

**October 31, 2005**  
**Work Plan for Fiscal Year 2006**

**I. Clear Creek Restoration Program CVPIA § 3406 (b)(12)**

**II. Responsible Entities**

	<b>Agency</b>	<b>Staff Name</b>	<b>Role</b>
Lead	Reclamation	Jim De Staso	Program Manager
Co-Lead	USFWS	Matt Brown	Program Manager

**III. Program Objectives for FY 2006**

- 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 an 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) Biological Opinion on the Long-Term Central Valley Project and State Water Project Operations Criteria and Plan, October 2004.

**IV. Status of the Program**

The Clear Creek Coordinated Resource Management Planning group (CRMP) and the Clear Creek Technical Team (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 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 Marine Fisheries Service (NMFS), 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, and the Horsetown Clear Creek Preserve. The Technical Team discusses and reviews proposed restoration actions and monitoring data to assist program managers in program management. The Technical 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. In addition, 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 such as 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, and increasing minimum stream flow; and d) augmenting the supply of spawning-sized gravel.

Objective A: The Stream Channel Restoration is a construction project designed to restore a functional floodplain and increase salmonid spawning and juvenile rearing habitat in a 2 mile section of creek. This section of creek was significantly degraded by gold and aggregate mining that resulted in essentially no spawning or rearing habitat. Four stream channel improvement projects were completed, in 1998 (Phase 1), 1999 (Phase 2A), 2001 (Phase 2B) and 2002 (Phase 3A). Construction of the four previously mentioned Phases has resulted in the project being approximately 50 percent completed.

CALFED funding is currently being sought for construction of Phase 3B and the Technical Team is currently discussing the need to construct Phase 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 coordinated with experts conducting 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 completion in 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, 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 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 the 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 Dam. 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. The increase in fall Chinook escapement 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. A minimum viable population goal of 1,000 adult spring Chinook and steelhead has been established for the creek. In 2004, spring Chinook and steelhead population indices were 97 and 300, respectively. Limiting factors that currently exist on the creek preventing spring Chinook and steelhead population goals include the uncompleted Channel Restoration Project, the lack of adequate spawning habitat, and suitable flows.

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. By the year 2020 the objective is to provide 347,288 square feet of usable spawning habitat between Whiskeytown Dam downstream to the former Saeltzer Dam. 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. The program is currently about 21 percent completed to date.

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) a barrier weir was successful in preventing fall Chinook from entering spring Chinook spawning areas. Monitoring is approximately 38 percent completed to date.

#### **IV. FY 2005 Accomplishments**

1. Monitoring showed a 363 percent increase in spawning density in the newly completed Phase 3A.
2. Monitoring indicated that migratory songbird diversity and population sizes were increasing in the restoration area.
3. Participated in the CBDA spawning gravel restoration workshop.
4. Ongoing mercury report to synthesize results of previous studies and regulations relevant to Clear Creek.
5. Two dimensional modeling showed that construction of Phases 3B and 3C will result in a four to five-fold increase in spawning habitat.
6. Completed IFIM data collection for spawning habitat in upper half of anadromous reach.
7. Provided flows suitable for all life stages of anadromous salmonids.
8. Candidate fall Chinook escapement was the third highest on record.
9. Threatened spring Chinook continues to repopulate upstream reaches.
10. Threatened steelhead spawning continues to increase following the removal of Saeltzer Dam. Spawning is concentrated in injected spawning gravel.
11. Continued work on the CCDAM model to address the need to develop a long-term spawning gravel injection strategy to address the lack of suitable spawning habitat quantity and quality.
12. Maintained barrier weir to prevent fall Chinook from hybridizing with spring Chinook.
13. Added 2,000 tons of gravel to the Whiskeytown Dam site, added 1,000 tons to the National Environmental Education (NEED) Camp site, and continued to develop the Dog Gulch injection site.

#### **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 Environmental compliance for Phase 3B construction
  - 2.2 Survey and monitor Phase 3B
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 NMFS for the protection of endangered spring 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)
4. Implement spawning gravel augmentation and monitoring program (objective C).
  - 4.1 Implement gravel injections at Whiskeytown Dam, NEED Camp and Dog Gulch
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.

**A. Schedule and Deliverables**

#	Task	Dates		Deliverable
		Start	Complete	
1	Program Management	10/01/05	09/30/06	
2.1	Environmental compliance for Phase 3B construction	10/01/05	09/30/06	Environmental assessment, biological assessment
2.2	Survey and monitor Phase 3B	10/01/05	09/30/06	
3.3	Determine through IFIM study, long-term flows needed to satisfy requirements of (b)(12)	10/01/05	09/30/06	Summary report and recommendations
4.1	Implement gravel injections at Whiskeytown Dam, NEED Camp and Dog Gulch	10/01/05	09/30/06	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.	10/01/05	09/30/06	Annual Report and recommendations for the future.

**B. Summary of Program Costs and Funding Sources**

#	Task (responsible agency in parentheses)	Total Cost	Funding Sources	
			W&RR	RF
1	Program Management (Reclamation, USFWS)	\$100,000		\$100,000
2.1	Environmental compliance for Phase 3B construction (Reclamation)	\$10,000		\$10,000
2.2	Survey and monitor Phase 3B (Reclamation)	\$15,000		\$15,000
3.3	Determine through IFIM study, long-term flows needed to satisfy requirements of (b)(12) (USFWS) <sup>a</sup>	\$408,101		\$408,101
4.1	Implement gravel injections at Whiskeytown Dam, NEED Camp and Dog Gulch (Reclamation)	\$125,000	\$125,000	
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. (USFWS)	\$175,000		\$175,000
<b>Total Program Budget</b>		<b>\$833,101</b>	<b>\$125,000</b>	<b>\$708,101</b>

IFIM funded by AFRP



C. CVPIA Program Budget

#	Task	FTE	Direct Salary and Benefits Costs	Contracts Costs	Miscellaneous Costs	Administrative Costs	Total Costs
1	Program Management						
	Reclamation	0.5	\$32,500			\$17,500	\$50,000
	USFWS	0.5	\$36,411			\$13,689	\$50,000
2.1	Environmental compliance for Phase 3B construction			\$10,000			\$10,000
2.2	Survey and monitor Phase 3B			\$15,000			\$15,000
3.3	Determine through IFIM study, long-term flows needed to satisfy requirements of (b)(12)		\$334,509			\$73,592	\$408,101
4.1	Implement gravel injections at Whiskeytown Dam, NEED Camp and Dog Gulch			\$125,000			\$125,000
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.			\$175,000			\$175,000
	<b>Total Program Budget</b>						<b>\$833,101</b>

**D. DRAFT CVPIA 5-Year Budget Plan FY 2007 - 2011 (\$ Thousands)**

**Program management** costs estimated at \$100 per year

**Stream Channel Restoration**

Program Description and Section		FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	Total (\$)
	W&RR						
	RF	\$125					
	State						
	Other-CALFED ERP	\$4,775					
<b>Total:</b>		<b>\$4,900</b>					<b>\$4,900</b>

**Spawning Gravel Supplementation**

Program Description and Section		FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	Total (\$)
	W&RR	\$720	\$500	\$500	\$500	\$500	\$2,720
	RF						
	State						
	Other						
<b>Total:</b>		<b>\$720</b>	<b>\$500</b>	<b>\$500</b>	<b>\$500</b>	<b>\$500</b>	<b>\$2,720</b>

**Adaptive Management and Monitoring**

Program Description and Section		FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	Total (\$)
	W&RR						
	RF	\$300	\$300	\$300	\$300	\$300	\$1,500
	State						
	Other CALFED ERP	To Be Determined	TBD	TBD			
<b>Total:</b>		<b>\$300</b>	<b>\$300</b>	<b>\$300</b>	<b>\$300</b>	<b>\$300</b>	<b>\$1,500</b>