for 10½ months in 2011 (September – June 15). As a result of the 2009 BO, the gates are required to be raised year-round after 2011. The

temporary pumping plants did not meet the capacity needs to deliver year-round irrigation supplies to local farmers. The new pumping plant was substantially completed in 2012. Over the next several years the fish screen will be hydraulically and biologically evaluated. Completion of the new pumping plant allows the RBDD gates to remain open year-round without affecting deliveries to water contractors and the Sacramento Wildlife Refuge (SNWR).

PERFORMANCE MEASURES

The Red Bluff Program's (RBP) current goals include passage of 80–100% of adult spring-run salmon, the Chinook salmon run that continued to be significantly blocked. The RBP aim was to achieve this target while maintaining water deliveries. Successful fish passage is now ensured, as the dam gates are no longer operated.

Passage of 50-100% of adult green sturgeon is also targeted while maintaining water deliveries to SNWR and other water contractors. Successful green sturgeon passage is now ensured now that the dam gates are no longer operated.

Completed Pumping Plant and Fish Screen – August 2012

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

FY 2012 ACCOMPLISHMENTS

In FY 2012, the RBP obligated funding from a variety of sources:

- $5,041,473 from Water and Related Resources Fund
- $492,451 from the American Recovery & Reinvestment Act Fund
- $3,472 from the state of California Cost Share Fund

Pumping Plant and Fish Screen

Construction of the new, 2,500-cfs permanent pumping plant and fish screen was substantially completed in 2012:

- Moving Water Industries (MWI), Inc. has installed the pumps and motors.
- Balfour-Beatty, Inc. completed the pumping station and fish screen contract.
- Tehama Environmental Solutions completed the construction and planting phase of the Terrestrial Mitigation contract during calendar year 2012 and has begun the five year plant establishment phase.

Fish Passage - The dam gates were not operated in 2012 and fish passage for all species was unimpeded.

Compliance with 2009 NMFS BO – The RBP continued green sturgeon studies, in compliance with the BO-required actions. In 2012, sampling occurred over a 94-river-kilometer range. Preliminary results indicate that green sturgeon spawning occurred from late April to late May, and larvae emerged from the spawning grounds between May and June.

Pumping plant complete in 2012. Looking from downstream to upstream

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 in July 2012. The CCRP is currently evaluating what measures are needed to address erosion concerns for the Dale Fire area.

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 2012 ACCOMPLISHMENTS

In FY 2012, the CCRP obligated $986,495 from the Restoration Fund and $32,020 from the Water and Related Resources fund.

Gravel Placement (Creation of Spawning Habitat) – A total of 10,000 tons of gravel was placed in Clear Creek in 2012 representing 40% of the annual target. Although more than 21,000 square feet of spawning habitat was created by the FY 2011 gravel placement projects, the amount of habitat created by the 2012 injections cannot be determined until next year.

- Gravel was placed in four sites during 2012: Guardian Rock (aka belowNEED Camp), Placer Bridge, Clear Creek Road Crossing, and the Tule Backwater.

The second annual evaluation of spawning gravel implementation and monitoring was 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 and BOR, in coordination with the Clear Creek Technical Work Group will begin cooperatively and adaptively evaluate the efficacy of the new criteria in FY 2013.

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

Instream Flows and Temperature of Flows – The CCRP met its goal of providing base flows of 200 cfs between October 1–May 31. Although the spring-run population numbers have been in decline, and (e.g.) the numbers of spring-run Chinook (7) were low in 2011, the pulse flows are beneficial in attracting fish and promoting upstream movement. In the spring of 2012, 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 under preparation. Similar flows will occur each year as directed by the NMFS OCAP BO.

Water temperature targets were partially met in 2011. The 60°F target from June 1 through September 15 was achieved 77% of the time due to necessary instream dredging required for a one-time removal of toxic waste from the Spring Creek arm of Keswick Reservoir. All of the exceedances occurred during the 56°F spawning and incubation period when the target was met only 26% of the time. The 2012 temperature data has not been fully analysed, however as of October 8, 2012, a total of 15 days exceeded temperature criteria, equating to meeting the target only 38% 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.

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.

Adaptive Management and Monitoring

Spawning gravel-size specifications improved based on monitoring. 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 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.

Stream channel restoration designs improved based on monitoring. In 2012, stream channel restoration Phase 3B designs were improved by monitoring and evaluations. Based on monitoring results, plans and designs were made for habitat improvements in scour channels and riparian vegetation and for the reduction of negative habitat fragmentation by decommissioning of roads used during habitat restoration. Funding from the Ecosystem Restoration Program will allow completion of project construction. In addition, the final proposal for the long term gravel supply 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.

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. Information was synthesized by the Clear Creek Technical Team to evaluate options and to identify the most appropriate solutions: sediment removal from a large pool, an erosion inventory, and erosion control. These actions may be funded in 2014. Funding will be needed to monitor and evaluate the effectiveness of these actions and to determine whether additional remedial measures will be necessary. Since the 2008 fires, the juvenile productivity of steelhead and spring and fall Chinook has decreased, although it is not yet clear why. It appears possible that the amount of fine sediment has been decreased, perhaps by the 6 pulse flows that have occurred since the fire.

Fish and geomorphic monitoring results may improve future pulse flows. Results of pulse flows in FY 2010 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 2010 results led to experimental flows in 2011, which were successful in achieving higher flows, and moving more sediment downstream. Therefore in 2012 both higher and lower 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 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. Using the old method the 2011 escapement would be 6,332 (31% higher). In addition, spawning populations of threatened spring Chinook and steelhead have been re-established in the watershed.

The recent DFG 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 DFG to build and install a fish counting weir in Clear Creek near the confluence with the Sacramento River. The weir will be operated year-round with DFG using it during fall Chinook passage and the FWS the rest of the year to monitor spring and late fall Chinook and steelhead.

Downstream view of the Placer Bridge injection site, taken from the Vietnam Veterans Memorial ridge (aka Placer Bridge).

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 Department of Fish and Wildlife in the Sacramento, American and Stanislaus rivers; juvenile production monitoring conducted by the Service in the Sacramento River (Reclamation funded), and private contractor in the Stanislaus River (CVPIA funded). No juvenile production monitoring is currently occurring in the American River but will occur in 2013. Adult escapement and juvenile production monitoring provides information on the number of juvenile emigrants produced per spawner.

PERFORMANCE MEASURES

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

The program 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 2012 ACCOMPLISHMENTS

In FY 2012, the SRHP obligated $758,228 from the Restoration Fund.

Sacramento River – In 2012, the program placed 15,000 tons of gravel just below Keswick Dam, or 150% of the annual target of 10,000 tons. This gravel is distributed downstream with high flows. Redd surveys funded separately by Reclamation showed that 66% of the winter-run Chinook salmon spawning occurred upstream of the Anderson Cottonwood Irrigation District diversion dam in 2012. 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 2012, the program placed 3,000 tons of gravel at the Goodwin Canyon Float Tube Pool representing 100% of the annual target of 3,000 tons. Gravel was placed with the "Habitat Builder" just upstream of a riffle created in 2004 to increase the habitat available in this heavily utilized location. Habitat Builder is a gravel placement system where gravel is pumped through a pipe using water to tranport the gravel through to the desired location in the river. At the end of the pipe, people in the river guide the gravel slurry to the desired placement locations. This is the closest spawning riffle to Goodwin Dam (the top of anadromous habitat) and is in an area with a high density of rearing O. mykiss which are a threatened species in the Stanislaus. During redd surveys in fall of 2012, 139 Chinook salmon redds were mapped on the float tube pool riffles.

American River – In 2012, the SRHP placed 24,510 tons of gravel and created a 400-foot side channel at lower Sailor Bar. The gravel placement represented 350% of the annual target of 7,000 tons. This project was funded by SRHP, AFRP and the Corps of Engineers and included participation by multiple agencies including Reclamation, Fish and Wildlife Service, the Water Forum, City of Sacramento, CDFW, USACE, and Sacramento County Regional Parks. The project included a designed channel spanning gravel placement and a side channel incorporating woody material. A matrix of nine distinct gravel patches was included to test the performance of various gravel mixtures (i.e., sizes) between three different suitability ratings based on water velocity and depth.

The program embarked on a Structured Decision Making process to help determine the most efficient use of management resources to maximize the number and condition of juvenile salmonids leaving the American River. We created a predictive model, parameterized primarily using expert opinion, representing the key variables that can be influenced by the gravel program. We are now 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

Crew placing gravel in the Stanislaus with the "Habitat Builder".

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.

FWS crew laying out an experimental gravel patch as gravel placement proceeds at lower Sailor Bar.

Completed side channel at lower Sailor Bar.

Table 11: Gravel Placed by Year in CVP Streams, and Percent of Target, 1997-2012

	Sacramento River 10,000 Ton Target	% Target	Stanislaus River 3,000 Ton Target	% Target	American River 7,000 Ton Target	% Target
1997	22,191	221	2,000	67	0	N/A
1998	22,191	221	3,000	100	0	N/A
1999	15,341	153	0	N/A	6,000	86
2000	29,850	298	1,300	43	0	N/A
2001	0	0	500	17	0	N/A
2002	15,341	153	4,000	133	0	N/A
2003	15,341	153	0	N/A	0	N/A
2004	22,191	221	1,200	40	0	N/A
2005	7,200	72	2,500	83	0	N/A
2006	6,000	60	2,500	83	0	N/A
2007	4,615	46	4,100	137	0	N/A
2008	8,300	83	0	N/A	7,000	100
2009	9,900	99	0	N/A	10,600	151
2010	5,500	55	0	N/A	16,000	229
2011	5,000	50	5,000	167	20,770	297
2012	15,000	150	3,000	100	24,510	350
TOTAL	**203,961**	**127**	**29,100**	**61**	**84,880**	**76**

Comprehensive Assessment and Monitoring Program

3406 (b)(16)

Pursuant to CVPIA section 3406 (b)(16), the Comprehensive Assessment and Monitoring Program (CAMP) was established to assess the biological results and effectiveness of actions implemented by CVPIA in support of the fish doubling goal. 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 program is heavily dependent on other programs and agencies to provide information. To optimize its program budget, CAMP works with partners whenever possible to complete high-priority monitoring projects.

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

CAMP focuses on three program objectives:

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

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

Objective #3 – 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 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 2012 report is the tenth report prepared since 1992.

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

FY 2012 ACCOMPLISHMENTS

In FY 2012, the CAMP received $3,621,718 from the Restoration Fund.

Objectives #1

CAMP Annual Report: the development of the 2011 version of the CAMP annual report was completed. The report is available at: *http://www.fws.gov/sacramento/Fisheries/CAMP-Program/Documents-Reports/Documents/2011_CAMP_annual_report.pdf.*

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 2012; a report documenting those operations is available at: *http://www.fws.gov/sacramento/Fisheries/CAMP-Program/Documents-Reports/Documents/2012%20Constant%20Fractional%20Marking%20Report.pdf*.

Develop Report Documenting Adult Salmon Surveys On Cottonwood Creek: the development of a report documenting salmon video monitoring results from Cottonwood Creek between 2007 and 2011 was completed. The report is posted on the CAMP's website at *http://www.fws.gov/sacramento/Fisheries/CAMP-Program/Documents-Reports/Documents/2007-2011%20Cottonwood%20Creek%20video%20survey%20results.pdf*.

Develop Report Documenting Adult Salmon Surveys On Cow Creek: the development of a report documenting salmon video monitoring results from Cow between 2006 and 2011 was completed. The report is posted on the CAMP's website at *http://www.fws.gov/sacramento/Fisheries/CAMP-Program/Documents-Reports/Documents/2006-2011%20Cow%20Creek%20Video%20Survey%20Results.pdf*.

Battle Creek Adult Chinook salmon escapement monitoring: surveys were conducted to quantify the abundance of adult Chinook salmon on Battle Creek. The surveys are conducted with a weir at the Coleman National Fish Hatchery. A report documenting the results from this activity will be completed in FY 2013.

Sacramento River Winter-run Chinook Salmon Escapement Surveys: a series of surveys were conducted to quantify the abundance of adult winter-run Chinook salmon in the Sacramento River mainstem. The surveys were conducted in partnership with the California Department of Fish and Wildlife. A report documenting the results from this activity will be completed in FY 2013.

Develop Analytical Framework And Tool To Develop Salmon Hatchery Proportions: a report providing an assessment of the feasibility of developing a spreadsheet/database quantifying the proportion of adult hatchery- vs. wild-origin Chinook salmon in watersheds and streams across the Central Valley was developed.

Finalize The Development Of The Chinookprod Database: supplemental funding was provided, and facilitated the conversion of the Chinookprod spreadsheet to a fully functional, fully documented database format.

Objective #2

CAMP Rotary Screw Trap Platform: work continued on the development of the CAMP Rotary Screw Trap Platform, and a final database structure for storing RST data has been created, a user interface with various forms for entering new RST data has been created, the migration of historical data from three watersheds to the CAMP database is nearly complete and the process of migrating historical data from two other watersheds is under way, and computer programming code is being developed that will produce juvenile salmon production estimates based on the raw data in the database.

Monitor Juvenile Chinook Salmon Production - Caswell State Park: rotary screw traps were operated at Caswell State Park on the Stanislaus River during all of the 2012 rotary screw trap field season; a report documenting those operations will be completed in late FY 2012. A report documenting the results from the 2010 and 2011 rotary screw trap field season was completed and is available on the CAMP's website at: *http://www.fws.gov/sacramento/Fisheries/CAMP-Program/Documents-Reports/Documents/Stanislaus%20River%20(Caswell)%20RST%20data%20(16)%202010%20and%202011.pdf*.

Monitor Juvenile Green Sturgeon And Chinook Salmon Abundance at the Red Bluff Diversion Dam: rotary screw traps were operated below the Red Bluff Diversion Dam on the Sacramento River mainstem on a nearly continuous basis. The trapping associated with that site is used to monitor the abundance of juvenile green sturgeon and four runs of Chinook salmon. A report documenting the results from this activity will be completed in FY 2013.

Monitor Juvenile Chinook Salmon Production – Upper Battle Creek: rotary screw traps were operated on Battle Creek Dam during all of the 2012 rotary screw trap field season. The trapping associated with that site is used to monitor the abundance of three runs of Chinook salmon. A report documenting the results from this activity will be completed in FY 2013.

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.

GIS Network Access Tool (GNAT): a tool to access the CVPIA document data base is under development by the BOR. This tool will allow users to access CVPIA documents according to location, topic, and program activity via an interactive, web-accessible graphical user interface (GUI). The tool will have the look and feel of a GIS tool. Deployment of this tool is scheduled for FY 2013.

Other Data Management: an Excel workbook was designed and created that allows entry of program activities and associated information (funding levels and source, responsible agencies, etc). Pre-formatted tables are easily created for input into the annual work plans.

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.

Anadromous Fish Screen Program

3406 (b)(21)

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

The AFSP provides matching funds for state and local funding, providing up to 50% of the cost of a fish screen project. The AFSP conducts monitoring at 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 typically complex, and are often 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 are conducting 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 2012 ACCOMPLISHMENTS

The AFSP obligated funding from the Restoration Fund in the amount of $6,014,000, $4,300,000 from the Water and Related Resources Fund, $1,500,000 from Bay-Delta funds, and $1,914,000 from State matching cost-share funds.

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

Construction continued on the Natomas Mutual Sankey Fish Screen project for a 389 cfs screened diversion on the Sacramento River that replaces two existing diversions on the Natomas Cross Canal. This project also results in the removal of an anadromous fish migration barrier (seasonal diversion dam) on the Natomas Cross Canal. This fish screen project will be completed in FY 2013. Also, environmental compliance and design work continued on the Phase 2A project to screen a Natomas Mutual 150 cfs diversion at Pritchard Lake on the Sacramento River.

The AFSP continued to support design, environmental compliance, and permitting activities for the RD 2035/ Woodland Davis Clean Water Agency Joint Intake and Fish Screen project on the Sacramento River. This fish screen project is targeted to begin construction in FY 2014.

The AFSP continued to support design, environmental compliance, and permitting activities for the West Stanislaus Irrigation District Fish Screen Project off the lower San Joaquin River. This fish screen project is targeted to begin construction in FY 2015 or 2016.

The AFSP completed construction of the Bella Vista Fish Screen, involving installation of state-of-the-art retractable cylindrical fish screens at the existing 85 cfs pumping plant on the Sacramento River near Redding. In addition, an existing RD 108 South Steiner 30 cfs diversion on the Sacramento River was permanently removed, and pipeline facilities were constructed to allow the area previously served by the South Steiner diversion to use irrigation water pumped from the existing RD 108 Wilkins Slough Pumping Plant and Fish Screen.

Project implementation continued on five fish screens: River Garden Farms #3 at Townsite (62 cfs), Cranmore Farms #2 (36 cfs), Tisdale #2 (44 cfs) and Alamo Farms #1 (36 cfs) on the Sacramento River, and Joe Sanchez Farms (24 cfs) on Steamboat Slough in the Sacramento-San Joaquin Delta. Fish entrainment monitoring was also conducted in 2012 at these five diversion locations prior to installation of the fish screens. This effort is part of a program to collect data to assess the biological benefits of fish screening and to help prioritize future fish screening efforts. In addition, project implementation continued on four fish screens: Feather Water District North (78 cfs) and South(40 cfs) on the Feather River, South Sutter #1 (80 cfs) on Auburn Ravine, and Colusa Indian Community Council Compton (22 cfs) on the Sacramento River. (see Table 12 for projects by watershed).

AFSP Technical Assistance – The AFSP continued a three-year (2010-2012) hydraulics and fish behavioral study at the UC Davis J. Amorocho Hydraulics Laboratory to identify critical factors resulting in fish losses at water diversions. The study is also evaluating potential lower cost options for minimizing fish losses at smaller diversions, such as use of behavioral devices at some diversions rather than use of more expensive positive barrier screens. A final study report will be issued in FY 2013.

Table 12: AFSP Projects by Watershed and Cubic Feet per Second (cfs) Screened, 1994-2012

Watershed	Number of Fish Screens	Flow (cfs)
Sacramento	21	4,212
American	1	310
Yuba	1	65
Butte	4	257
Delta	6	113
San Joaquin	2	455
TOTAL	**35**	**5,412**

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

The agencies responsible for the management of the SJRRP include Reclamation (lead), the Service, National Marine Fisheries Service (NMFS), California Department of Water Resources (DWR), and California Department of Fish and 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 CVP 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 CVP 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 mainstem of the San Joaquin River below Friant Dam to the confluence of the Merced River, including naturally reproducing and self-sustaining populations of salmon and other fish.

FY 2012 ACCOMPLISHMENTS

The Program obligated $2,599,325 from the CVP Restoration Fund to achieve the following:

Invasive Vegetation Management and Control – In support of the Restoration Goal, Reclamation identified the need to manage and control invasive vegetation as part of the environmental compliance and permitting activities for the Water Year 2012 Interim Flows, and specifically, as part of Reclamation's Water Year 2012 Interim Flows Environmental Assessment (EA). In FY 2012, the SJRRP awarded a grant to the San Joaquin River Parkway and Conservation Trust, Inc. to help fulfill these invasive vegetation monitoring and management commitments. The Invasive Vegetation Management Plan calls for monitoring and control and management activities focusing on five species: red sesbania, salt cedar, giant reed, Chinese tallow, and sponge plant.

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 2012, 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 2011 ATR in March 2012 and the Final 2012 MAP in November 2011.

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

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

In this photo, a fisheries biologist from Reclamation's Technical Service Center in Denver makes a small incision in a juvenile fall-run Chinook salmon and, at bottom right, inserts a small tag as part of a study supporting reintroduction of Chinook salmon into the San Joaquin River.

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 2012 ACCOMPLISHMENTS

The Modeling Program obligated $554,129 from the Restoration Fund in FY12.

CalSim II accomplishments for FY12 included (1) developed a new and improved CalSim Benchmark Study to establish a CalSim baseline that can be used for planning and other studies; (2) updated CalSim II models for the Shasta Enlargement Project EIS alternatives to match the current CalSim baseline and improve operations of the enlarged Shasta Reservoir; (3) completed modeling for the Interim SWRCB San Joaquin Flow Standards EA; (4) made various CalSim II modifications to rectify logic that was found to cause unintended effects, to adapt existing logic to changed assumptions that governs the model inputs and to expand the model's logic to reflect new physical and/or regulatory conditions; (5) developed the model and investigated the effects on Central Valley from BDCP Alternate 8 (aka SWRCB Alternative), Sisk Dam Corrective Action Studies, and North Bay Aqueduct Alternate Intake projects. These 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 FY12 included (1) finalized development of CalLite 2.0 and made it publicly available from California Department of Water Resources (DWR) website. In doing so, licenses to use the associated numerical solver were integrated into the model, thereby making CalLite 2.0 free to the user community; (2) conducted two training sessions, one for Reclamation and DWR and one for state and Federal fish agencies. Besides keeping the model relatively simple, this training helped make CalLite readily usable; (3) made various CalLite modifications to rectify logic that was found to cause unintended effects, to adapt existing logic to changed input assumptions and to expand the model's logic to reflect new physical and/or regulatory conditions. These modifications facilitate the use of the model for numerous studies by Reclamation and others which ultimately lead to increased understanding referenced in §3406(g); (4) implemented D1485 regulations and made the model able to evaluate their impacts on water supply and Delta exports; (5) added Dynamic Allocation Procedure (DAP) in CalLite model.

CalSim 3.0 accomplishment for FY12 included (1) continued to refine/calibrate/validate hydrology and stabilized the model for Sacramento Valley for the beta release; (2) refined ground water Dynamic Link Library (DLL) implementation in CalSim 3.0; (3) continued to refine the CalSim 3.0 schematic/ presentation tool; (4) developed model diagnostic/ presentation toolbox; (5) started merging with SJR module; (6) expanded model domain; (7) developed 2030 hydrology; (8) updated Delta land uses, etc.

HEC-5Q temperature model accomplishment for FY12 included (1) extended the model to include the Sacramento River to above Ord Ferry; four weirs (Moulton, Colusa, Tisdale, and Fremont); and the Sutter Bypass that will allow to complete the Sacramento River flow accounting and to provide computed temperature at the Feather–Sutter Bypass confluence; (2) implemented the HEC-RAS model for the Bypass–Feather–Sacramento–American system and prepared HEC-5Q-compatible cross-section inputs; (3) developed 1920-2012 meteorological inputs from CIMIS data at the Nicolas, Colusa, and Fair Oaks stations; (4) processed flow and operation data for the Folsom–Natoma– American River system; (5) converted the Folsom Lake temperature profile spreadsheet data to model-compatible DSS data; (6) developed Folsom Lake and Lake Natoma model data, including representation of the Folsom Dam temperature control device (TCD); (7) performed initial calibration of Folsom Lake using monthly profile and release temperature data; (8) refined representation of the Oroville–Thermolito facilities; (8) developed stage-flow (H-Q) relationships for defining downstream-reach control elevation for the HEC-RAS model; (9) simulated a series of flows with the HEC-RAS model for defining the depth-area-width-flow tables required by SRWQM; (10) generalized the utility program that converts American River HEC-RAS output to SRWQM inputs; (11) refined initial calibration of the American River using the HEC-RAS based geometry data; (12) Modified the HEC5Q source code to provide summary output for analyzing Folsom Dam temperature control device (TCD) structure operation, (13) processed additional inflow temperature data for model calibration; and (14) revised reservoir release algorithm for revised temperature objectives for Folsom Dam outflow.

C2VSIM (California Central Valley Groundwater-Surface Water Simulation Model) accomplishment for FY12 included (1) released IDC (IWFM Demand Calculator) version 4.0.226 to the public in May 2012; (2) released generic surface water-groundwater model engine Integrated Water flow Model (IWFM) version 4.0 to the public in July 2012; (3) completed C2VSIM draft report for the historical simulation 1922-2009 and associated appendixes; (4) developed a fine grid version of the C2VSIM model for the historical simulation 1922-2009 (resolution averages less than a square mile per element). It is expected to be released early 2013; (5) participated in the on-going CWEMF-sponsored peer review of the IWFM, HydroGeoSphere, and MODFLOW-FMP integrated hydrologic models; (6) assisted UC Davis in implementing IDC v 4.0 to Fabian Tract in the Delta and in organizing a CWEMF sponsored public workshop at UC Davis in August 2012 (7) implemented the San Joaquin portion of C2VSIM into CalSim 3.

ANN Model accomplishment for FY12 was that the robustness of the trained ANN for CalSim 3 base case was tested and training data requirements were identified.

DSM2 model accomplishment for FY12 included (1) improved channel geometry in the model and recalibrated DSM2 version 8.1 by adjusting Manning's coefficient values, (2) studied the South Delta null zones to analyze whether and to what extent CVP and SWP exports and the agricultural temporary barrier influence the stage and circulation; and (3) Improved DSM2 particle tracking modules.

inSALMO accomplishment for FY12 included (1) investigated how spatial resolution of the input data affects model results by procuring depth, velocity, and habitat data and extending the model to new river reaches; (2) continued to develop model parameters to enable inSALMO to simulate steelhead spawning, egg incubation, emergence and rearing; (3) further calibrated and validated the model with aforesaid data; and (4) submitted a manuscript entitled "Railsback, S. F., M. Gard, B. C. Harvey, J. L. White, and J. K. H. Zimmerman, Evaluation of a salmon habitat restoration project using an individual-based model" on June 23, 2012, to North American Journal of Fisheries Management.

HydroGeoSphere (HGS) accomplishment for FY12 included (1) developed a groundwater (subsurface flow only or variably-saturated flow) model capable of evaluating the impact of groundwater withdrawal on land subsidence in the San Joaquin River basin; (2) extended the groundwater model to surface/subsurface flow model by including application of surface-flow and parallelization capabilities.

The 3406 (g) program also prepared publications and provided support to model applications for stakeholders. Table 13 presents the nine model types and FY12 accomplishments.

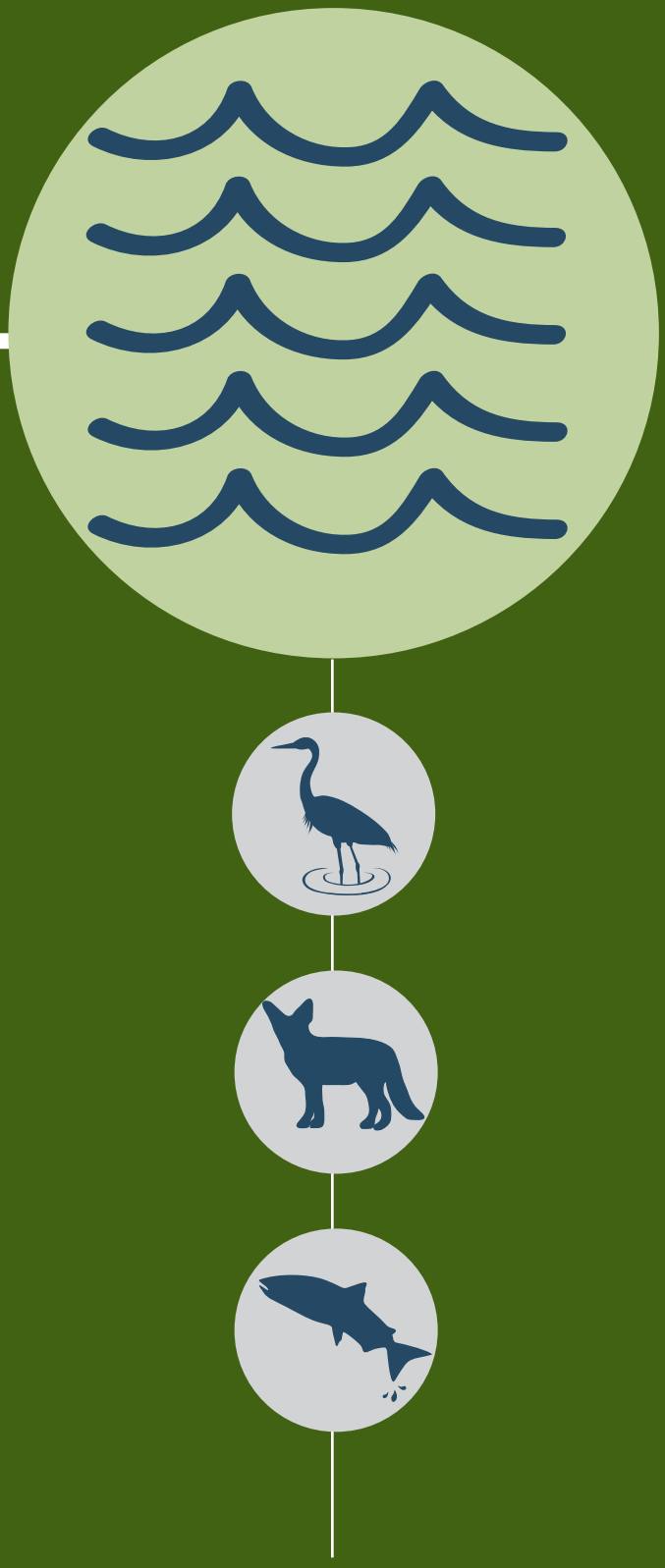
All of the projects that were undertaken in FY2012 met or exceeded the performance targets.

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 2012 ACCOMPLISHMENTS

The program obligated $776,136 from the Restoration Fund in FY 2012.

The Water Year type is a designation that is based on hydrologic indices for the Sacramento and San Joaquin Valleys. Water Year type is either wet, above normal, below normal, dry or critical. Water year type is determined by precipitation and is therefore indicative of local and regional conditions that influence climate, snowpack and runoff.

Water Year 2012 was the driest since the 2007-2009 drought. Near record dry conditions during

the winter precipitation months were followed by an unseasonably wet late spring. The final Water Year 2012 classification was below-normal for the Sacramento Valley and dry for the San Joaquin Valley. Impacts of the dry year were somewhat minimized due to the good carry-over storage from WY 2011.

The full 800,000 AF of (b)(2) water was available for fish actions in water year 2012. Table 14 presents the historic allocation and use of (b)(2) water. Table 15 summarizes how (b)(2) water was used in 2012 for fish and wildlife purposes.

Monies for this program activity fund real-time fish monitoring which informs when and where fish actions should be taken. On a weekly basis, fishery biologists from the Sacramento, San Joaquin and Delta regions report on fish movements to a B2 Interagency Team (Team). The Team, including fishery biologists from FWS, USBR, NOAA, CDFG, and DWR, evaluate the data and collaboratively decide where to apply CVPIA (b)(2) water. Interior provides detailed accounting of (b)(2) fish actions at www.usbr.gov/mp/cvo.

Table 14: Allocation Target and Use of (b)(2) Water, 2001-2012

		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		

* 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.

Table 15: FY 2012 Use of (b)(2) Water by Location

River	Action	Timeframe	Results
American	(b)(2) water used to augment would-be base flows to maintain 1100 - 2500 cfs	November 2011 - March 2012	Contributed toward AFRP Final Restoration Plan flow objectives and improved instream conditions for fall-run Chinook and steelhead spawning, rearing, and outmigration.
Clear Creek	AFRP under (b)(1) authority and (b)(2) water used to augment would-be base flows throughout water year 2012	October 1, 2011 – September 30, 2012	Contributed to AFRP Final Restoration Plan flow objectives and improved instream conditions for fall-run Chinook, spring-run Chinook and steelhead during spawning, incubation, rearing and downstream migration.
	(b)(2) water was used to provide short pulse flow	May 2012	Contributed to AFRP Final Restoration Plan flow objectives and provided pulse flow to attract adult spring-run Chinook salmon to suitable spawning areas.
Sacramento	(b)(2) water used to augment would-be base flows to maintain 3300 - 5800 cfs	December 2011 - February 2012	Contributed toward AFRP Final Restoration Plan flow objectives and improved instream conditions for late fall- and fall-run Chinook spawning and emergence.
Stanislaus	(b)(2) water used to provide outmigration pulse flow	April 2012 - June 2012	Contributed toward AFRP Final Restoration Plan flow objectives and provided pulse flow for juvenile steelhead and fall-run Chinook rearing and outmigration.
CVP Jones Pumping Plant	CVP exports were reduced pursuant to the NMFS BO.	February 2012 – June 2012	Benefitted outmigrating salmon and steelhead smolts. Concurrent benefits to delta smelt.

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. At times, this species has accounted for up to 70% or more of the statewide commercial harvest.

The Instream WAP manages a two year agreement (2012-2013) with the Merced Irrigation District to provide additional spring fishery flows on the Merced, and lower San Joaquin rivers. The flows are used in support of out migrating juvenile salmonoid in the spring.

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 2012 ACCOMPLISHMENTS

The Instream WAP obligated $1,983,287 from the Restoration Fund and $175,000 from the Water and Related Fund. The Instream WAP used this funding to acquire a total of approximately 25,714 AF.

Table 16 shows the instream water acquisitions from 1994-2012.

Table 16: Annual (b)(3) Instream Water Acquisitions, Toward 200,000 Acre-Feet Target, 1994-2012

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
Average	**78,576**	**39**

Flow Fluctuations and Reservoir Storage

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

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

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

In order to manage the program and reasonable and prudent alternatives (RPAs) contained in the 2009 NMFS OCAP BO, 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, 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 2012 ACCOMPLISHMENTS

The FFP obligated $14,779 from the Restoration Fund in FY 2012.

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 2011-2012 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.

American River – Two salmonid isolation pool surveys were conducted in May 2012 and multiple steelhead redd surveys took place December 2011 through April 2012. In the isolation pool surveys, a small number of steelhead and Chinook salmon were observed. No rescue measures were implemented because the pools reconnected shortly after the surveys were conducted. 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 2012 with 2.592 MAF and 1.800 MAF, respectively (see Table 17). This helps to ensure that the next water year starts with a good base supply and a large cold water pool to meet the various temperature requirements on the rivers for the fish species.

Table 17: Carryover Storage at Shasta and Trinity Reservoirs, 1998-2012

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

* million acre-feet
** thousand acre-feet

Contract Renewals and Water Transfers

3404 (c) & 3405

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

CONTRACT RENEWALS (3404(c))

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

To date, 88 long term renewal contracts and 28 interim-renewal contracts have been executed within the various divisions of the CVP. There are 4 contracts that have completed negotiation for a long term contract, and 1 currently in long term negotiations. Execution of the remaining contract renewals is pending completion of the court-directed BO. In addition, 132 long term contracts have been renewed with the Sacramento River Water Right Settlement contractors and 1 is pending renewal upon expiration in July 2020. Reclamation will continue to implement interim contract renewal consistent with CVPIA until such time that all environmental requirements have been satisfied, including the completion of a new biological opinion on the overall operations of the CVP. At that time, Reclamation intends to complete long term contract renewal.

WATER TRANSFERS (3405)

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

Reclamation has approved the transfer of CVP water in the following categories for FY 2012:

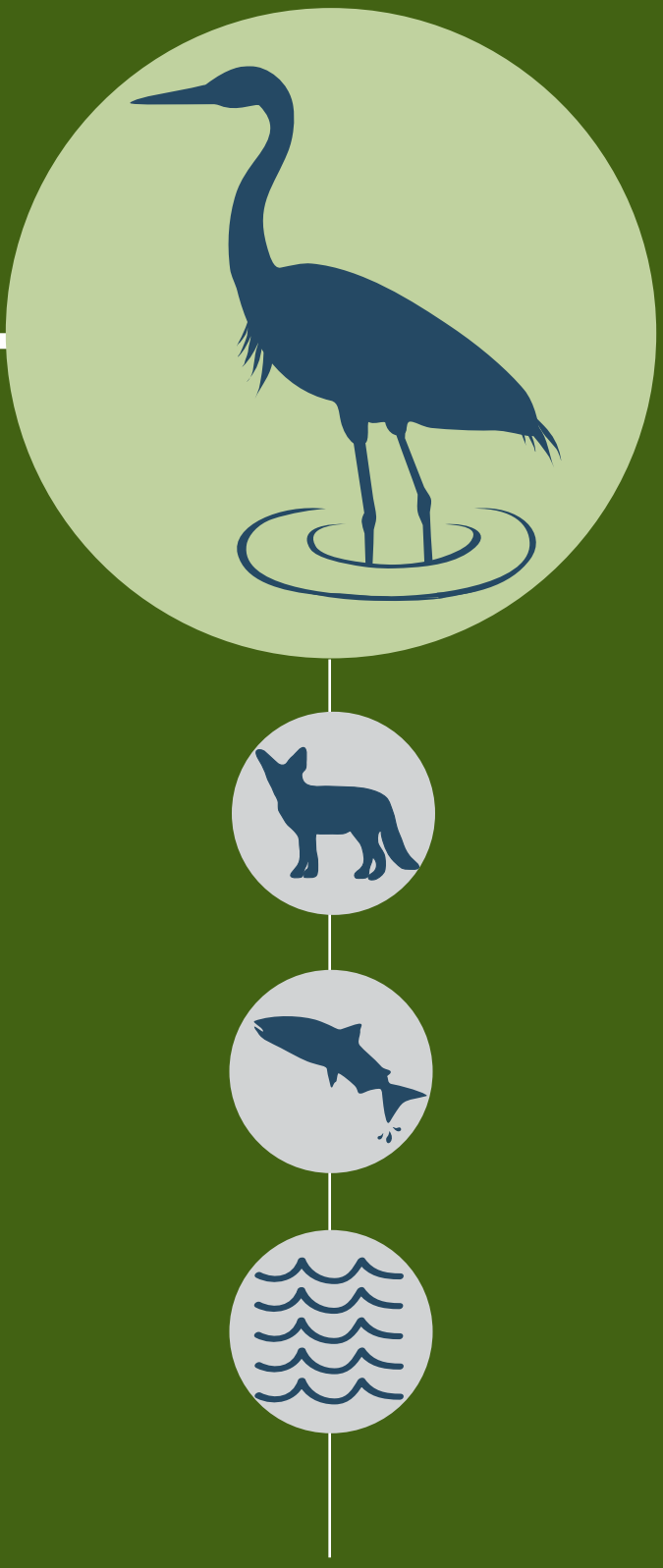
- 271,632 AF of CVP agricultural water was approved for agricultural purposes
- 92,916 AF of CVP agricultural water was approved for agricultural purposes (Recaptured Water Account (RWA))
- 10,000 AF of CVP municipal and industrial water was approved for agricultural purposes (Recaptured Water Account (RWA))
- 650 AF of CVP municipal and industrial water was approved for municipal and industrial purposes (Recaptured Water Account (RWA))
- 100,000 AF of CVP agricultural water was approved for municipal and industrial purposes (Metropolitan Water District)
- 1,300 AF of CVP agricultural water was approved for municipal and industrial purposes

- 13,100 AF of CVP municipal and industrial water was approved for agricultural purposes
- 34,438 AF of CVP agricultural water approved to Reclamation's Refuge Water Acquisition Program

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

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.

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: California

Department of Fish and Wildlife (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

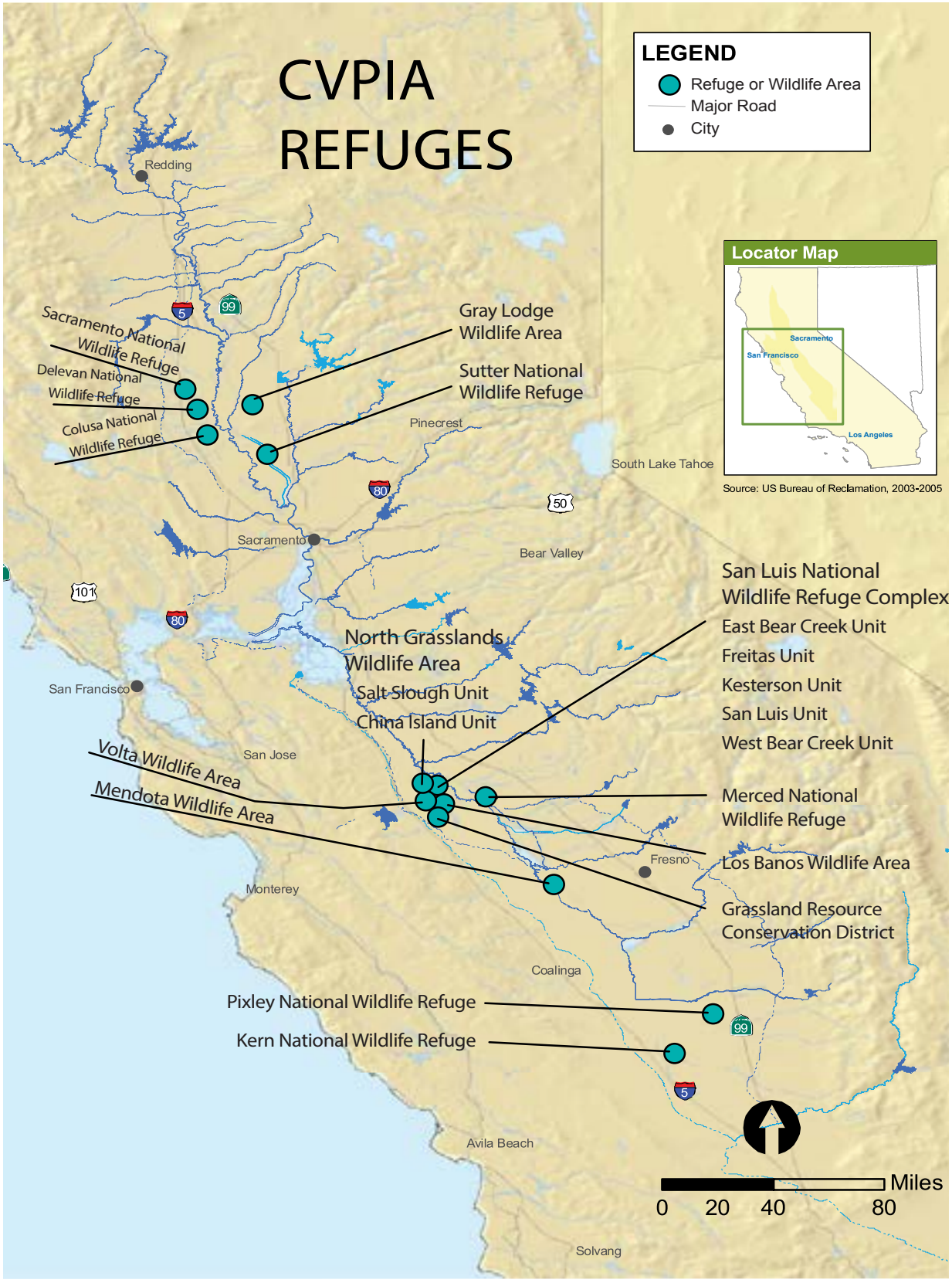
The RWSP strives to diversify its water sources. For example, the RWSP pursues groundwater projects in partnership with local water districts because groundwater does not require external conveyance if the source can be located at or near a refuge. The lower cost of groundwater is also an advantage, 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 2012, 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 2012, 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 of133,264 acre-feet (AF) of Incremental Level 4 (Inc L4) 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, Inc L4 water consists of annual purchases from willing sellers from both surface and groundwater supplies. In 1998 and 2005 the RWAP acquired 9,300 AF of permanent Inc L4 surface water supplies. The RWAP also acquires a portion of water supplies at no cost, including rescheduled water, 215 water, and water delivered under a mitigation agreement with the Federal Energy Regulatory Commission.

The RWAP continues to use groundwater to lower costs and increase reliability of providing supplemental refuge water supplies with acquisitions from Grassland Water District (GWD) and by 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 Inc L4 water to refuge boundaries annually (i.e. 133,264 AF plus any additional water needed to cover conveyance losses), excluding replacement water.

FY 2012 ACCOMPLISHMENTS

The RWAP obligated $6,662,257 from the Restoration Fund. Funds were used to support Real-time Water Quality Monitoring project, South-of-Delta (SOD) coordinator, groundwater assessment, and program administration.

The RWAP purchased 47,263 AF of water for Water Year 2012. This water was acquired for delivery in the 2012 water year which covers a portion of calendar year 2012 and a portion of calendar year 2013 (March 1 – February 28).

Snow Geese, Sacramento NWR

The 47,263 AF of purchased water was acquired from a variety of surface and ground water sources. An additional 6,750 AF of water was acquired without cost to Reclamation. Both purchased and no-cost supplies brought the Inc L4 water to 54,013 AF which includes water to account for conveyance losses such as seepage and evaporation. Of the 54,013 AF, approximately 42,494 AF of Inc L4 water was actually delivered to the nine SOD refuges and 1,450 to Delevan NWR, a North-of-Delta (NOD) refuge. See the next section on Conveyance for more information on water deliveries.

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

Table 18: Incremental Level 4 Acquisitions by Fiscal Year, 2002-2012

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
Average	**63,782**	**48**

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

** 2011 is the first year the Program is reporting purchased and non-purchased water acquired toward the Incremental Level 4 target.

Refuge Water Conveyance

3406 (d)(1), (2) & (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 Inc L4 acquired water supplies by specified amounts to the refuges totaling 133,264 acre-feet.

The RWCC delivers L2 and Inc L4 water supplies to the refuges through agreements with water conveying entities. Established refuge allocations for L2 and Inc L4 water supplies serve as the Program's goals for water conveyance quantities.

Reclamation entered into five long-term water supply contracts -- one with GWD, two with the Service, and two with CDFW -- 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 Inc L4 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 (including 26,007 AF of replacement water); and Inc L4 water of 133,264 AF per year.

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

FY 2012 ACCOMPLISHMENTS

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

Delivery – In 2012, an estimated 402,454 AF of L2 water was delivered to the refuges, representing 95% of the target (Table 19).

An estimated total of 55,515 AF of Inc L4 water was delivered, representing 42% of the target. Table 20 shows the targets and deliveries for each refuge for the 2012 Fiscal Year.

Diversification – Of the total of 402,454 AF of L2 water delivered in 2012, a total of 39,064 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 19: Level 2 (L2), Incremental Level 4 (Inc L4) and Full Level 4 Delivery Water by Year, 2002-2012

Fiscal Year*	L2 Delivered	% 422,251 AF L2 Goal**	Inc L4 Delivered	% 133,264 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
Average Deliveries	**383,081**	**91**	**68,269**	**51**	**451,350**	**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.

Table 20: Water Targets and Deliveries for Each Refuge (FY 2012)

	WATER ALLOCATION TARGETS			2012 DELIVERIES			% TARGET ACHIEVED***		
Refuge Name - Region	Level 2 Water (AF)*	Inc L4 Water (AF)**	Full level 4 Water (AF) (= L2+Inc L4)	Level 2 Water (AF)	Inc L4 Water (AF)	Total Delivered (AF) (= L2+Inc L4)	Level 2 Water (%)	Inc Level 4 Water (%)	Full level 4 Water (AF) (= L2+Inc L4)
Grassland Water District (private) — San Joaquin Valley									
Grassland RCD	125,000	55,000	180,000	136,529	28,146	164,675	109	51	91
CA Department of Fish and Wildlife — Sacramento Valley									
Gray Lodge WA	35,400	8,600	44,000	31,612	0	31,612	89	0	72
CA Department of Fish and Wildlife — San Joaquin Valley									
Volta WA	13,000	3,000	16,000	10,324	2,489	12,813	79	83	80
Los Banos WA	16,670	8,330	25,000	16,465	4,221	20,686	99	51	83
Salt Slough Unit	6,680	3,340	10,020	8,045	1,179	9,224	120	35	92
China Island Unit	6,967	3,483	10,450	7,948	920	8,868	114	26	85
Mendota WA	27,594	2,056	29,650	29,646	1,614	31,260	107	79	105
U.S. Fish and Wildlife Service — Sacramento Valley									
Sacramento NWR	46,400	3,600	50,000	41,077	0	41,077	89	0	82
Delevan NWR	20,950	9,050	30,000	20,443	3,250	23,693	98	36	79
Colusa NWR	25,000	0	25,000	20,019	0	20,019	80	N/A	80
Sutter NWR	23,500	6,500	30,000	11,553	0	11,553	49	0	39
U.S. Fish and Wildlife Service — San Joaquin Valley									
San Luis Unit	19,000	0	19,000	22,769	0	22,769	120	N/A	120
Kesterson Unit	10,000	0	10,000	10,907	0	10,907	110	N/A	110
West Bear Creek Unit	7,207	3,603	10,810	6,975	0	6,975	97	0	97
Freitas Unit	5,290	0	5,290	5,969	0	5,969	113	N/A	113
Merced NWR	13,500	2,500	16,000	16,126	2,500	16,126	119	100	101
East Bear Creek Unit	8,863	4,432	13,295	3,719	0	3,719	42	0	28
U.S. Fish and Wildlife Service — Tulare Lake Basin									
Kern NWR	9,950	15,050	25,000	4,147	11,196	15,343	42	74	61
Pixley NWR	1,280	4,720	6,000	681	0	681	53	0	11
TOTAL	**422,251**	**133,264**	**555,515**	**402,454**	**55,515**	**457,969**	**95**	**42**	**82**

* 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 Central Valley Project Improvement Act (CVPIA). 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 2012 ACCOMPLISHMENTS

In FY 2012, the RFCC obligated $138,073 from the Restoration Fund and $130,323 from the Water and Related Resources in support of refuges identified in the Plan. In addition, the RFCC obligated $493,849 from the Restoration Fund and $89,746 from ARRA in support of refuges identified in the Report. Total funds available for the construction of refuge conveyance facility projects in FY 2012 were $852,068.

In FY 2012, the RFCC contracted for services to provide ongoing repairs to the East Bear Creek Unit of the San Luis National Wildlife Refuge Complex (East Bear Creek) Pumping Plant. Repair work performed kept the pumping plant operational during FY2012. Other modifications at this pumping plant to improve its reliability are expected to be completed in FY 2013.

In FY 2012, the RFCC, in conjunction with the RWCC, completed construction of the Gray Lodge and Pixley Groundwater Well Projects, which were funded under the American Recovery and Reinvestment Act (2009) (ARRA). Two wells were installed at Pixley NWR, and will provide for full L2 water supplies. Three wells were installed at Gray Lodge WA and will provide a portion of this refuge's L2 supplies. Modifications to these wells are expected to be completed in FY 2013 to ensure their full functionality.

Also under ARRA, Reclamation completed the construction of four new groundwater production wells at the GRCD. One half of the water from these groundwater production wells will provide IL4 water supplies to GRCD, state, and federal CVPIA refuges on the west side of the San Joaquin Valley. The remaining half of the water will help diversify refuge L2 water supplies in accordance with CVPIA.

In addition, for the Gray Lodge WA, the final design of the Biggs-West Gridley Water District (BWGWD) Facilities Improvement Project was completed in FY 2012. Construction of this project is expected to commence in FY 2013. When completed, which is anticipated in FY 2015, BWGWD will have sufficient conveyance capacity for FL4 water deliveries to the Gray Lodge WA.

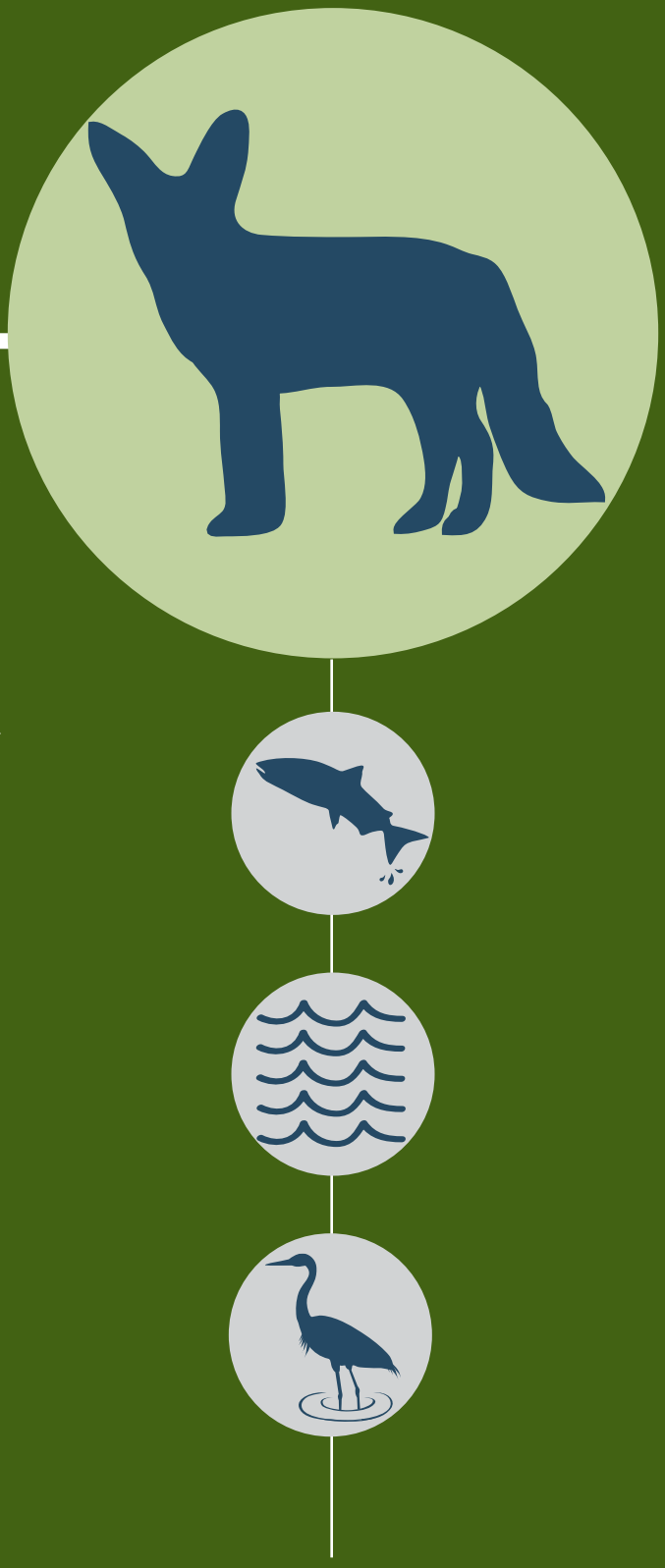
For each of the 19 CVPIA refuges, the conveyance target and actual conveyance capacity are shown in Table 21.

Table 21: Target Full Level 4 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	2015
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	0	0	2017

Chapter 5

OTHER RESOURCE AREA



Habitat Restoration Program

3406 (b)(1) "Other"

The Habitat Restoration Program (HRP) benefits federally listed Central Valley species and habitats impacted by construction and operation of the CVP. Habitat loss and fragmentation occurred across 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

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

The 1999 State Water Resources Control Board Decision 1641 (SWRCB's D-1641) requires that Reclamation provide compensation and habitat values to mitigate for impacts associated with the delivery of CVP water to lands previously outside the CVP Consolidated Place of Use. It identifies the HRP as one of three Reclamation programs suitable for fulfilling the mitigation plan. Pursuant to the SWRCB's D-1641, Reclamation developed the Consolidated

Endangered Metcalf Canyon jewelflower. Project entails introduction of the jewelflower to County lands at Tulare Hill, and supplementation of existing populations at Motorcycle County Park, in Santa Clara County.

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 as part of the 2.7 million acres affected by the CVP. See Table 22 for acres protected and restored from 1996 through 2012.

Other Activities – The program also provides funding to support the recovery of threatened and endangered species through activities such as research and captive propagation and reintroduction. In part, research proposals must describe how project deliverables would increase current and future protection and/or restoration of species or habitats impacted by the CVP. For captive propagation and reintroduction projects, reintroductions on lands that are protected in perpetuity, and specifically managed for the benefit of the species, receive priority consideration of funding within that category of activities.

FY 2012 ACCOMPLISHMENTS

The program obligated $1,485,765 from the Restoration Fund to achieve the following:

Protection and/or Restoration – The HRP funding helped protect 2,333 acres of land through fee title acquisitions of 520 acres of alkali scrub, grassland, and riparian woodland habitats in Fresno County; 1,615 acres of alkali scrub and grassland habitats in Kern and San Luis Obispo counties; and 198 acres of grassland habitat in Tulare County. Nine hundred and thirty-nine of these acres also count towards the SWRCB's D-1641 requirements.

Other Activities – The HRP provided funds for a Metcalf Canyon jewelflower captive propagation and reintroduction project in southern Santa Clara County. The objective is to reintroduce this federally endangered plant species at three sites on Tulare Hill, and to supplement an existing population at Motorcycle County Park.

Table 22: Acres of Habitat Protected and Restored by the (b)(1) "Other" Program, 1996-2012, Using HRP Funds

Year	Acreage Protected	Acreage Restored	Cumulative Acreage Progress 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
Total	**10,294**	**3,938**	**14,232**

Los Feliz Tract parcel. Project entails fee title acquisition of 198 acres of grasslands habitat by the US Fish and Wildlife Service to expand the Pixley National Wildlife Refuge to benefit Tipton kangaroo rat, San Joaquin kit fox, and blunt-nosed leopard lizard in Tulare 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.

PERFORMANCE MEASURES

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

The program has completed its acquisition and restoration work in the San Joaquin Valley (Tranquillity site). Westlands Water District retired approximately 89,000 acres, which exceeded the goals of the CVPIA land retirement program and the San Joaquin Valley Drainage Report (1990) for acquisition in the San Joaquin Basin.

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

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

Reduce agricultural drainage volume – The program has reduced the production of agricultural drainage water by approximately 43,500 acre-feet through the removal of irrigation water from the parcels within the Land Retirement Demonstration Project from 1995-2012.

FY2012 ACCOMPLISHMENTS

The program obligated $494,162 from the Restoration Fund, and $21,209 from the Water and Related Resources Fund.

Retire agricultural land – Contacts with the multiple Atwell Island Project Land owners were made for the acquisition of the remaining 750 acres. However, no land was acquired from willing sellers by the program during FY 2012. Table 23 lists the cumulative accomplishments of land retirement and the annual restoration and ag drainage reduction accomplishments.

Restore Habitat – 9,500 pounds of locally grown seed from native plants were planted on three-hundred acres of previously acquired land at the Atwell Island site in 2012. An excellent response of annual flora was observed at the restoration sites in the spring of FY 2012, contributing to the ongoing restoration of alkalai sink habitat at the site.

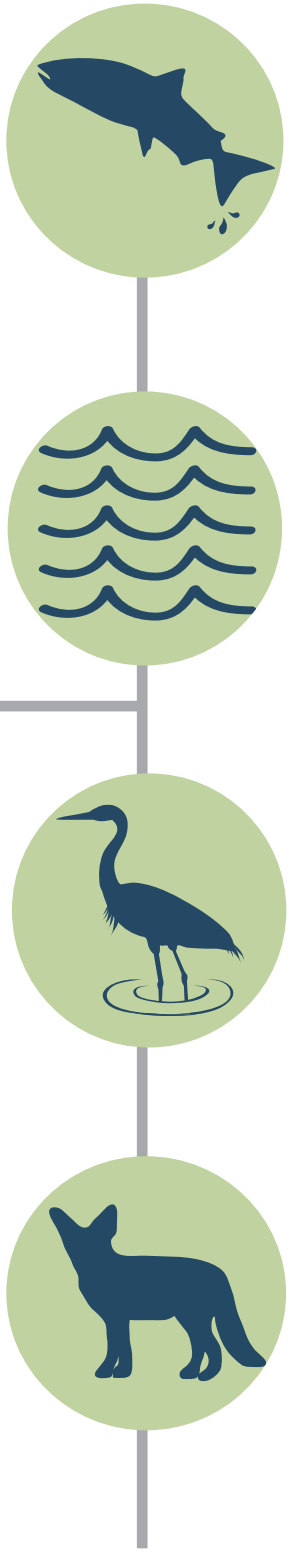
Reduce agricultural drainage volume – The program reduced the amount of agricultural drainage water on LRDP lands by approximately 4,100 acre-feet in FY 2012.

Table 23: Land Acquired and Restored, and Drainage Reduction by Year, 1995-2012

	Overall Targets		Annual Targets	
	Acres Acquired	Acres Acquired	Acres Restored	Reduction in Agricultural Drainage (acre-feet)
Year	Atwell Island (8,000 acres)	Tranquillity* (7,000 acres)	400 acres	6,000 acre-feet
1995	0	591	0	236
1996	0	0	0	236
1997	0	0	0	236
1998	0	995	1,220	634
1999	0	60	100	658
2000	2,645	0	777	1,716
2001	1,414	444	702	1,992
2002	1,510	0	373	2,672
2003	616	0	261	2,772
2004	155	0	308	3,000
2005	625	0	349	3,340
2006	38	0	416	3,355
2007	213	0	475	3,440
2008	0	0	390	3,568
2009	0	0	380	3,728
2010	50	0	400	3,888
2011	0	0	260	3,992
2012	0	0	260	4,100
Total	**7,266**	**2,090**	**6,671**	**43,563****

* 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 1995-2012.



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 2012 Accomplishment status is based upon the specific FY 2012 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	2012 Accomp-lishments	Comments
FISHERIES						
ANADROMOUS FISH RESTORATION PROGRAM (AFRP), 3406 (b)(1)						
Double the number of naturally produced, Central Valley wide, Fall-run Chinook	750,000 fish	1992 - 2011 average	372,344	50	102,821	
Double the number of naturally produced, Central Valley wide, Late Fall-run Chinook	68,000 fish	1992 - 2011 average	18,383	27	5,577	
Double the number of naturally produced, Central Valley wide, Winter-run Chinook	110,000 fish	1992 - 2011 average	6,578	6	1,552	
Double the number of naturally produced, Central Valley wide, Spring-run Chinook	68,000 fish	1992 - 2011 average	14,091	21	2,064	
Double the number of Central Valley wide Green Sturgeon	2,000 fish	1992 - 2005 average	2,948	147	10,272	Last data submission was 2009. Data provided from CDFG in 2006 - 2009 is preliminary and not used in calculation
Double the number of Central Valley wide 15-year old, White Sturgeon	11,000 fish	1992 - 2005 average	6,237	57	6258	Last data submission was 2009. Data provided from CDFG in 2006 - 2009 is preliminary and not used in calculation
Double the number of Central Valley wide Striped Bass	2,500,000 fish	1992 - 2007 average	978,199	39	684,486	Data from 2010
Double the number of Central Valley wide American Shad	4,300 fish	1992-2009 average	2,468	57	683	Last data year 2009
Cubic Yards of Spawning gravel placed in the American, Merced, and/or Tuolumne rivers.	unspecified	Annual	N/A	N/A	39,000	
Tons of Spawning gravel placed in the Mokelumne River	unspecified	Annual	N/A	N/A	6,557	
Complete 105 structural actions	105 actions	Cumulative	63	60	10	
Contribute towards completion of 128 High and Medium Priority Actions	128 actions	Cumulative	45	35	0	

Performance Goal Description	Target	Reporting Period (Annual, Cumulative, or Average)	To Date (Cumulative or Average)	% of Target	2012 Accomp-lishments	Comments
DEDICATED PROJECT YIELD, 3406 (b)(2)						
Provide instream flow, specified based on Wet, Dry, or Critically Dry year.	Wet Year target is 800,000 acre-feet	Annual	N/A	100	800,000	2012 Water Year was classified Below Normal
WATER ACQUISITION - INSTREAM, 3406 (b)(3)						
Provide supplemental (b)(2) instream flow water	200,000 acre-feet	Average from 1994 - 2012	78,576	40	38,500	FY2012 acquired water is 13% of target
TRACY PUMPING PLANT/TRACY FISH TEST FACILITY, 3406 (b)(4)						
Complete 23 actions to mitigate for fishery impacts	23 mitigation actions	Cumulative	16	70	0	
RED BLUFF DIVERSION DAM, 3406 (b)(10)						
Increase the Fish Passage Rate of Adult Spring-run Chinook	80-100%	Annual	100%	100	80%	Within target range Dam gates no longer operated
Increase the Fish Passage Rate of Adult Green Sturgeon	50-100%	Annual	100%	100	75%	Within target range Dam gates no longer operated
Complete the fish screen and pumping plant	100%	Cumulative	90%	90	25%	
CLEAR CREEK RESTORATION, 3406 (b)(12)						
Restore stream channel	2 miles	Cumulative	1.5	75	0.0	
Place spawning gravel annually	25,000 cy (1)	Annual	N/A	40	10,000	
Meet variable flow target		Annual		100	200	Ongoing operation
Maintain water temperature for optimum anadromous fish production	Maintain proper temperature 100% of the time	Annual	N/A	88		60°F 1-Jun to 14-Sep 56°F 15-Sep to 31-Oct 2011 data
SPAWNING GRAVEL, 3406 (b)(13)						
Place 10,000 tons of spawning gravel annually in the Sacramento River.	10,000 tons	Annual	N/A	150	15,000	
Place 3,000 tons of spawning gravel annually in the Stanislaus River	3,000 tons	Annual	N/A	100	3,000	
Place 7,000 tons of spawning gravel annually in the American River	7,000 tons	Annual		350	24,510	
Increase the percentage of spawning salmonids using placed gravel in the Sacramento River	25% usage	Annual	N/A	24%	6%	
Increase the percentage of spawning salmonids using placed gravel in the Stanislaus River	10% usage	Annual	N/A	210%	21%	
Increase the density of redds on emplaced gravel in the American River	0.03 redds/sq. meter	Annual		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	35	Undefined	2	
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	
Increase the escapment of Naturally produced Fall-run Chinook Salmon	62,000 fish	1992 - 2012 Average	16,110	85	52,687	
Increase the escapment of Hatchery produced Spring-run Chinook Salmon	3,000 fish	1992 - 2012 Average	8,918	224	6,712	
Increase the escapment of Naturally produced Spring-run Chinook Salmon	6,00 fish	1992 - 2012 Average	6,079	296	17,730	



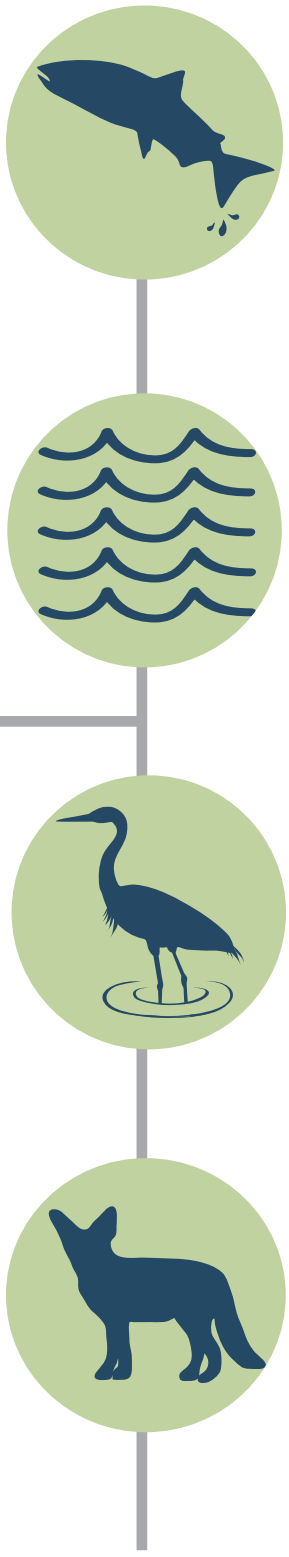

Performance Goal Description	Target	Reporting Period (Annual, Cumulative, or Average)	To Date (Cumulative or Average)	% of Target	2012 Accomp-lishments	Comments
Increase the escapment of Hatchery produced Coho Salmon	2,100 fish	1992 - 2012 Average	11,566	350	7,356	
Increase the escapment of Naturally produced Coho Salmon	1,400 fish	1992 - 2012 Average	1,890	567	7,939	
Increase the escapment of Hatchery produced Steelhead	10,000 fish	1992 - 2012 Average	12,347	57	5,737	
Increase the escapment of Naturally produced Steelhead	40,000 fish	1992 - 2012 Average	4,851	37	14,666	
Improve Infrastructure to allow ROD flows (369 TAF - 815 TAF)	Unspecified	Annual	Within target	100		
Provide minimum annual flows. The program releases between 369,000 and 815,000 AF each year, in accordance with the ROD	647,000	Annual	N/A	100	647,000	Based on 2012 as a normal 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	28	60	4	
Place 10,000 cubic yards of coarse sediment annually	10,000 cubic yards	Annual	N/A	0	0	
Reduce fine sediment delivery from tributary watersheds	10,000 to 20,000 cubic yards	Annual	N/A	150-300	30,000	
SAN JOAQUIN RIVER RESTORATION PLAN (SJRRP), 3406 (c) (1)						
Reduce or avoid water supply impacts to Friant Division long-term contractors	Unspecified	Annual	106,318	Undefined	106,318	
Restore and maintain fish populations in good condition	"Good" condition	Annual				
ECOLOGICAL AND WATER SYSTEMS MODELS, 3406 (g)						
Develop readily usable and broadly available hydrologic and ecologic models and supporting data to evaluate existing and alternative water management strategies	9 hydrologic/ ecologic models	Cumulative	8	89	0	
CVP WATER OPERATIONS						
RESERVOIR STORAGE, 3406 (b)(19)						
Maintain minimum reservoir storage in Shasta Reservoir	19 MAF	Cumulative	13 of 15	87	2.6 MAF	
Maintain minimum reservoir storage in Trinity Reservoir	600 TAF	Cumulative	15 of 15	100	1,800 TAF	
REFUGES						
REFUGE WATER SUPPLY PROGRAM - ACQUISITION (INC L4), 3406 (b)(3) and 3406(d)(2)						
Acquire 133,264 acre-feet for Incremental Level 4 water acquisition	133,264 acre-feet	Annual	97,997	74	97,997	
REFUGE WATER SUPPLY PROGRAM - CONVEYANCE, 3406 (d)(1)						
Provide Level 2 water supplies	422,251 acre-feet	Annual	N/A	95	402,454	
REFUGE WATER SUPPLY PROGRAM - CONVEYANCE, 3406 (d)(2)						
Provide incremental Level 4 water supplies	133,264 acre-feet	Annual	N/A	42	55,515	
REFUGE WATER SUPPLY PROGRAM - CONSTRUCTION (FULL L4 CAPACITY), 3406 (d)(5)						
Provide external conveyance capacity to 19 refuges to receive Full Level 4 Water annually	555,515 acre-feet	Cumulative	489,865	88		
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	

Performance Goal Description	Target	Reporting Period (Annual, Cumulative, or Average)	To Date (Cumulative or Average)	% of Target	2012 Accomp-lishments	Comments
OTHER						
HABITAT RESTORATION, 3406 (b)(1) Other						
Protect and/or restore habitat impacted by the CVP	A portion of 2,700,000 acres	Cumulative	14,232	TBD	912	Exact portion of target is yet to be determined
Protect and/or restore habitat areas specified by the SWRCB Decision 1641	45,391 acres	Cumulative	8,098	19	939	
LAND RETIREMENT, 3408(h)						
Retire 8,000 acres of Atwell Island land	8,000 acres	Cumulative, 1995–2012	7,266	91	0	
Retire 7,000 acres of Tranquility land	Complete	Cumulative, 1995–2012	7,000	100	N/A	
Restore 400 acres of retired land annually	400 acres	Cumulative, 1995–2012	6,671	76	260	
Reduce the production of agricultural drainage water by 6,000 AF through the removal of irrigation water from the parcels within the Land Retirement Demonstration Project	6,000 acre-feet	Cumulative, 1995–2012	43,559	67	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.

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



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
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
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

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
- **Capillary rise**
  Movement of water upwards from the watertable (the top of the groundwater) into the unsaturated soil above; can be likened to a dry sponge (the unsaturated soil) being placed on top of a wet surface (the watertable), the sponge sucking up water being similar to capillary rise in soils
- **Central Valley**
  Area in the central portion of California bounded by the Cascade Range to the north, the Sierra Nevada to the east, the Tehachapi Mountains to the south and the coast ranges and San Francisco Bay to the west
- **Central Valley Project (CVP)**
  As defined by Section 3403(d) of the CVPIA, "all Federal reclamation projects located within or diverting water from or to the watershed of the Sacramento and San Joaquin rivers and their tributaries as authorized by the Act of August 26, 1937 (50 Stat. 850) and all Acts amendatory or supplemental thereto, ..."
- **Central Valley Project water**
  As defined by Section 3403(f) of the CVPIA, "all water that is developed, diverted, stored, or delivered by the Secretary in accordance with the statutes authorizing the Central Valley Project in accordance with the terms and conditions of water rights acquired pursuant to California law."
- **Central Valley Project Improvement Act (CVPIA)**
  Public Law 102-575, Title 34. This law was passed in 1992 for the following purposes:
  a. Protect, restore, and enhance fish, wildlife, and associated habitats in the Central Valley and Trinity River basins of California
  b. Address impacts of the Central Valley Project on fish, wildlife and associated habitats
  c. Improve the operational flexibility of the Central Valley Project
  d. Increase water-related benefits provided by the Central Valley Project to the State of California through expanded use of voluntary water transfers and improved water conservation
  e. Contribute to the State of California's interim and long-term efforts to protect the San Francisco Bay/Sacramento-San Joaquin Delta Estuary




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

- **Central Valley Habitat Joint Venture (CVHJV)**
  The association of federal and state agencies and private parties established for the purpose of developing and implementing the North American Waterfowl Management Plan as it pertains to the Central Valley of California
- **Central Valley Rivers and Streams**
  The 22 Central Valley main rivers and streams were defined in the January 9, 2001, Final Restoration Plan, Appendix B as: Sacramento River, Clear Creek, Cow Creek, Cottonwood Creek, Battle Creek, Paynes Creek, Antelope Creek, Mill Creek, Deer Creek, Miscellaneous creeks, Butte Creek, Big Chico Creek, Feather River, Yuba River, Bear River, American River, Mokelumne River, Cosumnes River, Calaveras River, Stanislaus River, Tuolumne River, and Merced River.
- **Constant fractional marking program (CFM)**
  When fish are counted for CVPIA monitoring, program managers differentiate between wild and hatchery fish; hatcheries mark a percentage of juveniles before they are released and when fish come back to spawn, the mark will indicate which were hatchery-born
- **Diversion**
  Area where river water is rerouted in a direction other than its natural course
- **Entrainment**
  When fish are diverted from their natural 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…"

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

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

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

"…dedicate and manage annually 800,000 acre-feet of Central Valley Project yield for the primary purpose of implementing the fish, wildlife, and habitat restoration purposes and measures authorized by this title; to assist the State of California in its efforts to protect the waters of the San Francisco Bay/Sacramento-San Joaquin Delta Estuary; and to help meet such obligations as may be legally imposed upon the Central Valley Project under state or federal law following the date of enactment of this title, including but not limited to additional obligations under the federal Endangered Species Act…"

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

"Construct, in cooperation with the State of California and in consultation with local interests, a barrier at the head of Old River in the Sacramento-San Joaquin Delta to be operated on a seasonal




basis to increase the survival of young outmigrating salmon that are diverted from the San Joaquin River to Central Valley Project and State Water Project pumping plants and in a manner that does not significantly impair the ability of local entities to divert water…"

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

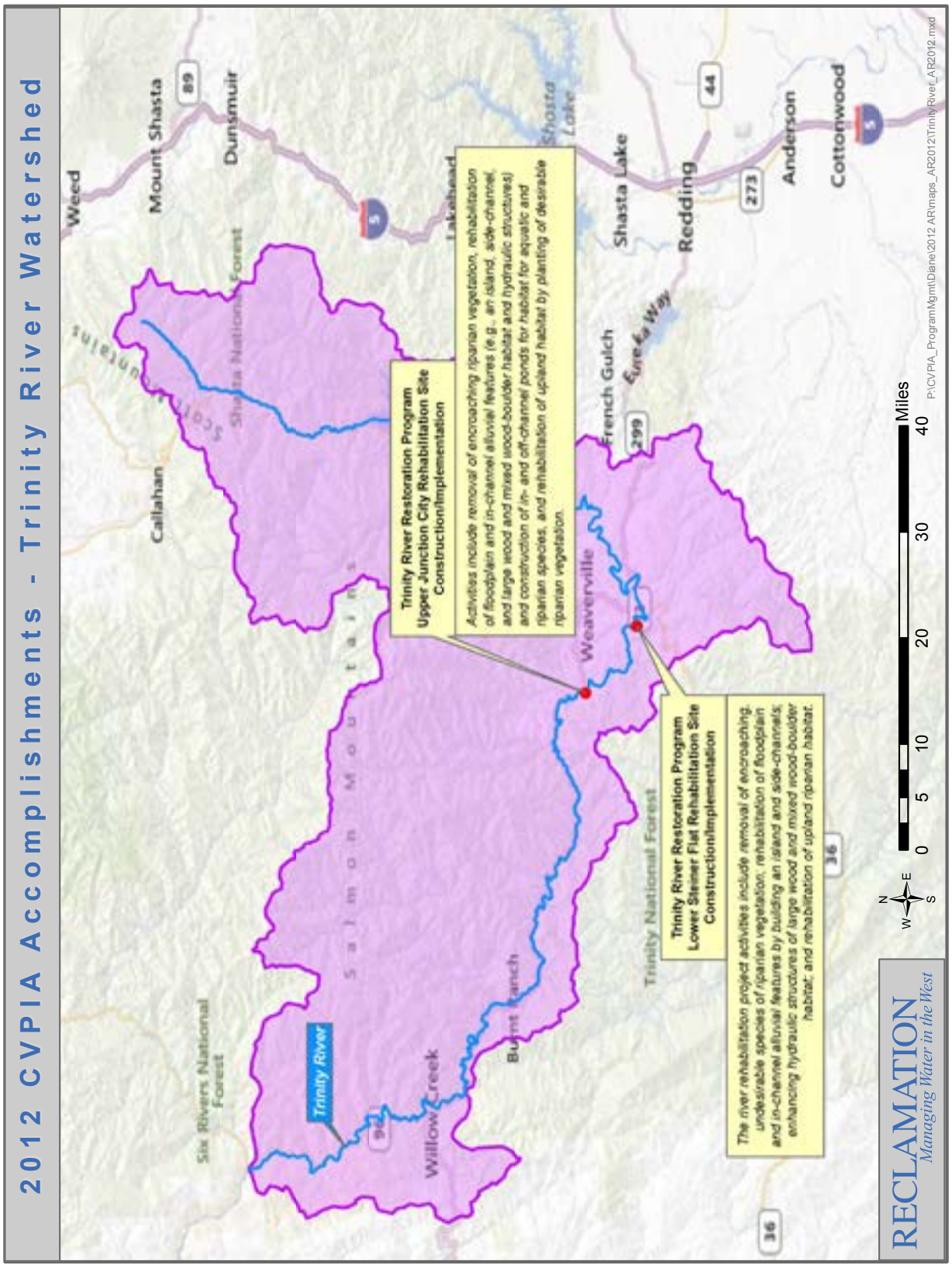
"The Secretary, in consultation with the State of California, is authorized to enter into agreements to allow project contracting entities to use project facilities, where such facilities are not otherwise committee or required to fulfill project purposes or other Federal obligations, for supplying carry-over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

Land Retirement – Section 3408 (h)

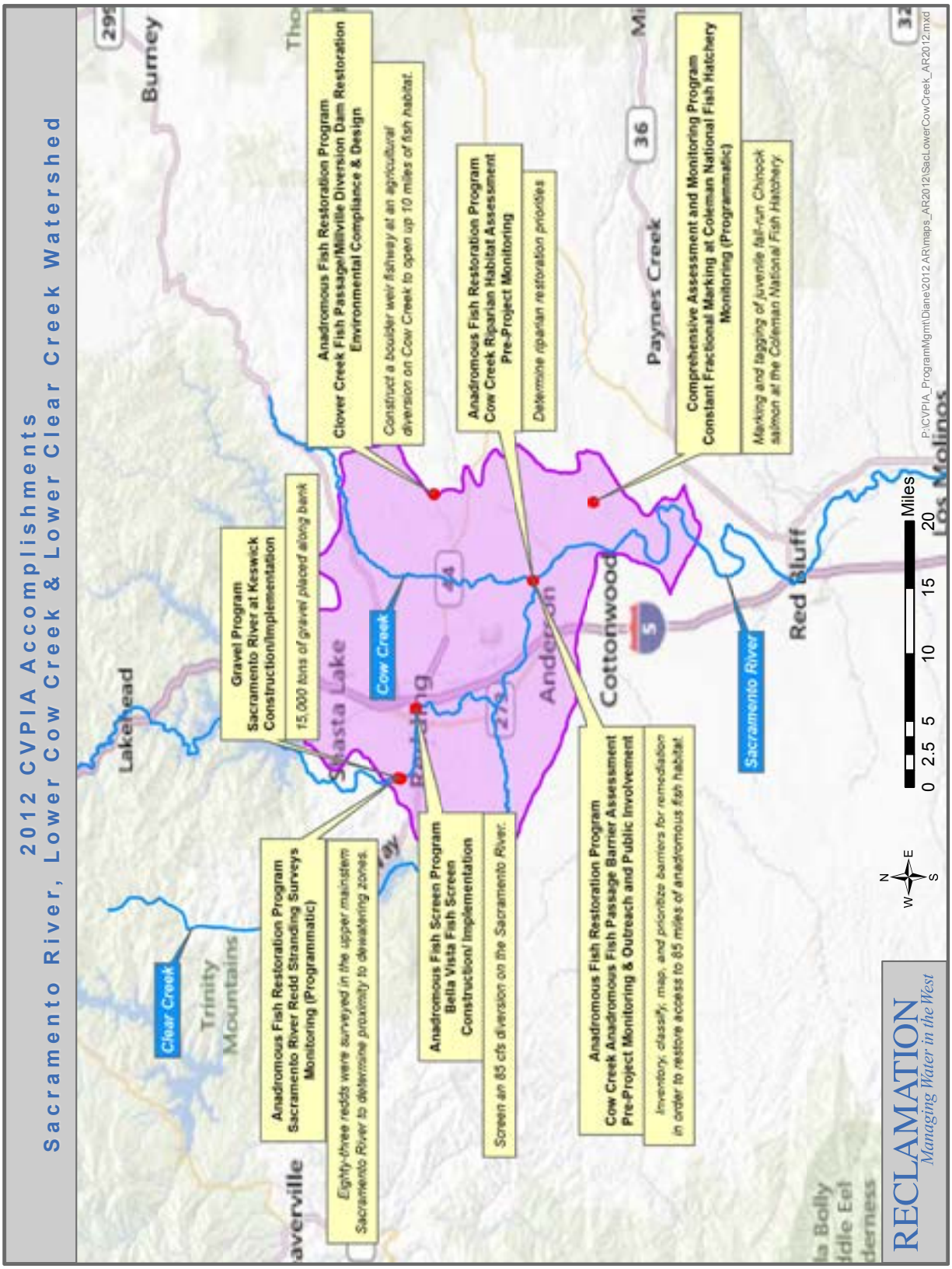
"The Secretary is authorized to purchase from willing sellers land and associated water rights and other property interests … which receives Central Valley Project water under a contract executed with the United States, and to target such purchases to areas deemed most beneficial to the overall purchase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

Appendix D: Maps

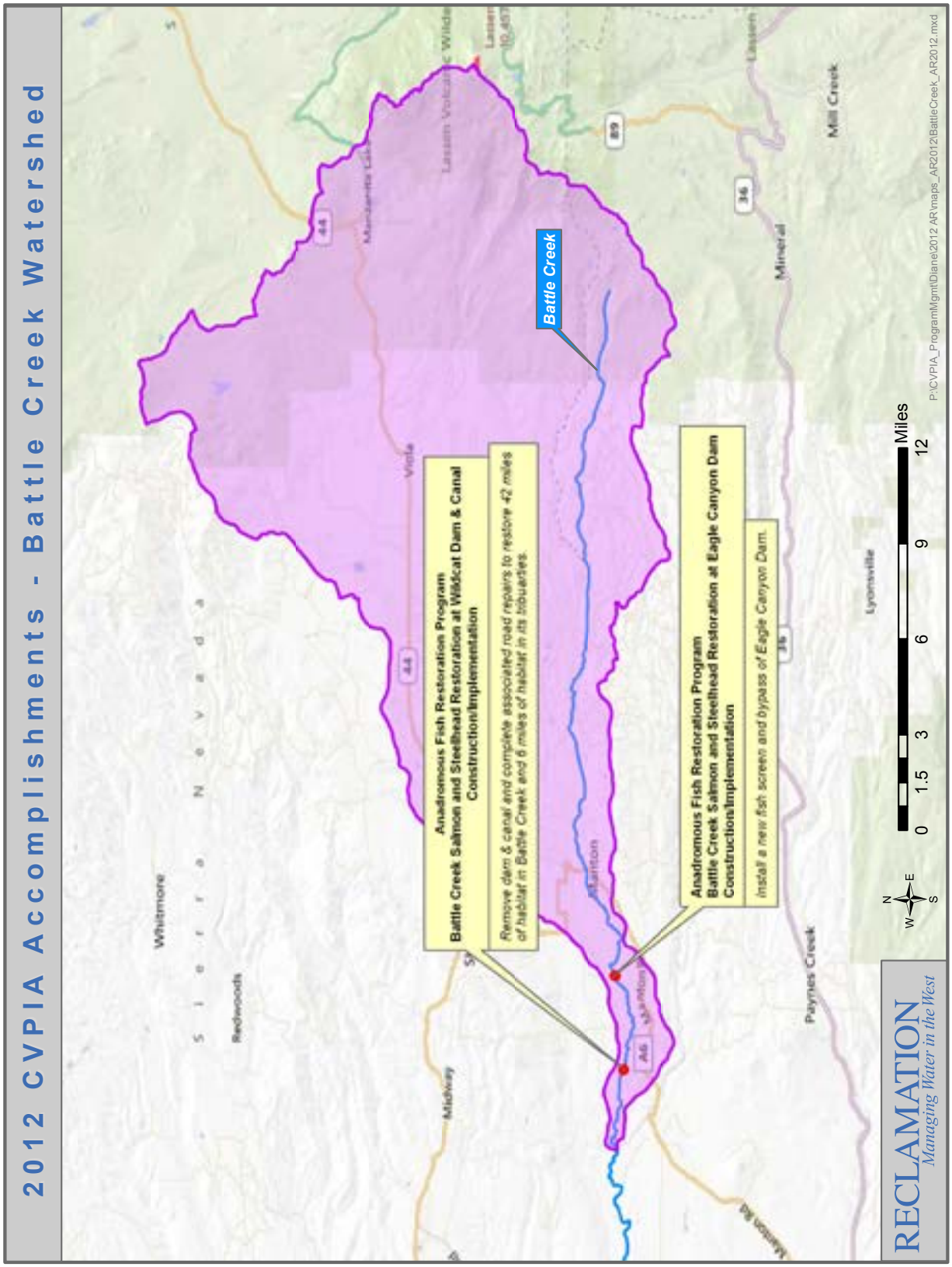
Central Valley Project (CVP) Service Area Boundary



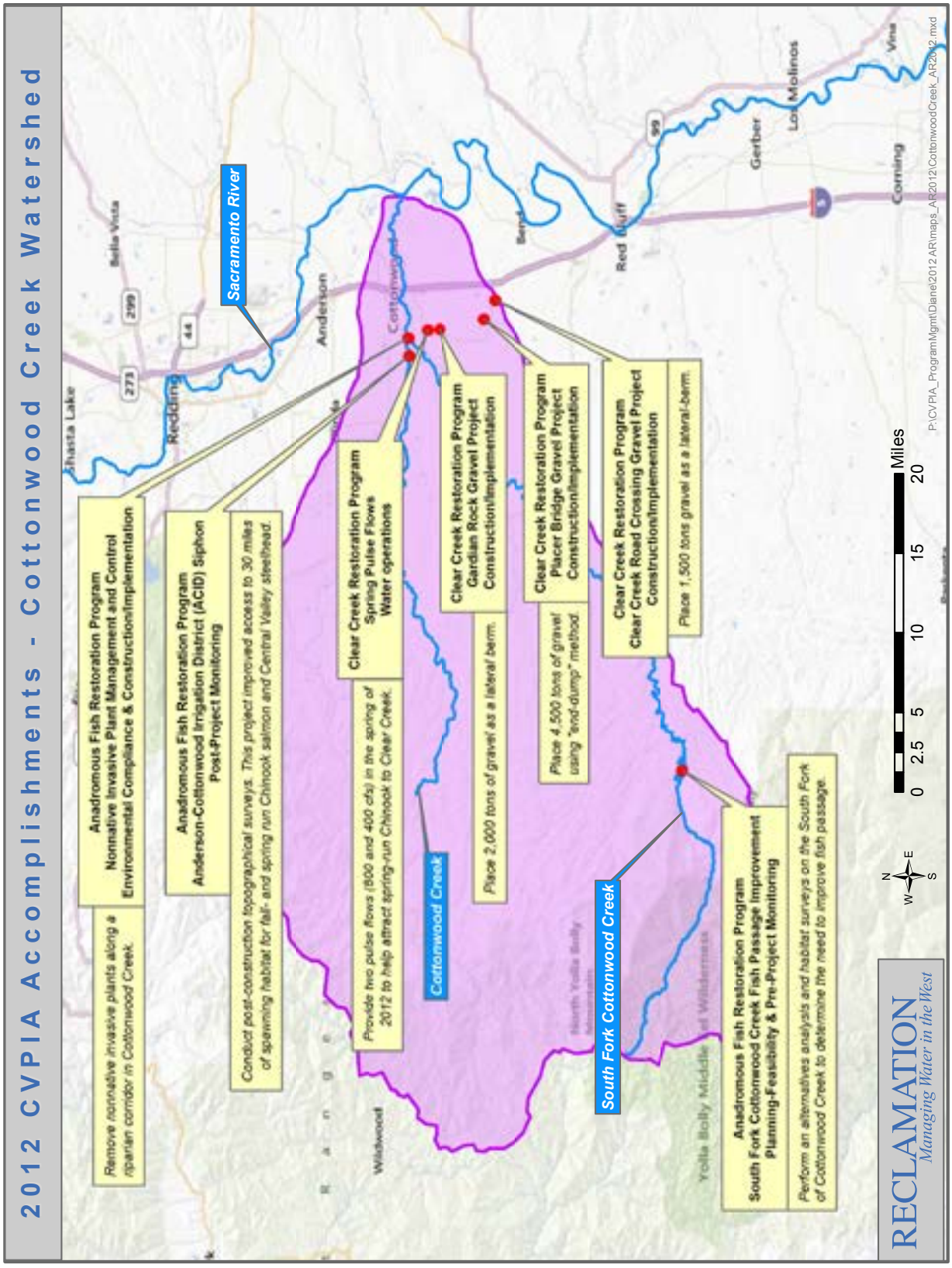
2012 CVPIA Accomplishments - Trinity River Watershed



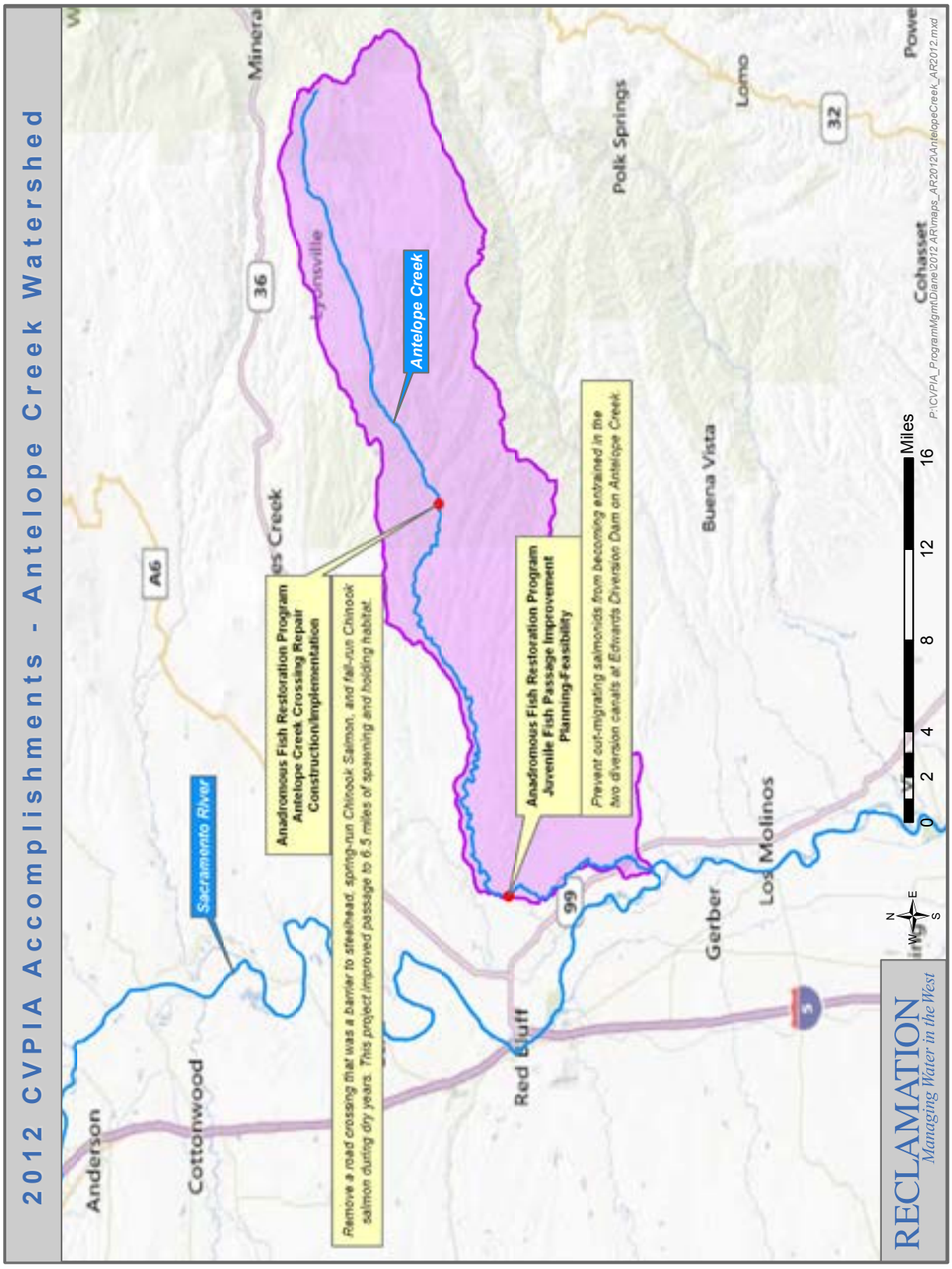
2012 CVPIA Accomplishments - Sacramento River, Lower Cow Creek & Lower Clear Creek Watershed



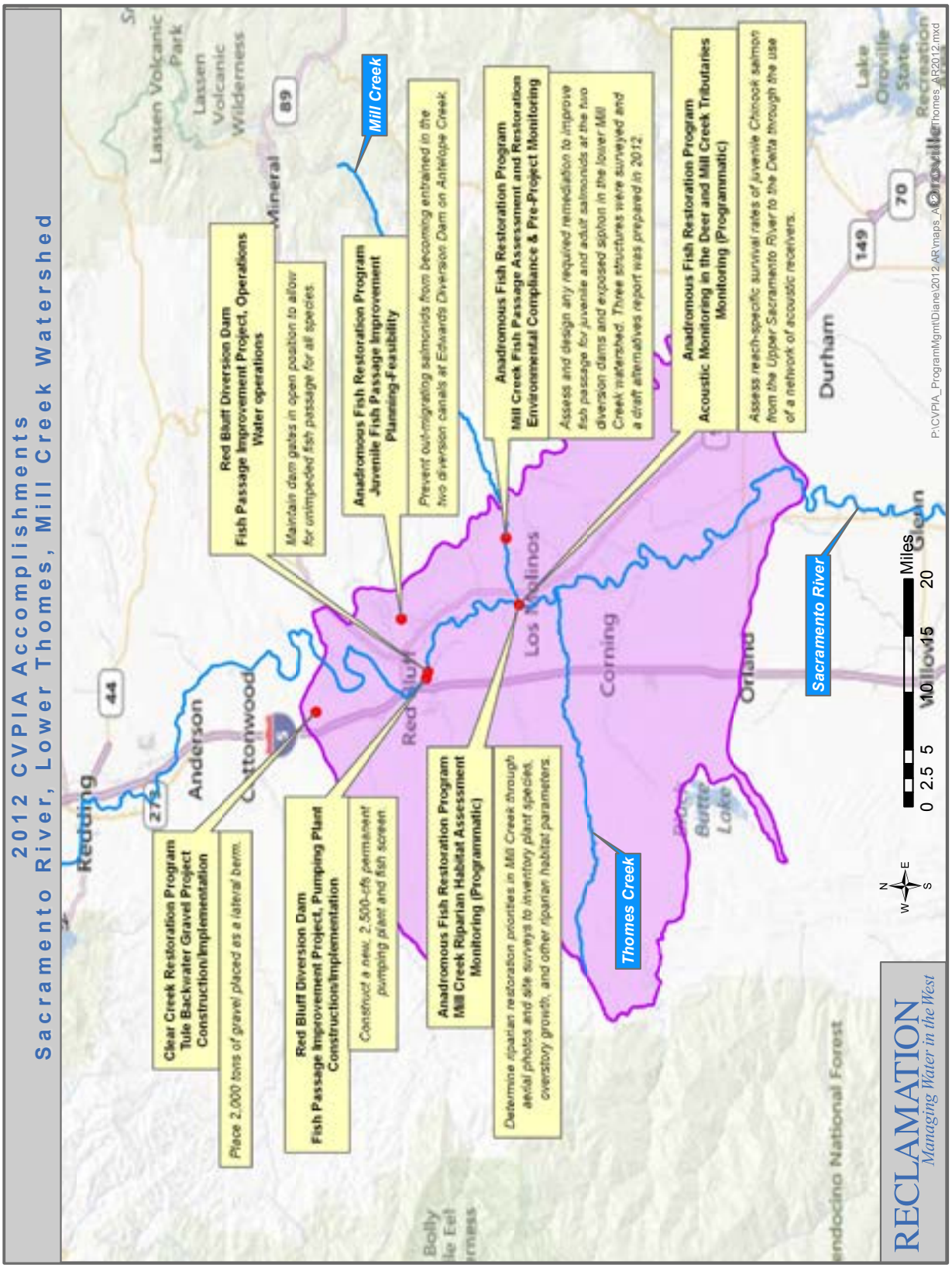
2012 CVPIA Accomplishments - Battle Creek Watershed



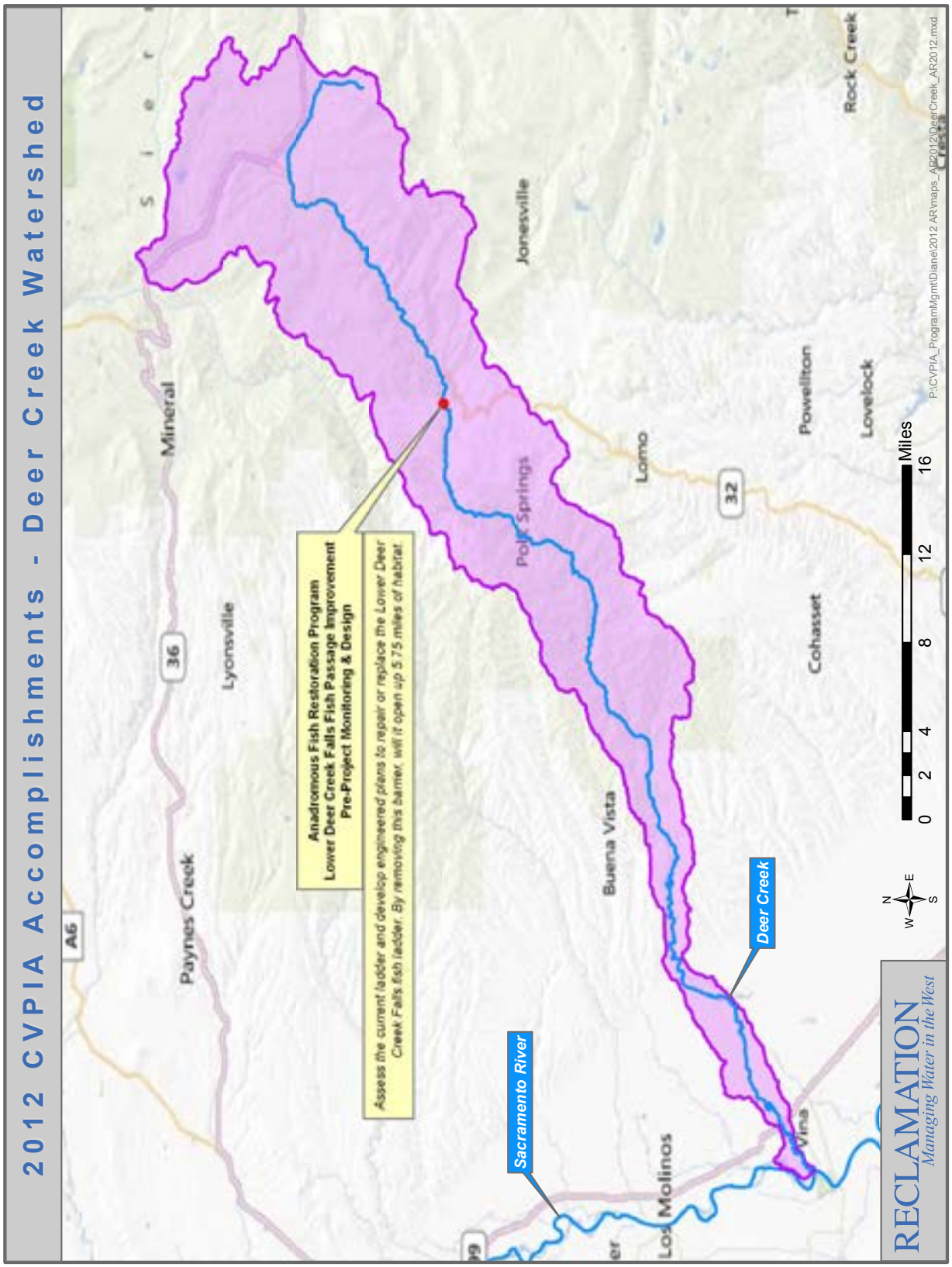
2012 CVPIA Accomplishments - Cottonwood Creek Watershed



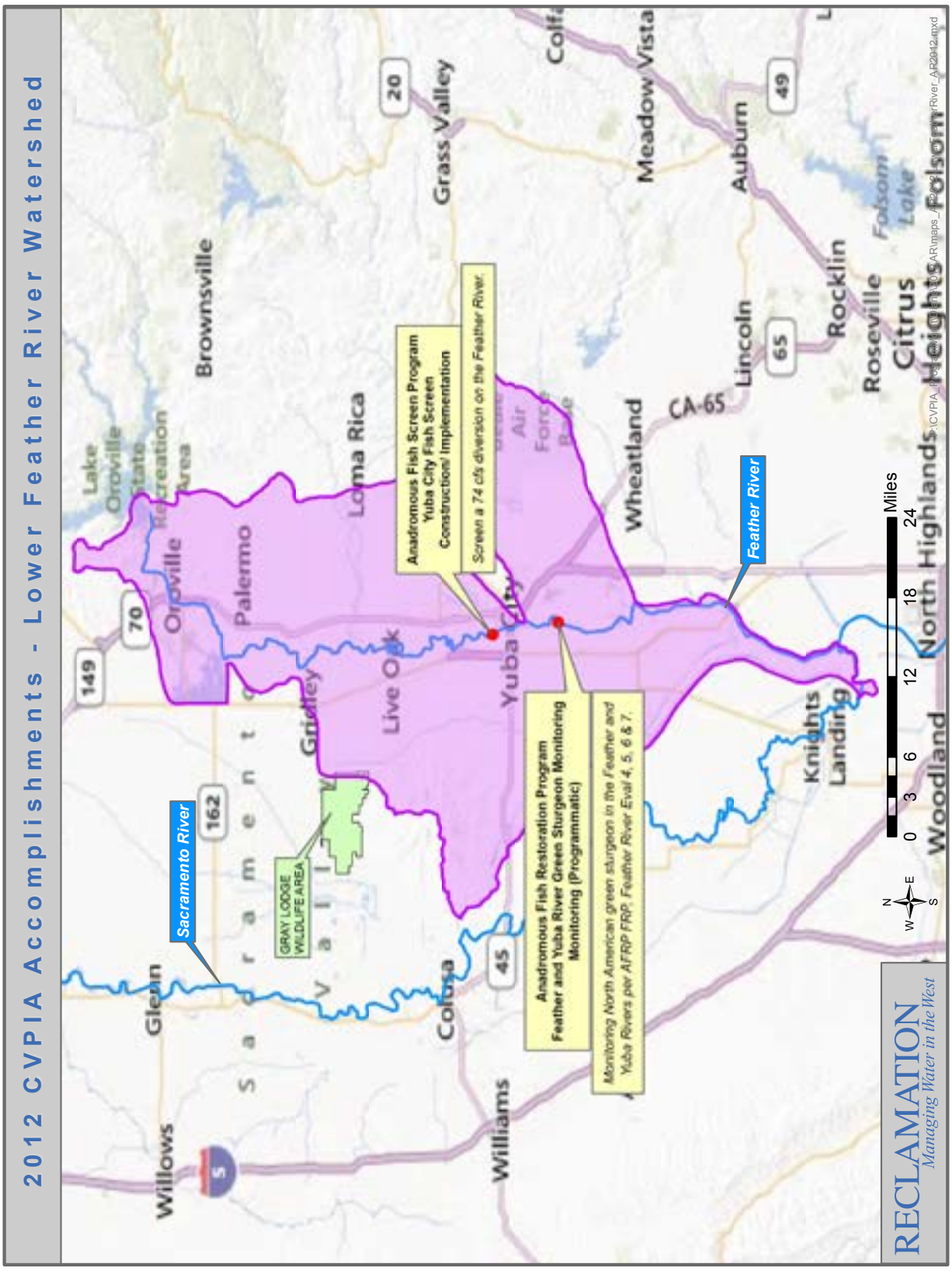
2012 CVPIA Accomplishments - Antelope Creek Watershed



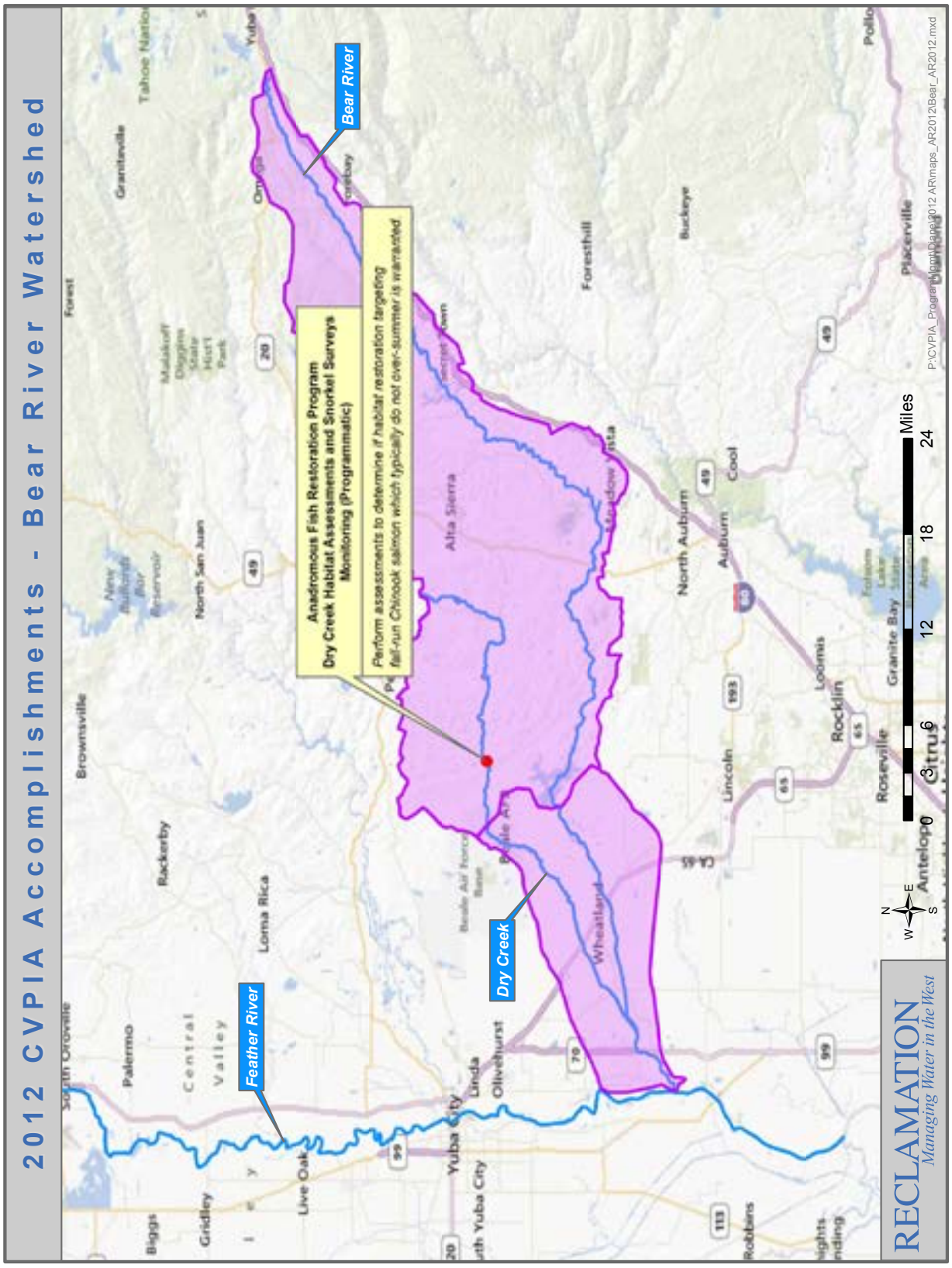
2012 CVPIA Accomplishments - Sacramento River, Lower Thomes, Mill Creek Watershed



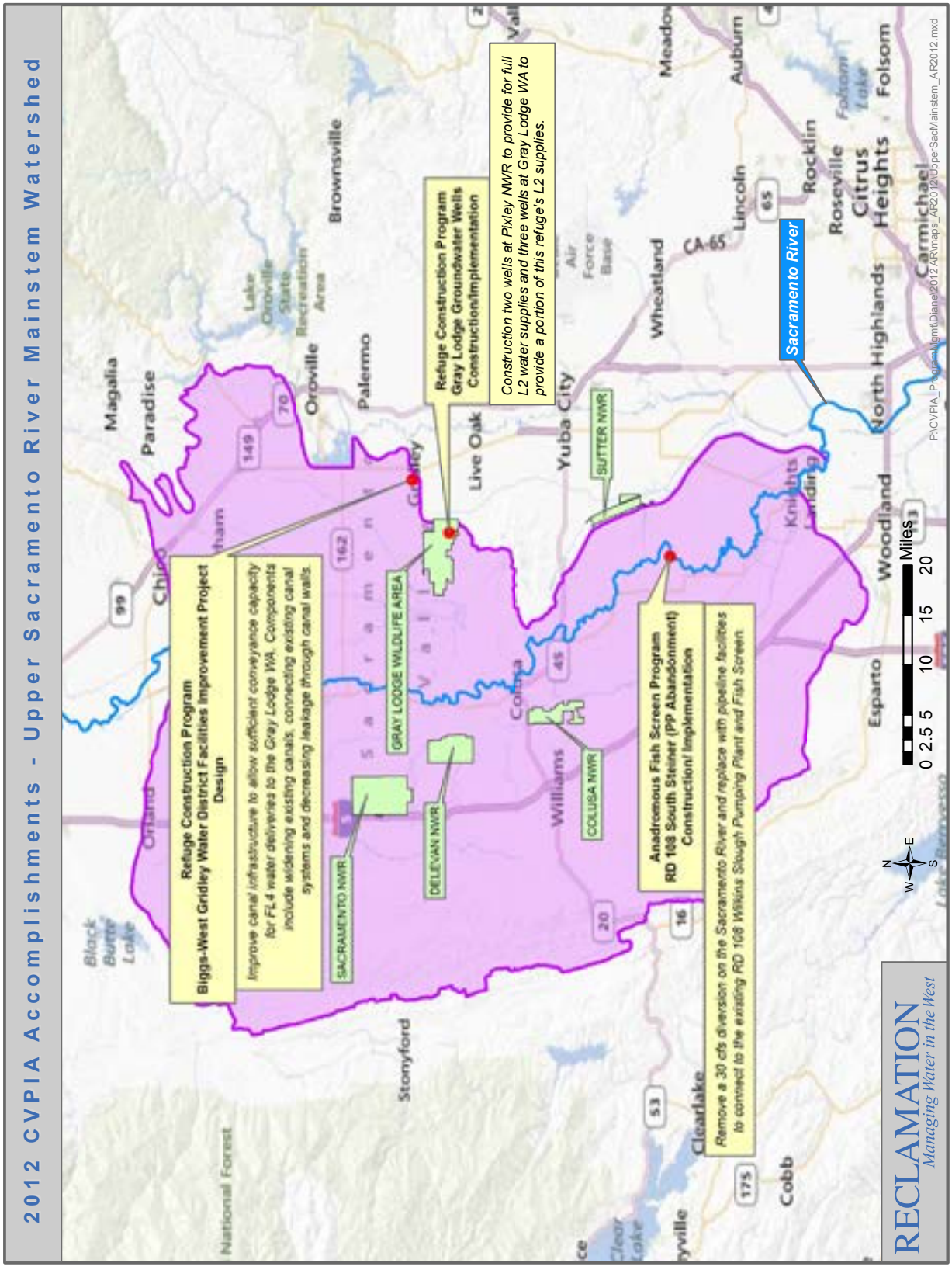
2012 CVPIA Accomplishments - Deer Creek Watershed



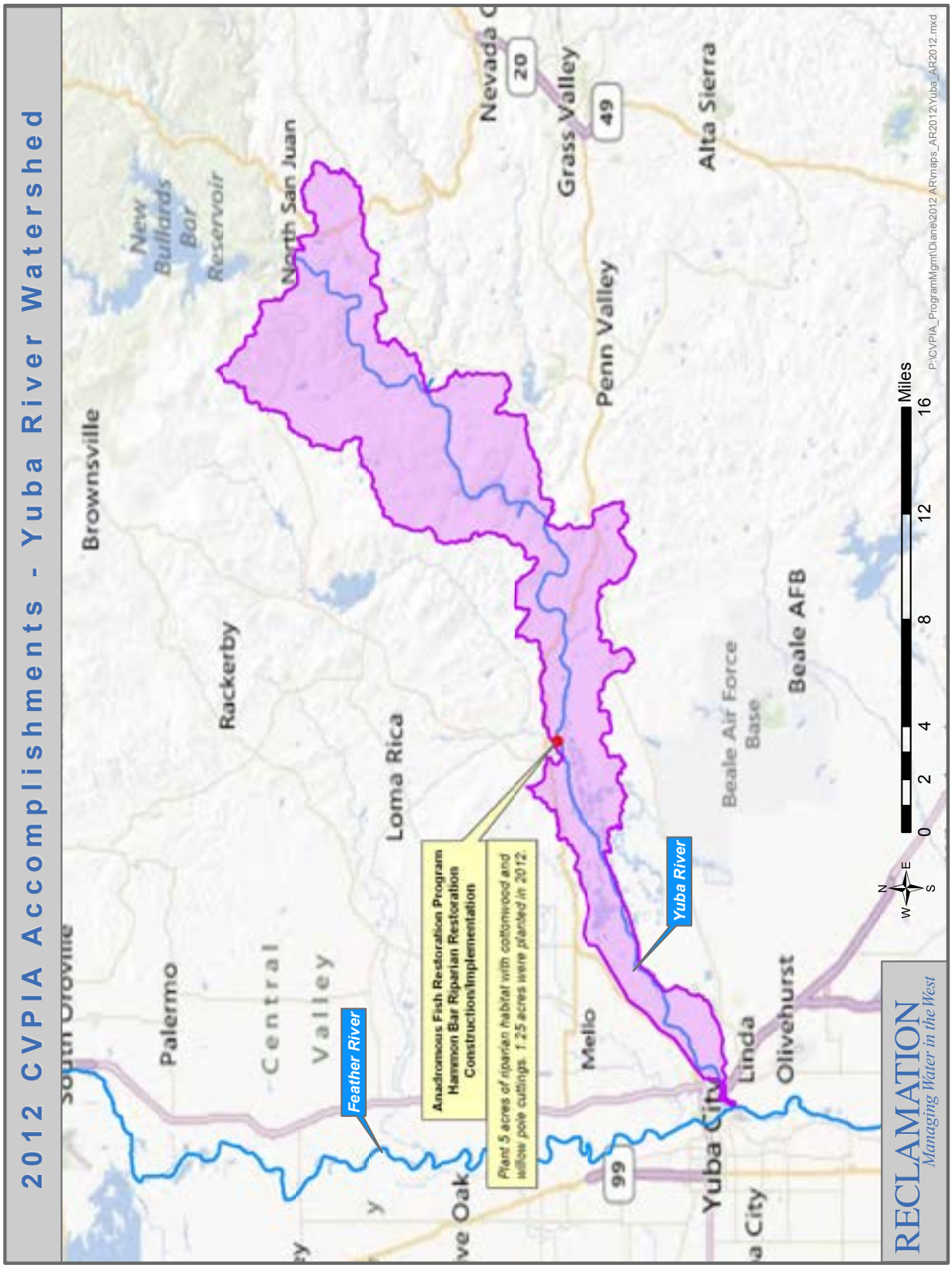
2012 CVPIA Accomplishments - Lower Feather River Watershed



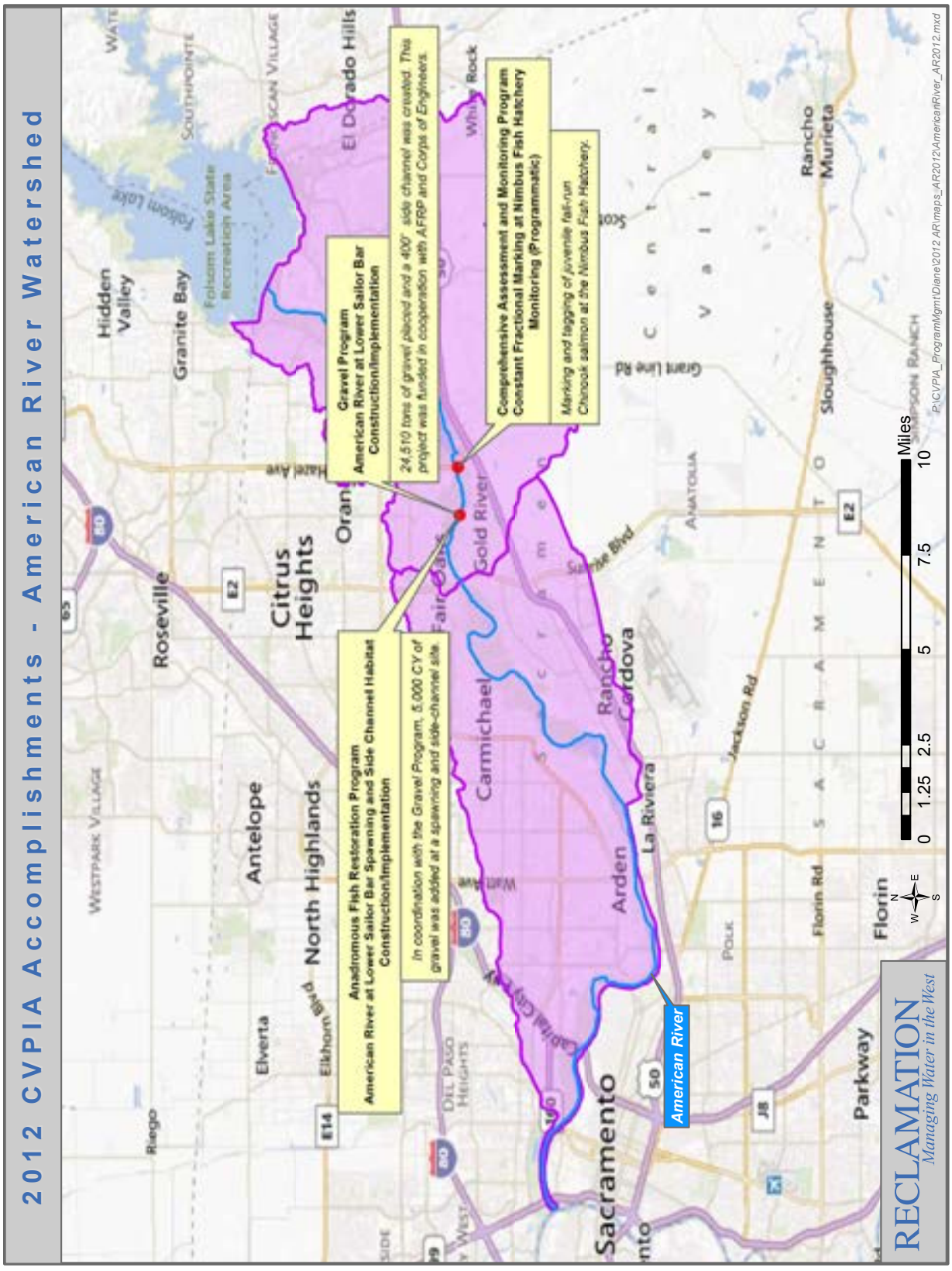
2012 CVPIA Accomplishments - Bear River Watershed



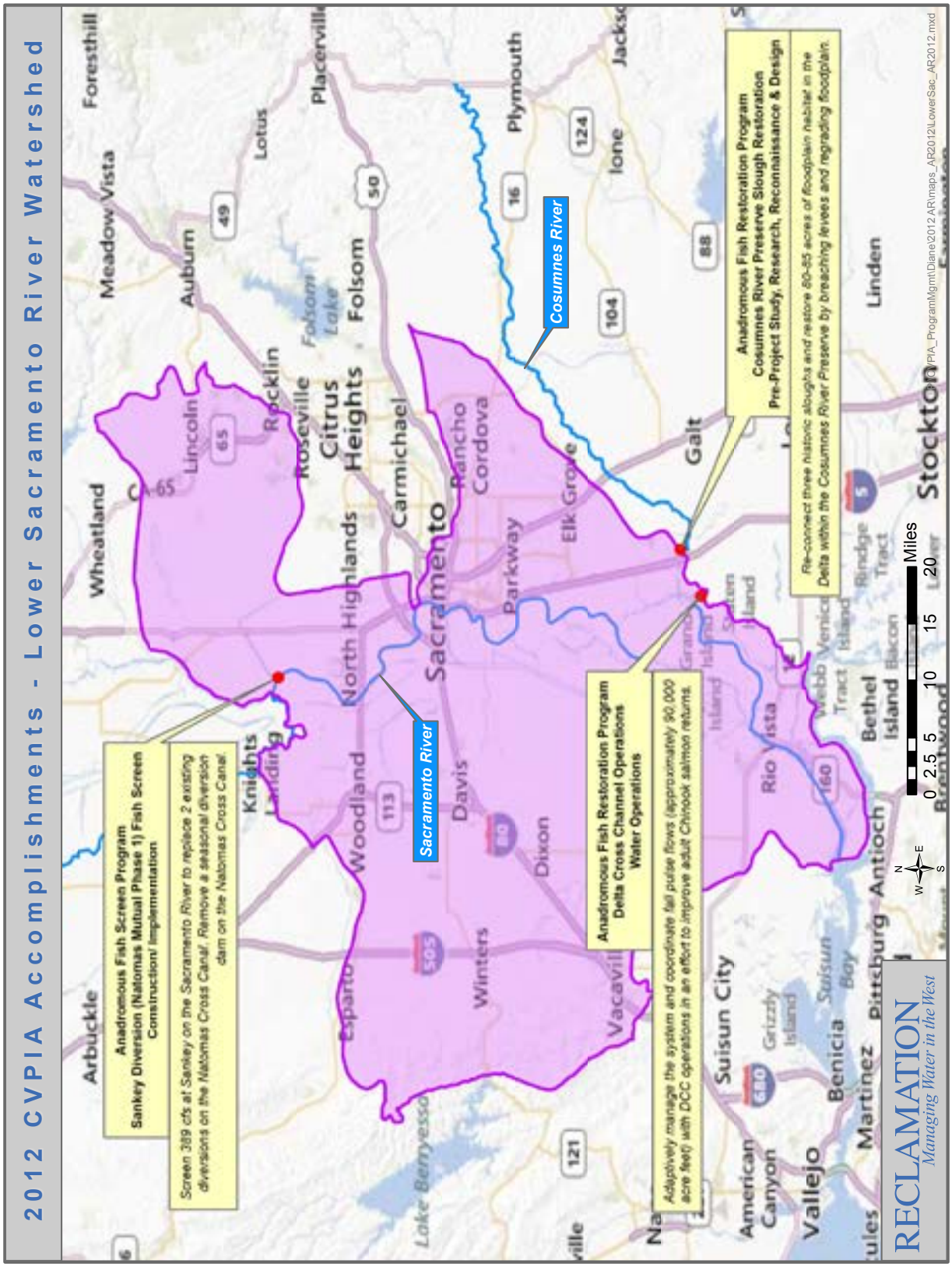
2012 CVPIA Accomplishments - Bear River Watershed



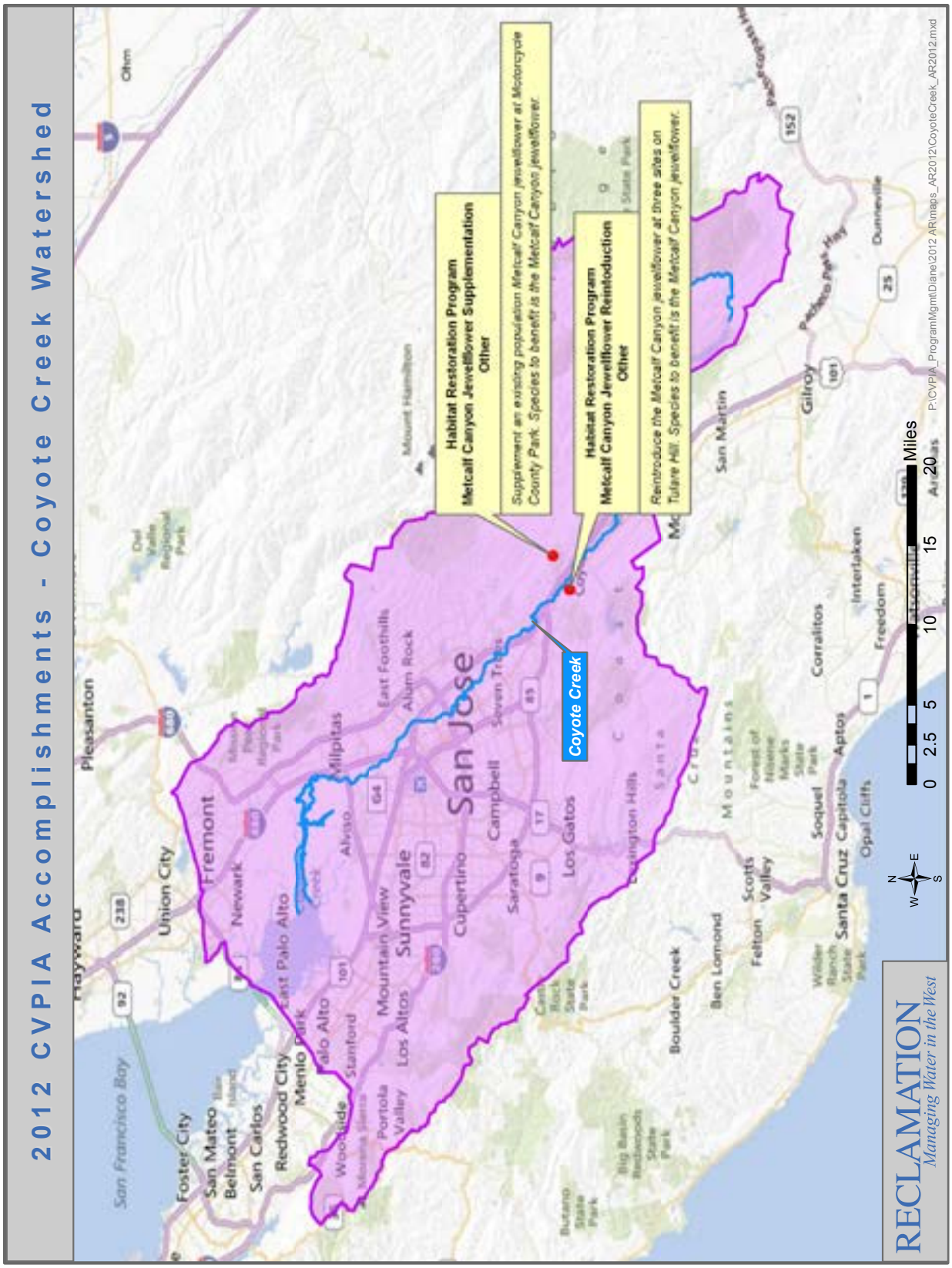
2012 CVPIA Accomplishments - Yuba River Watershed



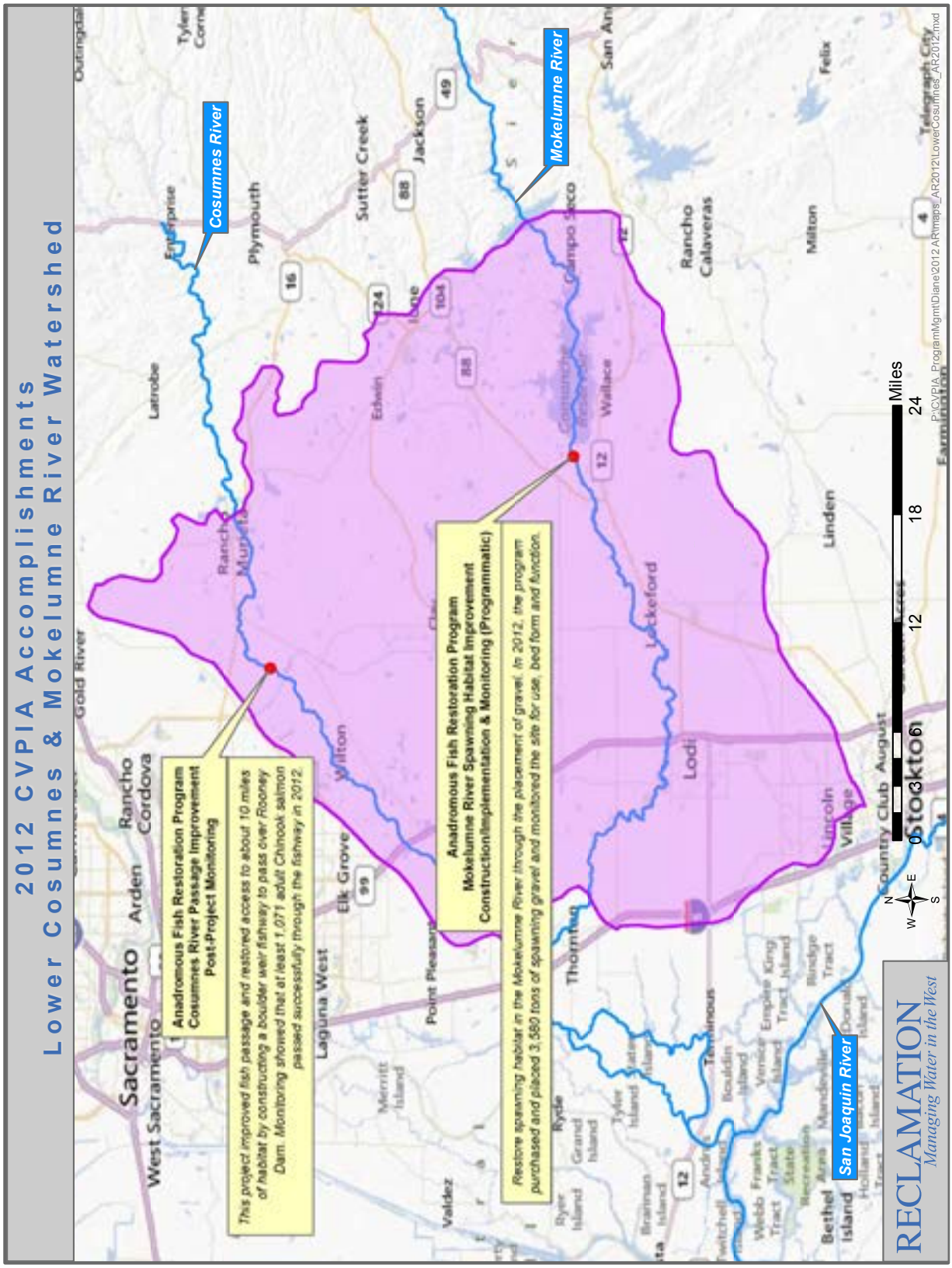
2012 CVPIA Accomplishments - American River Watershed



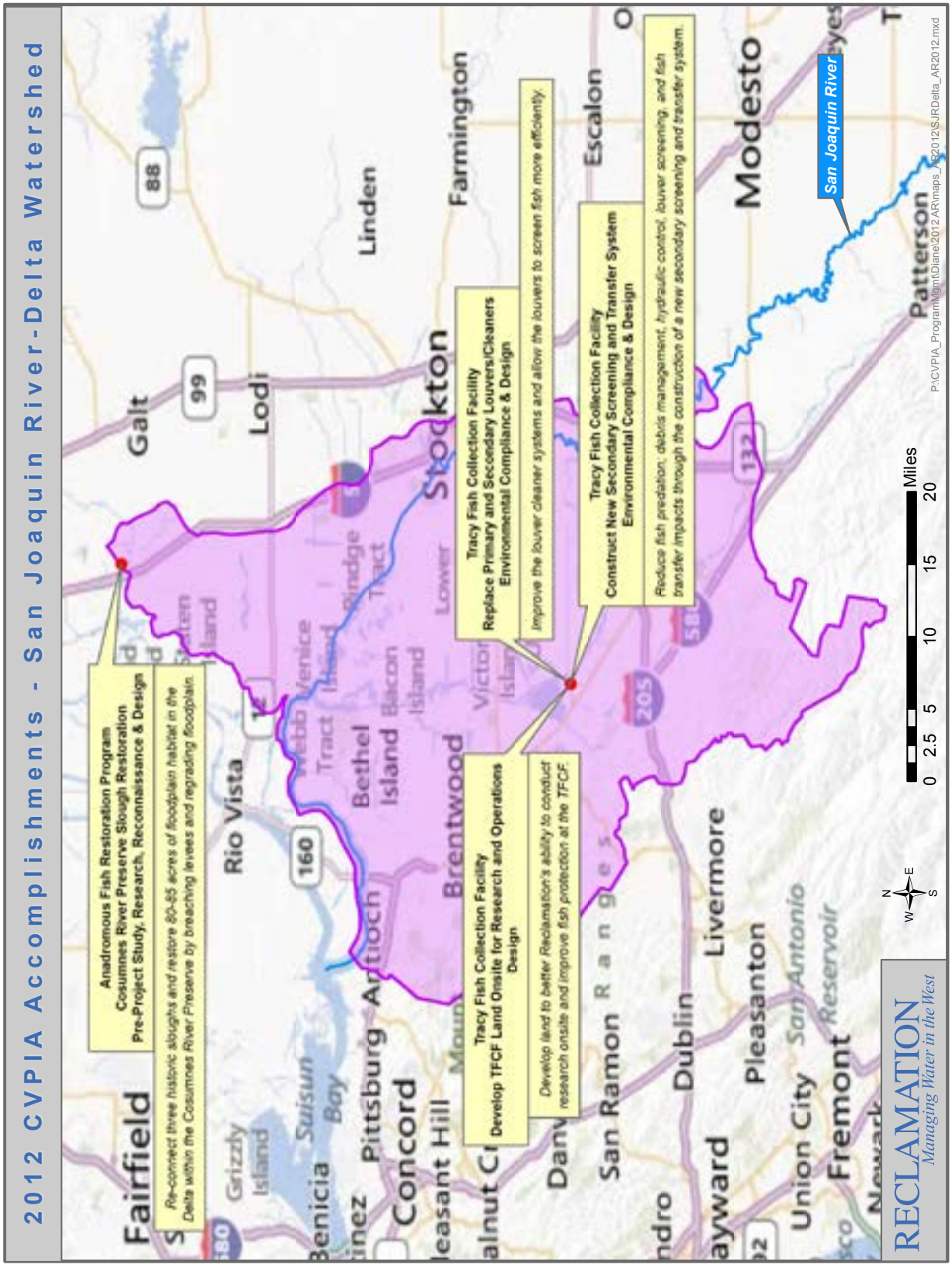
2012 CVPIA Accomplishments - Lower Sacramento River Watershed



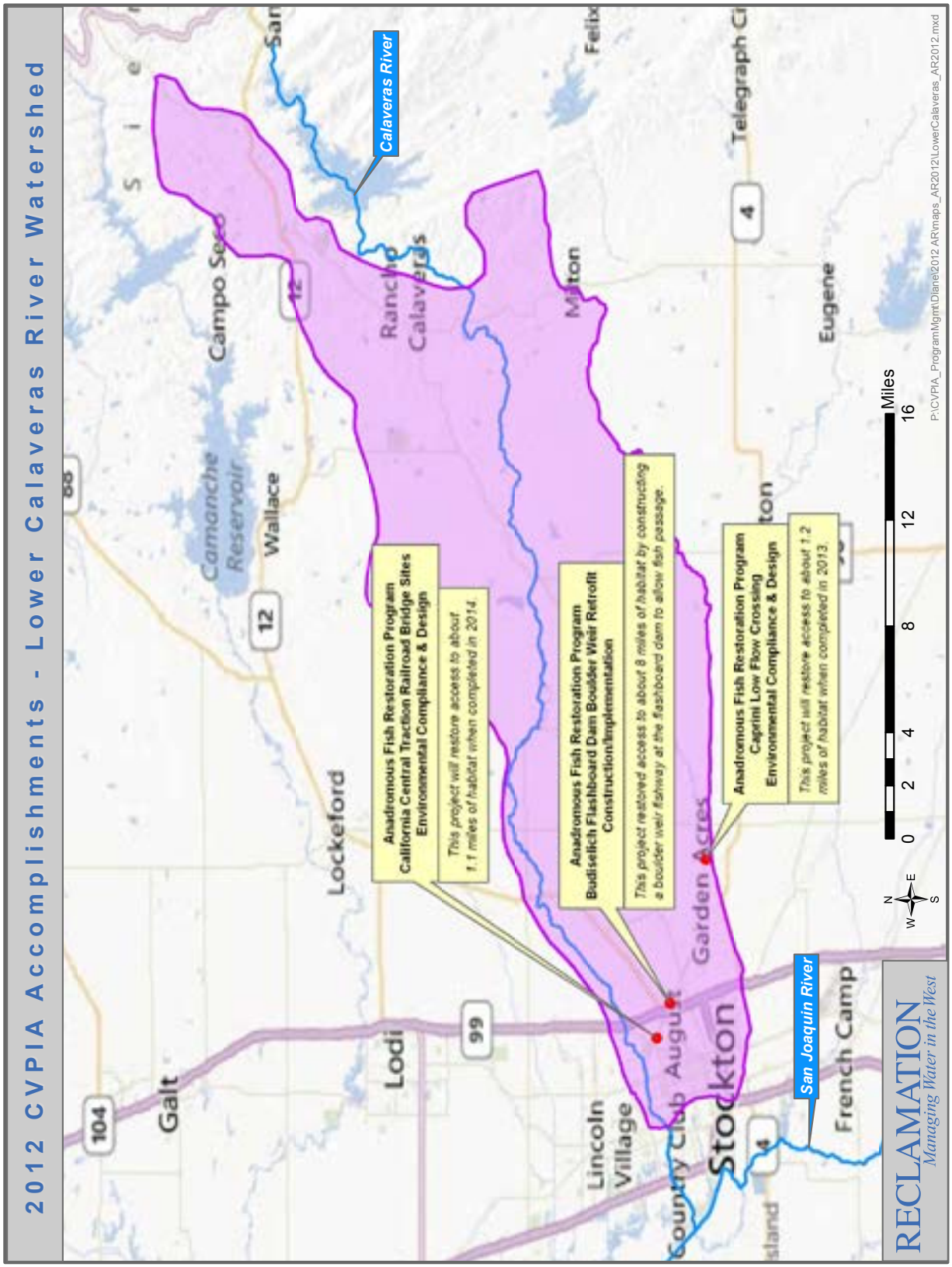
2012 CVPIA Accomplishments - Coyote Creek Watershed



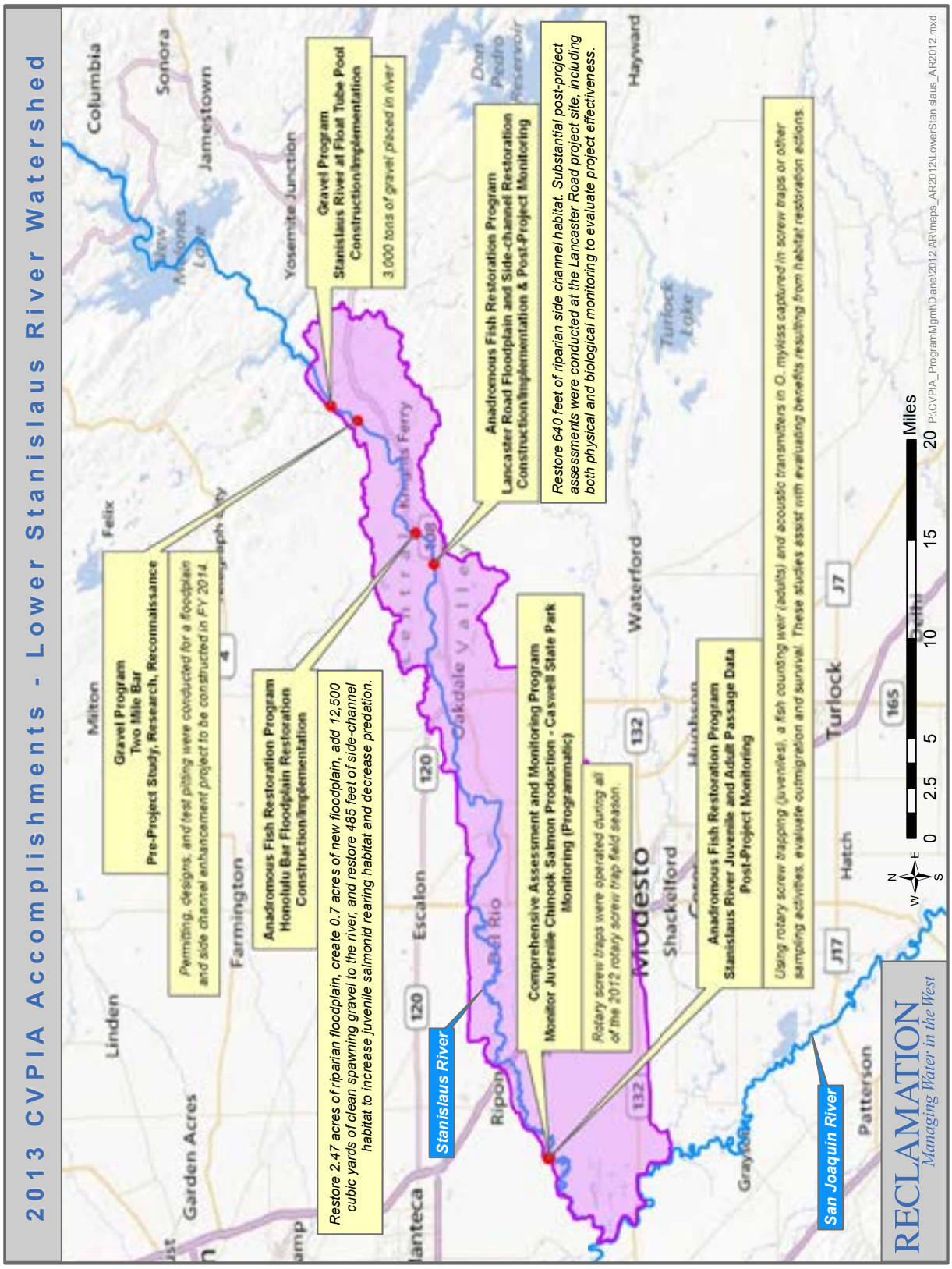
2012 CVPIA Accomplishments - Lower Cosumnes & Mokelumne Watershed



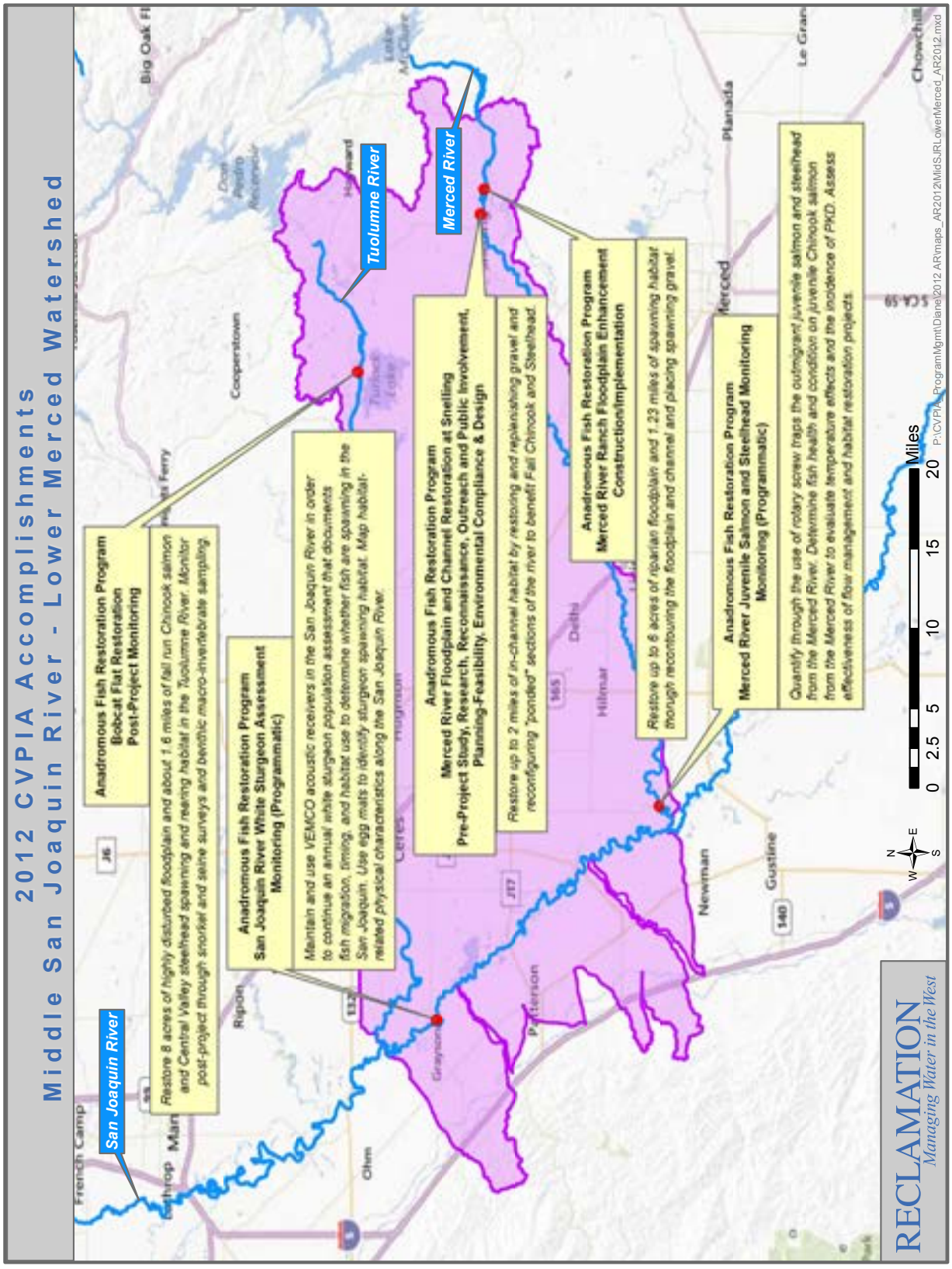
2012 CVPIA Accomplishments - San Joaquin River - Delta Watershed



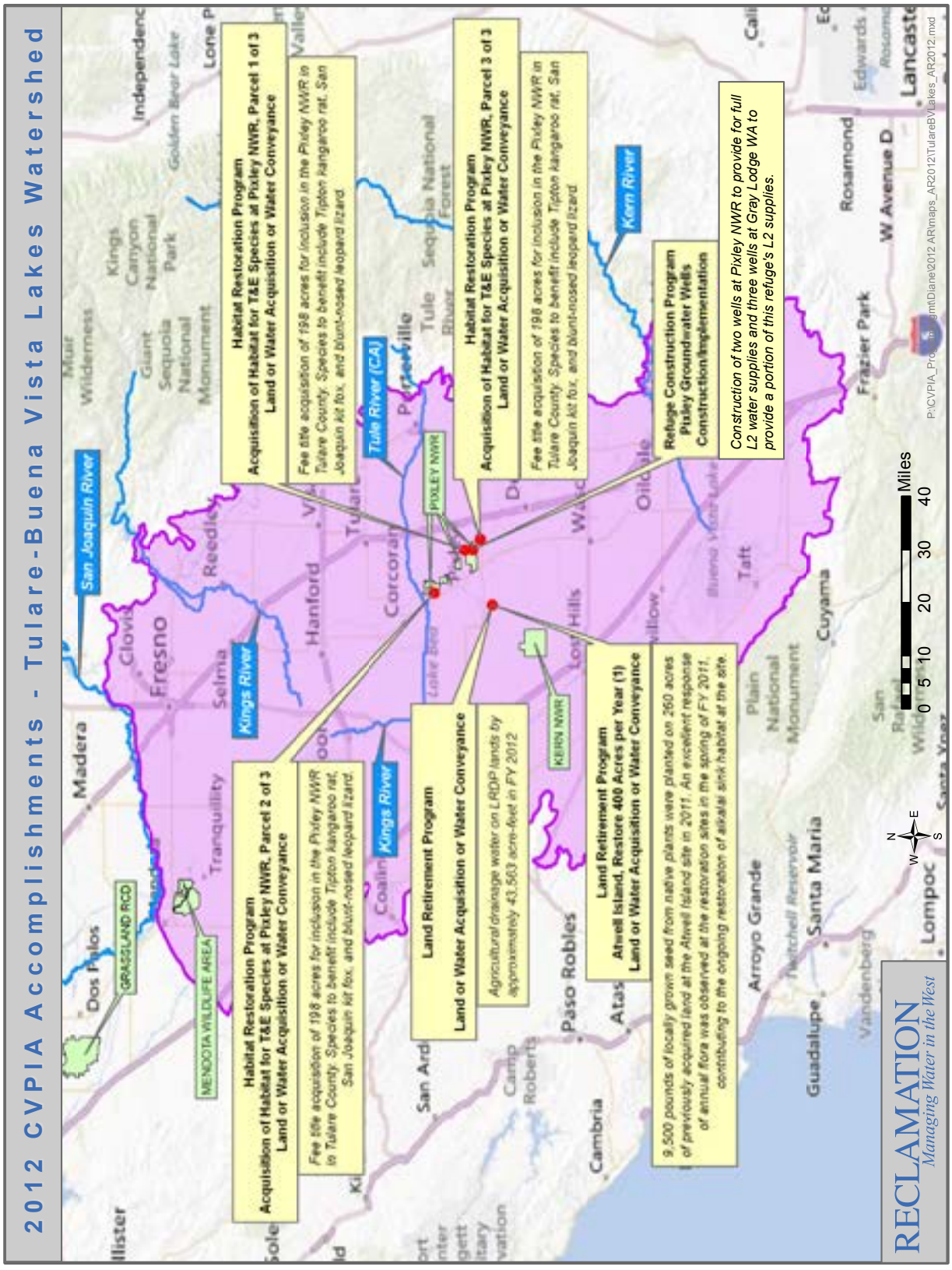
2012 CVPIA Accomplishments - Lower Calaveras River Watershed



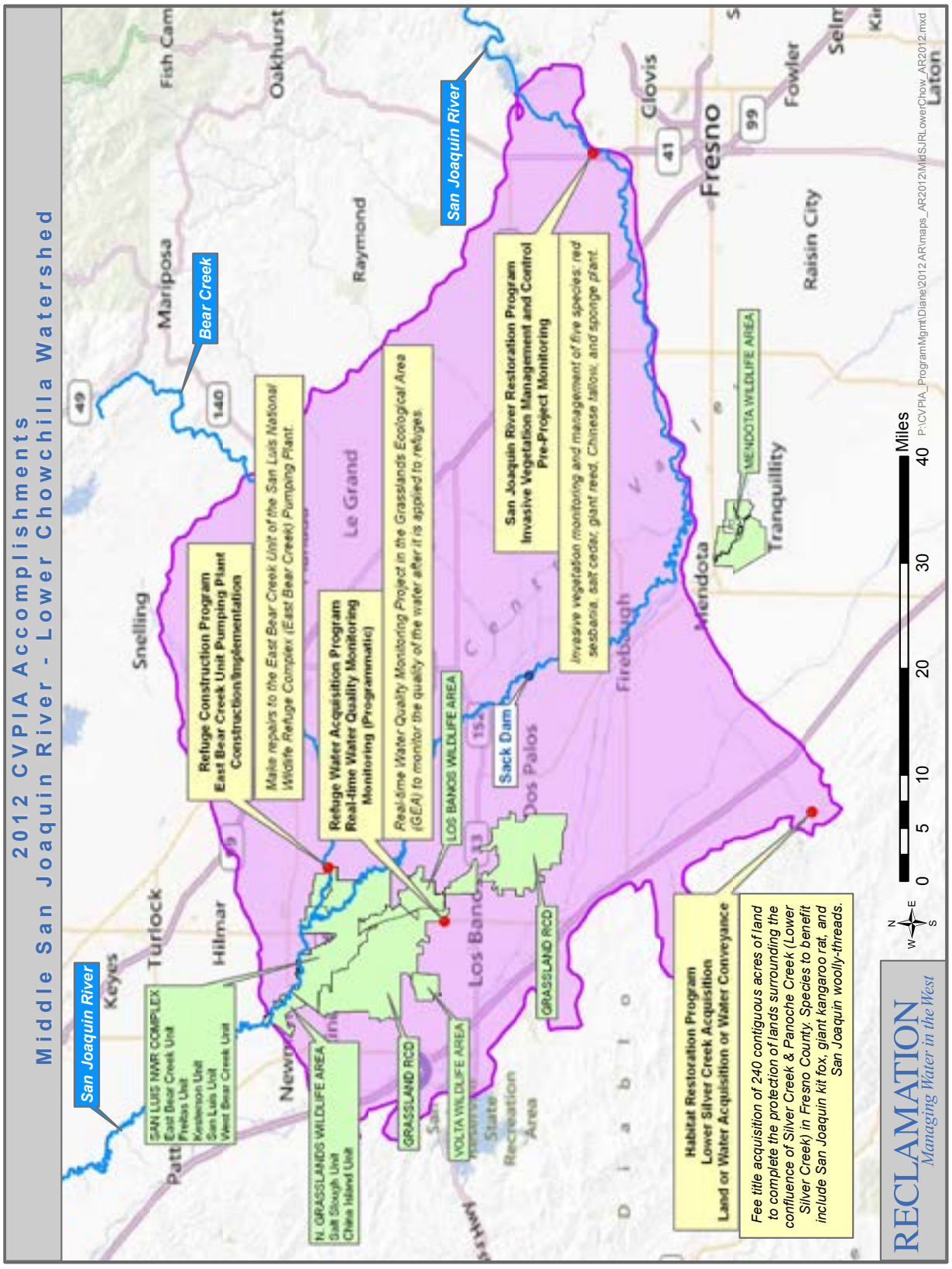
2012 CVPIA Accomplishments - Lower Stanislaus River Watershed



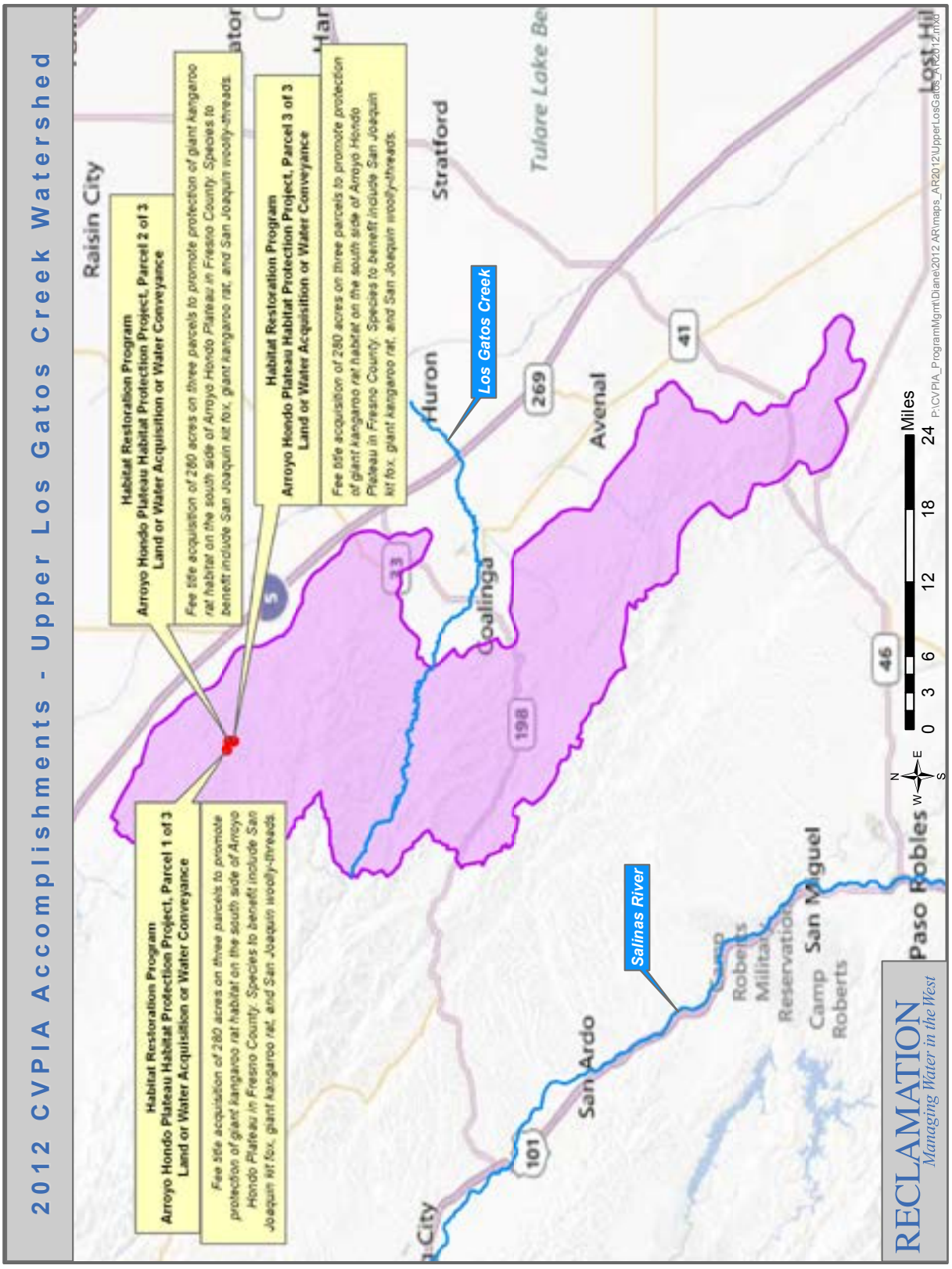
2012 CVPIA Accomplishments - Middle San Joaquin River - Lower Merced Watershed



2012 CVPIA Accomplishments - Tulare - Buena Vista Lakes Watershed

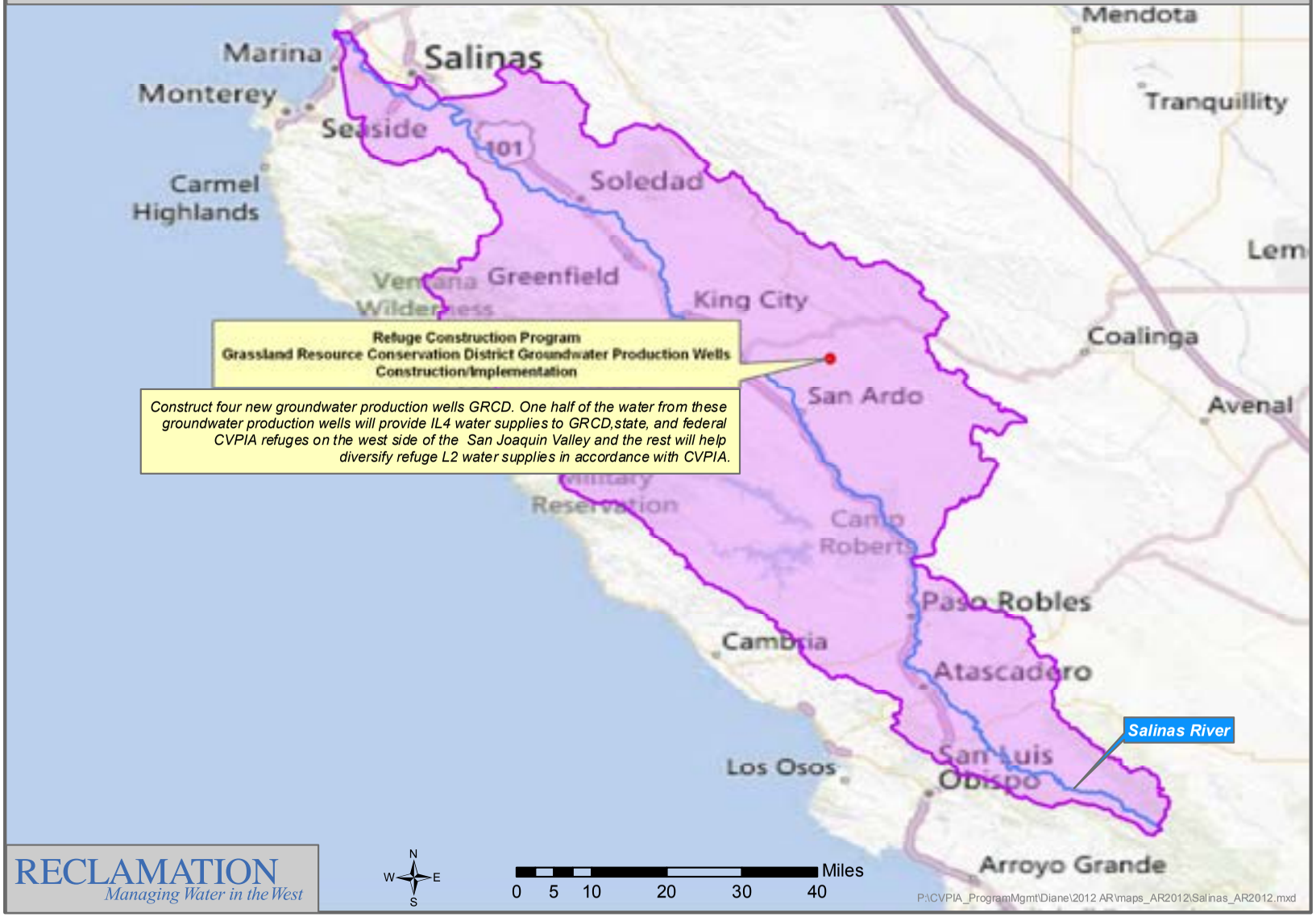


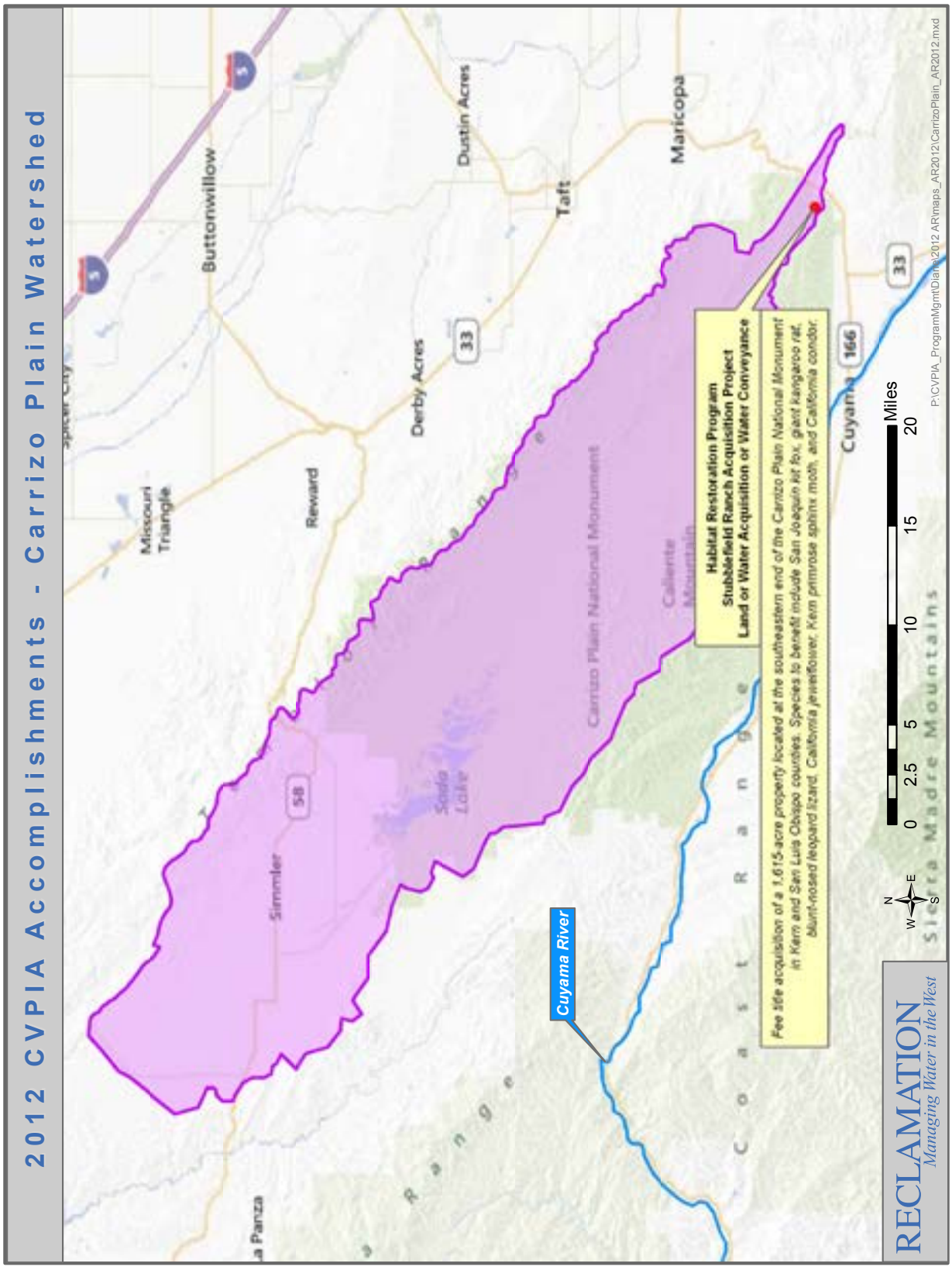
2012 CVPIA Accomplishments - Middle San Joaquin River - Lower Chowchilla Watershed



2012 CVPIA Accomplishments - Upper Los Gatos Creek Watershed

2012 CVPIA Accomplishments - Salinas River Watershed





2012 CVPIA Accomplishments - Carrizo Plain Watershed