Executive Summary
2014 CVPIA Planned Activities

The U.S. Bureau of Reclamation (Reclamation) and the U.S. Fish and Wildlife Service (FWS) develop annual work plans to disclose and solicit feedback on activities planned for the upcoming fiscal year under the authorities and responsibilities of the Central Valley Project Improvement Act (CVPIA), Title 34 of Public Law 102-575, and CVP Restoration Fund. This executive summary provides a synopsis of activities in the 2014 work plans.

Activities under the CVPIA fall under a Fisheries Resource Area, Refuge Water Supply Resource Area, Terrestrial Habitat Resource Area, or Land Retirement. Within each resource area, programs representing the specific authorities develop and implement activities for specific projects and actions to meet those authorities. General categories of activities include:

- Administration and Program Support: costs associated with establishing and maintaining a program or distributed costs not reasonably attributed to a specific activity.
- Projects: discrete activities directly associated with meeting objectives of the CVPIA including the accompanying project specific planning, environmental compliance and permitting, design, implementation, and project monitoring and close-out.
- Research and Assessments: activities for assessing progress, improving implementation, or scoping future plans unassociated with implementing a specific project.

In cases where multiple programs may support a single activity, the activity is reported under the first major authority. A range of sources may fund activities under CVPIA. The main body of the work plan provides tables detailing the specific activities and expenses.

The CVPIA Program Environmental Impact Statement (PEIS), Working Paper, Final Restoration Plan, Program Assessment and Rating Tool (PART), CVPIA Program Activity Review Report (CPAR), and various other reports describe the approach to meeting the goals of CVPIA and summarize the quantitative metrics for evaluating programs. The narratives for the individual work plans summarize the history and objectives for each program.

To develop work plans, the federal and state program managers assembled proposed activities for the upcoming year based on an estimated budget. These work plans underwent agency review by Reclamation, FWS, the National Marine Fisheries Service, the CA Department of Water Resources, and the CA Department of Fish and Wildlife. Following agency review, the work plans are presented to stakeholders and the public for review and feedback prior to finalization. Revisions and adjustments to the specific activities may occur during implementation. Reclamation and FWS develop an Annual Accomplishments Report to disclose implementation.

Fisheries Resource Area

The fisheries resource area includes all of the authorities under 3406(b), (c), and (g). A separate program implements each paragraph with informal coordination between program managers and formal coordination through a multi-agency core team.

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

The Anadromous Fish Restoration Program (AFRP) seeks to make all reasonable efforts to ensure that 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. Activities under the AFRP in partnership with local entities and other agencies include:

- Administration and Program Support: In addition to oversight, the AFRP funds state and federal Habitat Restoration Coordinators to manage contracts and grants, develop projects, provide environmental compliance and permitting, outreach, and report.
- Projects
    - American River - Lower American River Floodplain Restoration: funding for the Sacramento Area Water Forum to conduct spawning and rearing habitat restoration at 6 gravel augmentation sites and 3 side channels.
    - Antelope Creek Lower Slab Fish Barrier: hydraulic modeling to assess fish passage.
    - Antelope Creek Monitoring of the Tehama Wildlife Area Fish Passage Project: replacement of a road crossing with a modern bridge to provide access to 6.5 miles of spawning and holding habitat. FY 14 funds provide post-project topographic surveys.
    - Consumnes River Juvenile Outmigration Monitoring: reconnection of historic tidal sloughs restoring 85 acres of floodplain consisting of riparian and tidal shallow water habitat. FY14 funds provide evaluation of post-project restoration actions and a rotary screw trap.
    - Cottonwood Creek - South Fork Cottonwood Creek Fish Passage Improvement: repair fish passage barriers to allow access to 5 miles of additional habitat upstream of Hammer Diversion hydropower dam. FY14 funds will provide pre-project monitoring and construction.
    - Dry Creek: Habitat Assessment in the vicinity of the Spenceville Wildlife Area and Beale Air Force Base to determine anadromous salmonid habitat and evaluate passage barriers. FY14 funds provide for monitoring and study.

- Deer Creek Irrigation District Dam: replacement or repair of the diversion dam to provide adequate passage for access to 32 miles of potential habitat. FY14 funds will provide environmental compliance and contribute to construction funding.
- Merced River Ranch: 6 acres of restored floodplain and 1.23 miles of spawning habitat. FY14 funds provide post-project monitoring.
- Merced River Snelling Channel and Floodplain Restoration at Henderson Park: restoration of up to 1 mile of in-channel habitat and 15 acres of riparian floodplain habitat through gravel augmentation and channel earthwork. FY14 funds contribute to construction.
- Mill Creek Fish Passage Phase 2: passage at Upper Dam and Ward Dam to provide access to 44 miles of potential spawning habitat. FY14 funds will provide environmental compliance.
- Mokelumne River Spawning Habitat Improvement: purchase and place 6,557 tons of spawning gravel. FY14 funds provide construction.
- Sacramento River – Lower Sacramento River Bullock Bend Floodplain: restore 117 acres of floodplain and riparian habitat. FY14 funds contribute to pre-project monitoring.
- Stanislaus River Buttonbush Floodplain Restoration: restoration of 18 acres of floodplain habitat and approximately 2,800 feet of side channel habitat. FY14 funds will provide pre-project monitoring and construction.
- Stanislaus River Knights Ferry Floodplain Restoration: restoration of up to 1 acre of side-channel and floodplain habitat. FY14 funds provide construction.
- Yuba River Daguerre Alley: restoration of up to 180 acres of floodplain habitat and approximately 2.5 miles of side channel habitat. FY14 funds will provide planning, conceptual designs, and environmental compliance.
- Yuba River Hammon Bar: restoration of 5 acres of riparian habitat and 3.5 miles of rearing habitat. FY14 funds provide post-project monitoring to inform future riparian habitat restoration projects.
- Yuba River Narrows: restoration of 0.5 miles of in-channel habitat by adding gravel and removing shot rock debris. FY14 funds will provide environmental compliance.

- Research and Assessments
  - Floodplain Models: identification of restoration projects and the development of floodplain juvenile production models on the American, Stanislaus, Tuolumne, and Yuba Rivers.

- Stanislaus River Juvenile Chinook and O. mykiss Mortality Study: identification of specific sources of mortality.
- Mill and Deer Creek Juvenile Chinook Acoustic Tagging Investigations: evaluation of the effects of natural and anthropogenic changes in flow on movement and survival within the Sacramento River and Delta.
- Sacramento River Green Sturgeon Juvenile Overwintering Migration Investigation: collection of spatial and temporal habitat use.
- American River Structure Decision Making (SDM) Monitoring Studies: monitoring studies to support the American River SDM model.
- Sacramento River Redd Dewatering Study: mapping of redd locations and inundation corresponding to different flow rates.
- San Joaquin River Sturgeon Studies: acoustic study on distribution and habitat use, sampling for sturgeon eggs and larvae and physical habitat measurements, and effects of contaminants on sturgeon populations.
- Deer Creek Impacts of Illegal Marijuana Activity on Fish: identify the effects of cultivation and contaminants on water quality and fish production.

Dedicated Yield Program, 3406 (b)(2)

The Dedicated Yield Program manages up to 800,000 acre-feet of CVP water for fish, wildlife, and habitat restoration purposes through augmenting river releases from CVP reservoirs and reducing CVP exports in the Delta to improve flow and habitat conditions.

- Administration and Program Support: inter-agency team meetings to confer with operators and biologists, forecasting, developing water budgets, and accounting for the use of the dedicated yield.
- Projects: none.
- Research and Assessments
    - Sacramento River Redd Dewatering: Monitoring of fall- and late-fall run Chinook salmon redd locations and physical data (Oct-Apr) on the Sacramento River between Keswick and Red Bluff Diversion Dams to make real-time Keswick release decisions to benefit spawning, egg incubation, and fry emergence as well as contribute to long-term flow related management decisions.
    - San Joaquin River and Sac-SJ Delta Juvenile Outmigration: estimating juvenile Chinook salmon survival through the San Joaquin River and Delta and relating it to temperature, flow, exports, and the Old River barrier. The survival estimates will be compared between the two fish releases and identify proportional causes

of mortality hypothesized to be related to operational changes in hydrology and other project and non-project effects on outmigrating juvenile salmon smolts.

- Lower American River Redd Dewatering: estimate and describe the timing, location, and extent of salmonid redd dewatering on the Lower American River. This information will also be used to inform (b)(2) management decisions on the Lower American River.

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

The Water Acquisition Program (Program) is charged to acquire water to supplement the 800,000 acre-feet of dedicated CVP yield for fisheries.

- Administration and Program Support: consultation with water rights, contracts, solicitors, to develop agreements for water acquisitions.
- Projects: Anticipated acquisitions of up to $2.5 million based on available sellers.
- Research and Assessments: none.

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

The Tracy (Jones) Pumping Plan Program seeks to mitigate for fishery impacts associated with operations of the Tracy Pumping Plant through improvement or replacement of the fish screens and fish recovery facilities and related practices.

- Administration and Program Support: coordination and oversight including reviewing proposals and quality control and quality assurance programs.
- Projects:
  - Third Fish Release Site: construction of a new fish release site to reduce predation on salvaged fish. FY14 funds support reconnaissance and planning.
  - Replacement of Secondary Louvers: Enhance the efficiency of screening, fish survival, and reduction of predation within the secondary channel structure. FY14 funds provide construction.
- Research and Assessments
  - Evaluation of Chinook Salmon and Central Valley Steelhead Facility Losses at the Tracy Fish Collection Facility: determine whole facility survival (from the trash boom to the holding tank) for juvenile Chinook salmon and steelhead.
  - Investigations for Improvements to the Primary Channel: investigate screening concepts that will improve the primary channel collection process.
  - Evaluation of the Use of Electricity for Predator Removal at the Tracy Fish Collection Facility: determine methods for removal of predators in the primary

channel, using physical and non-physical removal methods (e.g., electricity, sound, light, CO2), with the goal of reducing predation loss to 10 percent or less.

- Effect of Negative Pressure on Selected Fishes Salvaged: evaluate use of a vacuum pump system at TFCF to remove fish from the recessed, cylindrical holding tanks in times of increased salvage that is beyond the fish-safe capacity of the lift bucket and transfer these fish to the fish-haul truck
- Evaluating the Use of Carbon Dioxide as an Alternative Predator Removal Technique: determine means and methods to reduce the number and average size of striped bass in the secondary system by removing large resident fish; increase survival of fish collected during the predator removal process; decrease the amount of time necessary to perform the predator removal process and minimize, or eliminate, facility downtime during predator removals, and to develop a predator removal technique that is safer for employees.
- Evaluating Debris Removal from Circular Holding Tanks: determine if quickly lifting and reseating the holding tank screen prior to collecting fish in the fish count and haul-out buckets is a cost efficient, effective and time conserving debris removal technique for periods when debris loads are excessive in the TFCF holding tanks.
- Evacuation Rates of Acoustic Tags in Striped Bass: Data are needed on the rate at which striped bass digestively pass acoustic tags that were inside predated salmon. This information will assist researchers with evaluation and interpretation of data on survival and movement of salmon and steelhead throughout the Central Valley of California
- Low Cost Solution to Retain More Larval Fish: Effectiveness of Using a Fine Mesh Screening on the Holding Tanks: A temporary blanket of 0.5 mm Nitex screen over the existing holding tank screen has shown promise for short term use. A successful Nitex screen retention of larval and juvenile fishes will mean enhanced salvage and more fishes released to the Delta. Application of the Nitex screen will be most valuable when delta smelt and longfin smelt (Spirinchus thaleichthys) larvae are present in the system.
- Influence of Acoustic Tags on Susceptibility of Chinook Salmon to Predation: determine if acoustic-tagged Chinook salmon in ongoing VAMP studies are consumed by predatory fishes in the Delta at a rate different than untagged salmon.

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

The Red Bluff Diversion Dam Program seeks to improve or eliminate passage problems while also allowing for diversion of irrigation water.

- Administration and Program Support: hydraulic and biological evaluation of the Program.
- Projects:
    - Decommissioning contract management, including safety management, construction inspection and oversight, and contract administration. (A30-0725-6341)
    - High Speed Interrupter Switches: installation to improve power plant reliability for primary power or transfer of main power line from WAPA to PG&E ownership.
    - Hydraulic Performance Evaluation: follow-up and fish screen and adjustments
    - Terrestrial Mitigation: maintenance period continues which includes irrigation and weed control.
- Research and Monitoring
    - Fish Screen Biological Evaluation: Experimental fish releases for studying survival associated with the pumping plant, and fish movement and behavior observation using acoustic imaging, video, or direct observation technologies.

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

The Goal of the Clear Creek Restoration Program is to develop and implement a comprehensive program to provide flows to allow sufficient spawning, incubation, rearing, and outmigration for salmon and steelhead from Whiskeytown Dam.

- Administration and Program Support: program management, budgeting, contracting, and coordination.
- Projects:
    - Cloverview Mercury Abatement and Fish Restoration: processing of historic mining tailings along Clear Creek to remove and sequester mercury laden sediments and the development of a 40-year supply of gravel. FY14 funds provide environmental compliance and construction.
    - Environmental Water Program: an experimental/pilot flow of 3,250 cfs from Whiskeytown Dam to help induce geomorphic processes in Clear Creek to promote maintenance and improvement of habitat for anadromous salmonids. FY14 funds provides environmental compliance.
    - Floodway 3B Project: FY14 funds provide for decommissioning access roads, work areas, and stabilizing/rehabilitating disturbed areas associated with project activities.

- Gravel Injection: addition of 7,400 tons of spawning gravel at selected sites in Clear Creek to create spawning habitat and promote geomorphic processes. FY14 funds provide for implementation.
- McConnell Foundation Water Exchange/Pumping: pumping costs, when needed associated with the Saeltzer Dam removal.

- Research and Assessments:
  - Juvenile Spring Chinook Salmon Monitoring Project. Estimating the production of juvenile spring Chinook in Clear Creek, migration timing, and their biological condition.
  - Fall Chinook salmon spawning area Mapping: mapping spawning areas.
  - Clear Creek Spawning Gravel Evaluations:
  - Geomorphic Monitoring: Evaluating effectiveness of Environmental Water Program (EWP) geomorphic pulse flows for changes to the physical characteristics and potential benefits.
  - Spring Chinook and Steelhead Spawning Escapement Surveys: evaluate adult returns and spawning success consistent with RPAs.
  - Juvenile Chinook and Steelhead Production Estimates: year-round monitoring of all juvenile salmonids.

Gravel Program, 3406 (b)(13)

The purpose of the gravel program is to increase the availability of spawning and rearing habitat in the Sacramento, American, and Stanislaus River Basins.

- Administration and Program Support: plan projects, conduct monitoring, and oversee construction.
- Projects:
  - Sacramento River Project: Spawning and rearing habitat restoration project at a site between Clear Creek and Keswick Dam with planning underway for new project site that could be implemented in 2014. FY14 funds provide for planning, environmental compliance, construction, and post-project monitoring.
  - American River Project: Gravel, side channel, and floodplain project at Nimbus Basin or other permitted sites. FY14 funds provide for construction and post-project monitoring.
  - Stanislaus River Project: Gravel, side channel, and floodplain at Two Mile Bar or upper Honolulu Bar cooperative project or the Goodwin gravel placement sites. FY14 provides for construction and post-project monitoring.

- Research and Assessments
    - American River Monitoring: evaluate a series of seven restoration sites on the American River with biological and physical monitoring.
    - Stanislaus River Monitoring: Redd mapping at gravel placement sites and monitoring gravel movement through snorkel surveys in coordination with CDFW.
    - American River Spawning Photos: aerial photos documenting Chinook spawning.
    - American River Structured Decision Making: model construction and information assembly for identifying restoration actions and monitoring priorities.

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

The Comprehensive Assessment and Monitoring Program (CAMP) seeks to monitor fish and wildlife resources in the Central Valley and assess the biological results and effectiveness of actions under CVPIA.

- Administration and Program Support:
    - Developing an annual report; participating in planning exercises; managing contracts and/or cooperative agreements; acquiring, refining, and synthesizing data; and identifying new CVPIA data collection activities.
    - Structured Decision Making (SDM): a science-based decision making process to enhance the manner in which CVPIA is implemented and its performance is measured.
- Projects:
    - Rotary Screw Trap Platform: Maintain and refine the CAMP's rotary screw trap platform that stores rotary screw trap data and produces juvenile salmon production estimates. This project does not require FY2014 funding and will be paid for with carryover funds from the FWS.
    - Accomplishment Database: development of improved planning and reporting tools to facilitate the administration of CVPIA.
    - CVPIA GIS Network Access Tool (GNAT): archiving of documents for project locations and accomplishments. FY14 funds provide continued support.
- Research and Assessments
    - Rotary Screw Traps: monitoring the production of juvenile Chinook salmon and/or juvenile green sturgeon on the Stanislaus River, American River, Battle Creek, and Sacramento River at Red Bluff Diversion Dam.

- Constant Fractional Marking Program: marking to assess the relative proportion of wild versus hatchery-origin adult salmon that return to spawn at the Feather River Fish Hatchery, Nimbus Hatchery, and Coleman Hatchery.
- Winter-run Chinook salmon Carcass Survey: quantify production (escapement) of adult winter-run Chinook salmon on the Sacramento River mainstem.
- CWT recovery on Cottonwood Creek / Sacramento River: Collect adult Chinook salmon from Cottonwood Creek and a portion of the Sacramento River mainstem and retrieve coded wire tags (CWTs) with the goal of quantifying the proportion of wild- vs. hatchery-origin salmon in those two watersheds.
- Battle Creek Adult Salmonid Escapement Monitoring: quantify the production (escapement) of adult spring-run Chinook salmon and monitor the abundance of adult steelhead in Battle Creek.
- San Joaquin River Delta Chinook Salmon Survival Study: quantify the survival of juvenile Chinook salmon as they migrate through the lower San Joaquin River and Sacramento River/San Joaquin River Delta.

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

The Anadromous Fish Screen Program assists the State of California in efforts to develop and implement measures to avoid losses of juvenile anadromous fish resulting from unscreened or inadequately screened diversions.

- Administration and Program Support: Provides leadership and overall management of the Anadromous Fish Screen Program (AFSP) including project implementation, program budget, contracts and environmental compliance.
- Projects
  - RD 2035/Woodland Davis Clean Water Agency (WDCWA) Joint Intake and Fish Screen: construction funding to RD 2035 for a fish screen at an existing 400 cfs diversion owned by RD 2035.
  - Pritchard Lake (Natomas Mutual Phase 2A) Fish Screen: construction funding to Natomas Mutual Water Company (Natomas Mutual) for a 160 cfs fish screen at the Pritchard Lake diversion.
  - West Stanislaus Fish Screen Project DEC Review: a Design, Estimating, and Construction (DEC) review to assess to determine if cost estimates for a project are appropriate for their intended purpose, identify potential fatal flaws in the designs and determine whether major risk and uncertainties have been fully addressed in the cost estimates.
- Research and Assessments

- Unscreened Diversion Assessment: Final report under preparation to assess fish screen benefits, and help prioritize diversions for future screening now that diversions over 150 cfs in size on the mainstem Sacramento River have already been screened or are currently proposed for screening. This report summarizes monitoring conducted at 12 unscreened diversions during 2009-2012.

Ecosystem and Water Systems Operations Modeling Program, 3406 (g)

The goal of the Ecosystem and Water Systems Operations Models program is to develop readily usable and broadly available models and supporting data in order to 1) evaluate ecologic and hydrologic effects of existing and alternative water management strategies in the Sacramento, San Joaquin, and Trinity River watersheds; 2) improve scientific understanding of ecosystems in the Sacramento, San Joaquin, and Trinity watersheds; and 3) support the Interior Secretary's efforts in fulfilling the requirements of the CVPIA.

- Administration and Program Support: coordinating program activities, budget and work with Federal and State agencies. Coordinate with FWS co-lead to review agencies modeling needs, activities, modeling tools development for the
- Projects:
  - CalLite Development: a simplified water management screening model. Development in FY14 will work towards integrating Reclamation's San Joaquin River Basin Model with the Sacramento River and the Sacramento-San Joaquin Delta model, further development of the Forecast Allocation module (FAM-CalLite), application of the model in simulation studies in support of COA Agreement re-evaluations, effects of implementing SWRCB mandated actions on the CVP and SWP operations, water management alternative analysis applications, and developing user-friendly automated data processing packages for input/output analysis and display.
  - CalSim II Model Development & Application: a monthly based simulation model of the CVP and SWP in support of water resources planning by DWR and Reclamation as well as other state, federal and local agencies. Developments will include user-friendly automated data processing packages for input/output analysis and display. Uses of CalSim II include:
  - CalSim 3.0 Model Development & Application: a monthly model of CVP and SWP operations at a level of detail suitable for evaluating individual contracts. Improvements undertaken in FY14 will seek to integrate Reclamation's San

Joaquin River Basin Model with the Sacramento River and the Sacramento-San Joaquin Delta leading to the release of a beta version.

- Daily Operations Models Tools: development of modeling on a daily time step. Activities include: developing logic for daily flood control operations, channel routing, reservoir releases, weir operations, water diversions, and Delta operations. Daily models provide better estimates of high reservoir inflows of water supply, geomorphic, and biological interest. The modeling will support operational decisions for the Fremont Weir, Sacramento Weir, and the North Delta intakes.
- Artificial Neural Network (ANN) Model Development & Application: training flow-salinity relationships in key locations of the Delta for planning simulations and alternative analysis.
- HEC-5Q Temperature Model Development & Enhancement: develop modeling protocols, pre, post, and Batch processing tools that can be used to calibrate, extend, verify the San Joaquin River (SJR) HEC5Q model in support of various studies for Central Valley Project.
- C2VSIM Model Development & Application: continued development of the DWR surface water-ground water model for carrying out future planning studies including climate change. Specific tasks to be completed in FY14, include updating the generic surface water-groundwater model engine (IWFM), calibrating the fine-mesh grid version of C2VSIM, and further developments in user-friendly automated data processing packages for input/output analysis and display.
- Multi-D Proccess Based Model for Central Valley "To develop, extend, calibrate, verify a multi-D model to the Central Valley region so that various studies for Central Valley Project (CVP) can be undertaken.
- Research and Assessments: All activities under this authority were considered projects.

San Joaquin River Restoration Program, PL 111-11, Title X

The San Joaquin River Restoration Settlement Act (Title X, Subtitle A, Part I of Public Law 111-11), authorizes and directs implementation of the Settlement in *NRDC, et al., v. Rodgers, et al.* Section 10007 of the Settlement Act finds and declares that the Settlement satisfies and discharges all of the obligations of the Secretary contained in Section 3406(c)(1) of the CVPIA. Section 10006(b)(2) authorizes use of the CVP Restoration Fund in an amount not to exceed $2,000,000 (October 2006 price levels) in any fiscal year. CVPIA funded activities include:

- Administration and Program Support: Funded independently by the SJRRP.
- Projects under Authorities with the CVP Restoration Fund

- Arroyo Canal Fish Screen/Sack Dam: accommodate fish passage and improve operational control under the scheduled Restoration Flow regime.

- Research and Assessments
  - Annual Technical Report: an annual cycle of identifying study needs and monitoring activities and providing for timely release of all quality controlled monitoring data.

Trinity River Basin Fisheries Program 3406 (b)(1) other & (b)(23)

The goal of the Trinity River Restoration Program is to restore and sustain natural production of anadromous fish populations downstream of Lewiston Dam by restoring the processes that produce a healthy alluvial river ecosystem. Administration and Program Support: oversight, planning, coordination, and outreach for the TRRP.

- Administration and Program Support: funded independently by the TRRP.
- Projects
  - Flow Management: Design variable hydrographs and release flows to address needs of anadromous fish and meet geomorphic objectives based on water year type.
  - Channel Rehabilitation for Mainstem Restoration: Planning, design, construction, and environmental compliance for implementation of three large scale channel rehabilitation projects along the mainstem Trinity River. Potential projects include: Lower Junction City, Limekiln Gulch and Bucktail. Final selection of projects is dependent on cultural resources, environmental compliance, landowner access agreements, and other factors.
  - Gravel Augmentation On-site gravel augmentation along the Trinity River to promote geomorphic processes and habitat development. Gravel augmentation takes place during high flow events and at channel rehabilitation sites. Material processing of floodplain terraces occurs to produce appropriate size class of gravels.
  - Watershed Restoration: implementation of watershed restoration projects to reduce fine sediment.
- Research and Assessments
  - Stream Gaging: real-time and final, quality controlled data for the Trinity River and tributaries.
  - Assessing effects of restoration on Chinook Salmon and Coho Salmon rearing and spawning habitat: Evaluate the effects of restoration on Chinook Salmon and Coho Salmon habitat at multiple spatial and temporal scales.

- Monitor adult escapement of hatchery and naturally produced spring and fall Chinook, coho and fall steelhead: Spring and fall Chinook and coho salmon and fall-run steelhead run-size estimation using mark-recapture methods. Includes Trinity River Hatchery Chinook Coded Wire Tagging.
- Juvenile salmonid outmigrant monitoring program: Quantitative assessment of juvenile salmonid production in the Trinity River.
- Mainstem Chinook salmon spawning survey: Monitor spring and fall Chinook salmon spawning in the mainstem Trinity River.
- Monitor harvest of naturally produced fall Chinook: Includes the following fall Chinook harvest monitoring projects: Yurok Tribal Harvest, Hoopa Tribal Harvest, Lower Trinity River Sport Harvest Survey, Lower Klamath River Creel Census.
- Gravel implementation monitoring: Monitoring activities needed to support a comprehensive evaluation of gravel augmentation activities.
- Riparian vegetation monitoring: Map and quantify changes in riparian floodplain vegetation (e.g., species, age-class, initiation success, structural attributes) system-wide.
- Riparian and riverine bird monitoring: Restoration-associated changes in fish abundance and riparian habitat complexity are expected to affect riparian and riverine bird communities on the Trinity River. This project includes a multi-scale, multiple methodology monitoring program designed to track avian response to restoration actions.
- Juvenile salmonid density monitoring: Assess the spatial and temporal distribution and density of juvenile salmonids in the mainstem Trinity River restoration reach, Lewiston Dam to confluence with North Fork Trinity River.
- Sediment transport monitoring: Used to develop total sediment load estimates (for gravel and sand) associated with the annual variable flow releases.
- Expert review: External peer review of investigation plans or reports.
- Water Year Specific Evaluations: To address water year specific objectives or questions as developed by the Flow workgroup (e.g. additional adult fish health monitoring in critically dry years, additional sediment monitoring in extremely wet years).
- Scientific Advisory Board: Five scientists, recognized as experts in the disciplines of fisheries biology, fluvial geomorphology, hydraulic engineering, hydrology, riparian ecology, wildlife biology, or aquatic ecology, form a Scientific Advisory

Board (SAB). They evaluate channel rehabilitation actions, monitoring and assessment methods and peer review TRRP products.

Refuge Water Supply Program 3406(d)

The Refuge Water Supply Program's (RWSP) overarching goal is to ensure that all 19 CVPIA identified wetland habitat areas, hereinafter referred to as "refuges", annually receive water of specified quantity and suitable quality, meeting required flow rate and timing, to support their wetland and aquatic environments. A full Level 4 water supply will provide for optimum habitat management, supporting a broad range of species including targeted threatened and endangered species. The RWSP consists of three major components: water acquisition, water conveyance, and facilities construction.

- Administration and Program Support: oversight, coordination, planning, environmental compliance, contract negotiation and administration, and budget management.
- Refuge Facility Construction Projects: construct the necessary infrastructure with sufficient conveyance capacity to support long-term delivery of firm, reliable water supplies to the refuge boundaries.
    - Gray Lodge Wildlife Area (WA) Water Supply Project: FY14 funding includes project management, design and construction of improvements to the Biggs-West Gridley Water District's conveyance facilities.
    - East Bear Creek Unit Pumping Plant: troubleshooting service with MCC Control System to sustain the functionality of the plant for delivering water to the refuge.
    - Sutter NWR Feasibility Study and Design Specs: Contract to provide a feasibility report on conveyance facilities alternatives for delivering full Level 4 water supplies to the Sutter NWR and provide design specs for a lift pump station off of the Sutter Bypass, also to be incorporated into the overall conveyance plan. Contract to be awarded in 2013, with work to be performed in FY2014.
- Refuge Water Conveyance Projects: wheel or extract long-term, firm and reliable water for the annual delivery of Level 2 (L2) water supplies up to 422,251 acre-feet and Incremental Level 4 (IL4) acquired water supplies up to 133,264 acre-feet to the refuge boundaries.
    - Surface Supplies: conveyance of L2 and IL4 refuge surface water supplies to the boundaries of CVPIA refuges
    - Power Costs for Pumping: power costs for groundwater pumping, pumping plant operation, and lift pumping required to elevate L2 and IL4 surface water supplies
    - L2 Diversification: O&M costs for pumping L2 supplies in lieu of delivering project yield.

- Refuge Water Acquisition Projects: acquire up to 133,264 acre-feet (AF) of IL4 (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.
    - Exchange Contactor Agreement: water acquisition for IL4 refuge water supplies of an estimated 24,438 total af of surface water.
    - Grassland Water District Agreement: acquire up to 10,000 acre feet of IL4 water (groundwater) @ $85af from Grassland Water District.
    - Additional Agreements To Be Determined: acquire up to 13,938 acre feet of IL4 water from yet to-be-determined potential sellers such as Grassland Water District (ARRA wells), Friant Water Useres (San Joaquin River Restoration Program recaptured water), Santa Clara Valley WD, or Kern-Tulare WD.
- Research and Assessments:
    - Gray Lodge WA Water Quality Monitoring: Contract laboratory water sampling analysis costs for Gray Lodge WA water quality monitoring program.
    - Los Banos WA Water Quality Monitoring: Contract laboratory water sampling analysis costs for Los Banos WA water quality monitoring program.
    - Bear Creek Flow Meters: Collect flow data on Bear Creek within the East Bear Creek Unit for analysis and determination of conveyance losses.

Terrestrial Habitat Resource Area, (Habitat Restoration Program) 3406 (b)(1) other

The Habitat Restoration Program funds habitat restoration of CVP-impacted habitats; land acquisition and habitat restoration to protect CVP-impacted species and their habitats; research actions that correlate and support land acquisition and/or habitat restoration projects; and captive propagation and reintroduction projects to assist with recovery of federally listed species and their populations. These actions will occur through a grant award process.

- Administration and Program Support: soliciting and selecting proposals; integration with Reclamation's CVP Conservation Program; conducting site reviews; and oversight.
- Projects:
    - Land Acquisition: fee title or conservation easement acquisition of property for protection of federally listed and other special status CVP-impacted species where threats to their habitats and populations are significant, and for future habitat restoration, if needed. This project action has the highest priority over the other three actions.

    - Habitat Restoration: restoration of terrestrial habitats to markedly improve conditions for federally listed and other special status CVP-impacted species.
    - Captive Propagation Projects: propagation of federally threatened and endangered species in captivity, and subsequent reintroductions of individuals to their native habitats to assist with recovery of species populations.
- Research and Assessments: correlated to and supports land acquisition and/or habitat restoration projects to benefit federally listed and other special status CVP-impacted species and facilitate species recovery. Research may include studies or surveys.

Actions undertaken are determined based on needs identified in species recovery plans, and are selected based on priorities established in consultation with the FWS following a competitive proposal solicitation process.

Land Retirement Program, 3408 (h)

The goals of the Land Retirement Program are to retire drainage impacted lands, reduce agricultural drainage, and restore habitat.

- Administrative and Program Support: oversight and contracting.
- Projects
    - Acquire and Restore Land: inter-agency agreement with BLM to acquire land from willing sellers.
- Research and Assessments: none.