Work Plan for Fiscal Year 2005

I. Program Title: CVPIA § 3406 (b)(12), Clear Creek Restoration

II. Responsible Entities:

	Agency	Staff Name	Role
Lead	USBR	Jim De Staso	Program Manager
Co-Lead	USFWS	Matt Brown	Program Manager

III. Program Objectives for FY 2005:

A Restore stream channel form and function necessary to optimize habitat for salmon and steelhead and the aquatic and terrestrial communities on which they depend.

B Determine long-term flow needs for spawning, incubation and rearing by conducting and IFIM study as mandated in Section (b)(12).

C Provide flows of adequate quality and quantity to meet the requirements of all life stages of Chinook salmon and steelhead trout known to use Clear Creek.

D Provide spawning gravel to replace supply blocked by Whiskeytown Dam.

E Monitor project results.

Source documents supporting each of the above objectives include: 1) CVPIA Section 3406 (b)(12); 2) Record of Decision, Central Valley Project Improvement Act; 3) CALFED Bay-Delta Programmatic Record of Decision, proposed Ecosystem Restoration Program stage 1 actions; 4) CALFED Ecosystem Restoration Program Strategic Plan For Ecosystem Restoration, action 3, page D-23; 5) Biological Opinion, Effects of the Central Valley Project and State Water Project Operations from October 1998 through March 2000 on Steelhead and Spring-run Chinook Salmon; and 6) Draft Biological Opinion, for Interim Operations of the CVP and SWP between April 1, 2002 and March 31, 2004.

IV. Status of the Program:

The Clear Creek Coordinated Resource Management Planning group (CRMP) and the Clear Creek Technical Team work directly with local entities to achieve program objectives. The CRMP and the Technical Team are comprised of local landowners, agency representatives and stakeholders. The groups have been meeting since 1995 to plan, implement, and monitor restoration projects using a multi-disciplinary restoration approach. The Clear Creek Technical Team (Technical Team) is made up of expertise from the Fish and Wildlife Service, Reclamation, Bureau of Land Management, Western Area Power Administration, Natural Resource Conservation Service, National Park Service, National Oceanic and Atmospheric Administration, AmeriCorps, Department of Fish and Game, Department of Water Resources, Regional Water Quality Control Board, Shasta County Department of Education, City of Redding, Central Valley Project Water Users, Sacramento Municipal Utilities District, the Western Shasta Resource Conservation District, Point Reyes Bird Observatory, Horsetown Clear Creek Preserve, The Nature Conservancy, and Shasta College. The Technical Team discusses and reviews proposed

restoration actions and monitoring data to assist program managers in program management. The Clear Creek Restoration Team uses an adaptive management approach to improve learning through active experimentation. Many of the projects are implemented by the Western Shasta Resource Conservation District with technical assistance from more than a dozen Federal, State and local agencies.

Clear Creek Restoration Program actions are specifically mandated by the CVPIA. Similar actions on Clear Creek are called for by the CVPIA Anadromous Fisheries Restoration Program Plan, the CALFED Strategic Plan for Ecosystem Restoration, and the Record of Decision for the CALFED Bay-Delta Program all call for similar actions on Clear Creek, some of which have already been implemented: removing Saeltzer dam, filling instream and floodplain mining pits, and refining and implementing a watershed management plan to reduce the transport of fine sediment to the creek. Continuing actions from the three plans include: A) implementing large-scale restoration projects; B) evaluating the need to augment flows through IFIM; C) providing channel maintenance high flows with the CBDA Environmental Water Program; C) increasing minimum stream flow; and D) augmenting the supply of spawning-sized gravel.

Objective A: Four stream channel improvement projects were completed, in 1998 (Phase 1), 1999 (Phase 2A), 2001 (Phase 2B) and 2002 (Phase 3A). The projects have functioned as designed in restoring a functional floodplain, but the majority of the potential increase in salmonid spawning habitat will occur in future phases when the stream channel is restored. Funding is being sought for Phases 3B and 3C. Funding for future phases has not been forthcoming from CALFED since the 1998 PSP due to concerns over the large scale and costs of the project, the desire for more explicit and active adaptive management and the potential for negative impacts from mercury. In response to these concerns, the Technical Team has designed smaller, less expensive projects (Phase 3A was funded by cost savings achieved in the two previous phases), participated in the Adaptive Management Forum, and waited for mercury studies.

Teams of interdisciplinary mercury experts from USGS, BLM and the University of Montana continue to evaluate the potential risk of using tailings in future restoration projects. This research is key to restoration efforts, as gold mining tailings used for restoration projects may liberate mercury which could have negative impacts on the environment and human uses. Recent reports available from USGS and University of Montana have shown that elevated mercury levels in the watershed are not associated with restoration activities and that restoration activities have not been shown to have negative impacts.

Objective B: The CVPIA mandated the development and use of an Instream Flow Incremental Methodology (IFIM) study to determine flows from Whiskeytown Dam to allow sufficient spawning, incubation, rearing, and outmigration for salmon and steelhead. The IFIM study began in FY 2004, and was estimated in FY 2001 to cost a total of $1.2 million. The FWS Sacramento Fish and Wildlife Office IFIM program will perform the majority of the IFIM in FY 2006 through FY 2008.

The current instream flow prescriptions for the creek, based on 1983 conditions, needs updating to include temperature concerns, analysis of barriers to fish passage, recent developments in minimum flow setting methodology and changes in the stream channel that have been ongoing since Whiskeytown Dam was closed in 1963. IFIM methods now include more appropriate 2-dimensional hydraulic models and additional habitat suitability criteria, the two main elements used to calculate the amount of habitat created by different flows. Advancements in juvenile habitat suitability criteria related to adjacent flow velocities and the use of cover, will produce different flow recommendations for juveniles than the old study. In addition, the new IFIM will develop Clear Creek-specific habitat suitability criteria specifically for spring Chinook and steelhead. Generalized fall Chinook criteria were used for spring Chinook in the old IFIM. We now know that spring and fall Chinook have different life histories and habitat requirements. The new criteria will improve not only Clear Creek flow management but also efforts for the recovery of threatened spring Chinook and steelhead on other Central Valley regulated streams.

Since the original IFIM was developed, McCormick-Saeltzer Dam was removed opening up 12 miles of the 18 miles of lower Clear Creek and allowing re-establishment of two threatened species, spring Chinook and steelhead. The original IFIM did not adequately characterize the reach upstream of McCormick-Saeltzer Dam. Very little data was collected upstream of the dam. The upstream reach has very different channel form and gradient than the lower reach. The differences in channel form and gradient are the major determinants of flow / habitat relationship. In addition, removal of Saeltzer Dam has released large amounts of sediment that were stored upstream of the dam resulting in ongoing changes in stream habitat which have yet to be evaluated.

The Clear Creek stream channel has been changing gradually since Whiskeytown Dam was closed in 1963. The channel has been resized to the reduced flows, and riparian vegetation has fossilized parts of the stream channel resulting in a degraded channel cross-section. Some reaches of the creek have incised and degraded due to the reduction in sediment supply caused by Whiskeytown. These changes have probably resulted in changes in the optimal stream flow.

Objective C: Clear Creek has experienced a five-fold increase in fall Chinook spawning escapement over the 1967 to 1991 baseline period. Record levels of escapement were estimated by carcass surveys in the last two years. The increase in average fall Chinook is largely attributable to higher minimum flows between October and June. The benefits of higher minimum flows between July and September for threatened spring Chinook and steelhead were demonstrated in rotary screw trap catches and in snorkel counts of adult spawners and their redds. While populations of these threatened species are small, they appear to be on an upward trend.

Objective D: Spawning gravel supplementation is a long term need created by the construction of Whiskeytown Dam, which blocks all gravel from moving downstream into the areas of Clear Creek where salmonids spawn. Each year since 1996, spawning gravel has been augmented at two or more locations. Spawning gravel introductions have created high density spawning areas in areas once bereft of spawning gravel.

Objective E: Ongoing monitoring studies involve salmonid use of restored habitat, fish stranding and passage, juvenile salmonid out-migration, adult population estimates, redd mapping, neotropical migratory bird populations, riparian vegetation, wetlands, groundwater, stream flows, water temperatures, bedload movement, channel geomorphology, and spawning gravel quality. In addition to results listed in the accomplishments below, monitoring also indicated: a) riparian re-vegetation continues to show excellent growth and success; b) after a slow start, Chinook spawning in Phase 3A was high; c) fewer fish stranded during high flows on newly constructed floodplains than on natural floodplains; d) few fish were stranded by water project operations; e) juvenile salmonids and redds were subjected to severe scouring by high winter flows; f) stream flows in summer 2002 provided water temperatures favorable for steelhead summer rearing and spring Chinook spawning; g) stream flows provided in 1999 resulted in strong returns of adult spring Chinook in 2002; h) increased flows can not be used to separate fall and spring Chinook; i) kayak-based redd surveys are preferred for estimates of steelhead populations trends; j) significant stream channel changes due to the removal of Saeltzer Dam continue to occur both up and downstream of the dam site; and k) the barrier weir was successful in preventing fall Chinook from entering spring Chinook spawning areas.

IV. FY 2004 Accomplishments:

1. Monitoring showed a 363 percent increase in spawning density in the newly completed Phase 3A.
2. Monitoring indicated that Phase 3A successfully restored natural geomorphic form and process.
3. Monitoring indicated that migratory songbird diversity and population sizes were increasing in the restoration area.
4. Revegetated floodplain reconstructed in Phase 3A.
5. Participated in the CBDA spawning gravel restoration workshop.
6. USGS and University of Montana mercury studies indicated that the stream channel restoration projects have not had adverse impacts.
7. Initiated mercury report to synthesize results of previous studies and regulations relevant to Clear Creek.
8. Two dimensional modeling showed that construction of Phases 3B and 3C will result in a four to five-fold increase in spawning habitat.
9. Completed IFIM data collection for spawning habitat in upper half of anadromous reach.
10. Provided flows suitable for all life stages of anadromous salmonids.
11. Candidate fall Chinook escapement was the third highest on record.
12. Threatened spring Chinook continues to repopulate upstream reaches.
13. Threatened steelhead spawning continues to increase following the removal of Saeltzer Dam. Spawning is concentrated in injected spawning gravel.
14. Continued work on the CCDAM model, begun with CALFED funding.
15. Maintained barrier weir to prevent fall Chinook from hybridizing with spring Chinook.
16. Added 4,768 tons of spawning gravel to the Whiskeytown Dam site, and developed a new site at the National Environmental Education (NEED) Camp

V. Tasks, Costs, Schedules and Deliverables:

A Narrative Explanation of Tasks.

1. Program Management

2 Implement Clear Creek stream channel restoration project (objective A)
- 2.1 Design Phase 3B
- 2.2 Implement Phase 3B
- 2.3 Implement riparian encroachment inventory

3 Provide baseline flows for all life stages of anadromous fish, and pursue spring pulse flows (objective B)
- 3.1 Recommend flows between June and September to maintain water temperatures that meet standards established by the NOAA Fisheries for the protection of endangered spring-run Chinook and steelhead
- 3.2 Recommend flows between October and May to provide spawning and rearing habitat for Chinook and steelhead
- 3.3 Determine through IFIM study, long-term flows needed to satisfy requirements of (b)(12)
- 3.4 Consider implementing a pulse flow of approximately 400 cfs in the spring to attract spring Chinook

4. Implement spawning gravel augmentation and monitoring program (objective C).
- 4.1 Implement gravel injections at Whiskeytown Dam, NEED Camp and Dog Gulch
- 4.2 Implement gravel injections at Peltier Valley Road and Reading Bar
- 4.3 Improve sediment-transport sub-model of Clear Creek Decision Analysis Model (CCDAM) to explore design options and cost implications associated with Clear Creek's gravel management plan

5. Monitoring (objective D)
- 5.1 Monitor anadromous fishery including juvenile salmonid use of restored habitats, fish stranding, adult population estimates, and redd mapping. Monitor stream flows, water temperatures, spawning gravel, and stream channel form.

B. Schedule and Deliverables.

#	Task	Dates		Deliverable
		Start	Complete	
1	Program Management	10/01/04	09/30/05	
2.1	Design Phase 3B	10/01/04	09/30/05	Designs
3.3	Determine through IFIM study, long-term flows needed to satisfy requirements of (b)(12)	10/01/04	09/30/05	Summary report and recommendations
4.1	Implement gravel injections at Whiskeytown Dam, NEED Camp and Dog Gulch	10/01/04	09/30/05	Completion report
4.3	Improve Clear Creek Decision Analysis Model for gravel management planning	10/01/04	09/30/05	Completion report
5.1	Monitor anadromous fishery including juvenile salmonid use of restored habitats, fish stranding, adult population estimates, and redd mapping. Monitor stream flows, water temperatures, spawning gravel, and stream channel form.	10/01/04	09/30/05	Annual Report and recommendations for the future.

C. Summary of Program Costs and Funding Sources.

#	Task	Total Cost	Funding Sources	
			W&RR	RF
1	Program Management	$100,000		$100,000
2.1	Design Phase 3B	$95,000		$95,000
3.3	Determine through IFIM study, long-term flows needed to satisfy requirements of (b)(12)	$228,000		$228,000
4.1	Implement gravel injections at Whiskeytown Dam, NEED Camp and Dog Gulch	$140,000		$140,000
4.3	Improve Clear Creek Decision Analysis Model	$57,000		$57,000
5.1	Monitor anadromous fishery including juvenile salmonid use of restored habitats, fish stranding, adult population estimates, and redd mapping. Monitor stream flows, water temperatures, spawning gravel, and stream channel form.	$339,000		$339,000
Total Program Budget		**$959,000**	**0**	**$959,000**

Additional Program Needs.

#	Task	Total Cost	Additional Funding Need
			CVPIA
2.4	Implement Phase 3B*	$3,500,000	$3,500,000
4.2	Implement gravel injections at Peltier Valley Road and Reading Bar**	$150,000	$150,000
Total Additional Funding Needs			**$3,650,000**

*2.4 Continuing channel degradation threatens investments in previous Phases. The only solution is to implement Phase 3B.

**4.2 Limited funds for the Clear Creek Fish Restoration Program in 2005 will require reduced funding for spawning gravel. Clear Creek Gravel Management Plan recommends more gravel than current budget allows. The spawning gravel task has been underfunded for 5 years.

D. CVPIA Program Budget.

#	Task	FTE	Direct Salary and Benefits Costs	Contracts Costs	Miscellaneous Costs	Administrative Costs	Total Costs
1	Program Management						
	USBOR	0.5	$32,500			$17,500	$50,000
	USFWS	0.5	$35,000			$15,000	$50,000
2.1	Design Phase 3B			$95,000			$95,000
3.3	Determine through IFIM study, long-term flows needed to satisfy requirements of (b)(12)			$228,000			$228,000
4.1	Implement gravel injections at Phase 3A and NEED Camp			$140,000			$140,000
4.3	Improve Clear Creek Decision Analysis Model			$57,000			$57,000
5.1	Monitor anadromous fishery including juvenile salmonid use of restored habitats, fish stranding, adult population estimates, and redd mapping. Monitor stream flows, water temperatures, spawning gravel and stream channel form.			$339,000			$339,000
	Total Program Budget						**$959,000**