

Draft CVPIA Fiscal Year 2011 Annual Work Plan

January 31, 2011

Program Title

Clear Creek Restoration - CVPIA Section 3406(b)(12).

Responsible Entities

Staff Name	Agency	Role
Jim De Staso	Reclamation	Lead
Matt Brown	FWS	Co-Lead

Program Goals and Objectives for FY 2011

Goal A - Provide flows to allow sufficient spawning, incubation, rearing, and outmigration for salmon and steelhead.

Objectives: 1) provide available habitat that is at least 90 percent of the maximum possible weighted usable area, 2) do not exceed Igo gauge water temperature criteria including 60°F from June 1 through September 15, and 56°F from September 15 through October 31, and 3) provide passage allowing at least 70 percent of adult anadromous fish to pass upstream of the former McCormick-Saeltzer Dam location.

Task 1.4.1 – Assist Environmental Water Program (EWP) with Channel Maintenance Flows required by NMFS OCAP BO RPA Action I.1.2.

Task 1.13.1- Conduct instream flow study to determine long-term needs.

Task 1.14.1 - Provide funding for wheeling water through the Bella Vista Water District.

Goal B – Restore the stream channel and associated instream habitat.

Objectives: 1) restore 2 mile section of Clear Creek degraded by aggregate and gold mining, 2) annually inject 25,000 tons of spawning gravel to recharge system, and 3) reduce fine sediments through erosion control and mechanical removal.

Task 1.4.2 - Add 15,000 tons of spawning gravel at 5 sites to provide 60 percent of program goal (25,000 tons annually).

Task 1.4.3 - Inventory erosion control needs due to 2008 fire and subsequent logging, and reduce fine sediment impacts to salmonids.

Goal C – Determine impacts of restoration actions on anadromous fishery and geomorphology.

Objective: Conduct fishery and geomorphic monitoring at levels necessary to ascertain project effects on fishery and geomorphic resources.

Task 1.12.1 - Conduct adult and juvenile salmonid monitoring using snorkeling, rotary screw trapping, and other techniques.

Task 1.12.2 - Conduct geomorphic monitoring to monitor effectiveness of program,

Supporting documents

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; and 5) Biological Opinion on the Long-Term Central Valley Project and State Water Project Operations Criteria and Plan, June 2009.

Status of the Program

Most actions in this Annual Work Plan are required by the Reasonable and Prudent Alternative of the Central Valley Project Operation Criteria and Plan Final Biological Opinion from the National Marine Fisheries Service (NMFS OCAP BO).

Flows

Interim flow increases began in 1995 and have occurred every year since. Pre-CVPIA baseline flows were 50 cfs between January and October and 100 cfs in November and December. Under (b)(2), interim flows were increased to 200 cfs from mid September through mid June and approximately 70 to 90 cfs during the summer for temperature control. This interim flow prescription was recommended by the AFRP Working Paper which derived its recommendations from an Instream Flow Incremental Methodology (IFIM) study conducted in the mid 1980's. The FWS began a new IFIM study in 2004 to reassess flow requirements taking into account changes in instream habitat resulting from CVPIA restoration efforts.

In 2011, 3 IFIM reports will be finalized after peer review. Work will continue on bio-validation of the models. The 32 IFIM flow-habitat models will be synthesized with population, temperature, and restoration information to provide flow prescriptions that optimize habitat needs for all species, runs and life stages of salmonids in the different reaches of the creek, throughout the year. Alternative flow prescriptions would then be compared and a new long-term flow schedule will be proposed to NMFS under terms of the OCAP BO. The IFIM study should be complete in 2011.

Studies have been undertaken by CVPIA and CALFED since 1999 to develop channel maintenance flows, which may be vital for maintaining ecosystem processes that provide salmonid habitat in Clear Creek. These efforts have resulted in a CALFED EWP and FWS proposal to Reclamation to re-operate of Whiskeytown Dam, between March 1 and May 15, such that a glory hole spill produces a minimum target release of 3,250

cfs for one day occurring seven times in a ten year period. Flows of this magnitude and duration could reactivate 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. In 2008, CALFED contracted with FWS to provide program management for a pilot re-operation including subcontracts with Reclamations Denver Technical Service Center, ESSA Ltd, Graham Matthew and Associates, and Stillwater Sciences. This four year contract would to develop forecast and decision making tools, finalize implementation and monitoring plans, provide geomorphic and fisheries evaluations and pay for foregone power generation.

McCormick-Saeltzer Dam Passage

McCormick-Saeltzer Dam was removed in the fall of 2000. Passage of spring-run Chinook has increased from 0 to 70 percent allowing for establishment of a new population of this threatened species. Stream surveys and juvenile monitoring results also suggest that dam removal is allowing re-establishment of spring-run Chinook as well as a new population of threatened Central Valley steelhead.

Stream Channel Restoration

The Stream Channel Restoration project is a construction project designed to eliminate gravel extraction pits, restore a functional floodplain, and increase salmonid spawning and juvenile rearing habitat in a 2 mile section of creek significantly degraded by gold and aggregate mining. Four Phases of the project are complete including: Phase 1 in 1998, Phase 2A in 1999, Phase 2B in 2001, Phase 3A in 2002, Redding Bar in 2003 and Phase 3B in 2008. Phase 3C, the last phase of the project, is currently being considered for design and permitting in future years.

Spawning Gravel Supplementation

Spawning gravel supplementation is a long-term need created by the construction of Whiskeytown Dam, which blocks gravel from moving downstream into the areas of Clear Creek where salmonids spawn. By the year 2020 the overall goal is to provide 347,288 square feet of usable spawning habitat between Whiskeytown Dam downstream to the former McCormick-Saeltzer Dam, the amount that existed before construction of Whiskeytown Dam. Between 1996 and 2009, a total of approximately 130,925 tons of spawning gravel was added to the creek. The programs' interim annual spawning gravel addition target is 25,000 tons per year, but only an average of 9,358 tons has been placed annually since 1996 due to lack of funding.

Erosion Control

In 2008, catastrophic wildfire burned significant portions of the Clear Creek watershed resulting in fire line building and savage clear cutting. In 2009 and 2010, large amounts of fine sediment entered Clear Creek and covered a large CVPIA investment in spawning gravel. Efforts to remove this sediment and inventory its sources will be needed to avoid further degradation of habitat.

Adaptive Management/Monitoring

Monitoring results are reported directly to the Clear Creek Technical Team during

regularly scheduled meetings, and in annual reports. This information is used in budget and project planning and the design of restoration projects. The majority of Clear Creek monitoring in the past 5 years was performed using state CALFED funds, which will not be available in FY2011. CVPIA will have to pick up some of this monitoring and other monitoring will cease in 2011.

FY 2010 Accomplishments

Flows

Base flows of 200 cfs between October 1 and May 31 were achieved. Flows to achieve temperature control of 60°F from June 1 through September 15 2009 and 56°F from September 15 through October 31 2009 met the target 78% of the time. All of the exceedances occurred during the 56°F spawning and incubation period when the target was met only 28% of the time. Temperatures were higher in part because of a three year drought and because toxic mine waste removal from the Spring Creek arm of Keswick Reservoir resulted in higher water temperatures. Two pulse flows were provided during the spring 2010 to attract spring Chinook into Clear Creek. Similar flows will occur each year as directed by the NMFS OCAP BO.

The IFIM study, being conducted by the FWS, completed a draft report on fall-run Chinook salmon spawning study sites in the lower reach of Clear Creek and a draft report on fall-run Chinook salmon juvenile rearing study sites in the lower reach of Clear Creek.

In 2008, FWS and the CALFED EWP entered into a contract to provide a pilot re-operation of Whiskeytown reservoir to achieve the channel maintenance flow prescription outlined in Status of the Program section. Funds for the contract came from the state and were frozen in December 2008 due to the State of California budget crisis. The contract has not moved forward since the bond freeze. In FY 2010 the State of California gave permission to proceed with the project but the FWS is now opposed to funding FWS salaries with state funds. CVPIA funding would be used to fund FWS participation in the project in FY2011.

Stream Channel Restoration

Phase 3B floodplain revegetation was completed leaving only 25% of the 2.0 mile restoration reach to restore. Understory re-vegetation was planted in Phase 3A, now that the initial overstory plants were tall enough to provide shade.

Spawning Gravel Supplementation

Long-term environmental permits for spawning gravel addition projects continue to be prepared with completion anticipated in 2010.

The first annual evaluation of spawning gravel implementation and monitoring was submitted to NMFS as a requirement under the OCAP BO. One thousand tons of gravel was placed at three sites: Below NEED Camp, Phase 3A upper and phase 3A lower. The 3,000 tons is 12% of the CPAR annual goal. An additional 5,500 tons was placed

by the Western Shasta Resource Conservation District at 5 sites using Bureau of Land Management ARRA funding.

Permits and designs continue to be prepared for the Long-term Spawning Gravel Supply Project. Concept and final funding proposals were submitted to CALFED for the DFG portion of the project (Phase2). The larger portion of the project (Phase 1) which will occur on BLM lands requires \$2.5 million.

Adaptive Management / Monitoring

Fisheries and geomorphologic monitoring documented a large amount of deleterious fine sediment entering Clear Creek from a sub-watershed that had undergone substantial wildfire in 2008. Subsequent salvage logging contributed greatly to a significant 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 three actions may be funded in 2011. Continued monitoring will evaluate the effectiveness of these solutions.

Spawning studies continued to indicate that stream channel restoration phases 3A and 3B greatly increased the amount of spawning in the restoration area. Juvenile salmon rearing studies suggest that while Phase 3A continues to perform well, Phase 3B is not performing as well as controls. The 2010 study suggested several potential improvements or fixes for Phase 3B and future projects.

A series of unusual storms in October eventually overtopped and compromised the segregation weir used to protect spring Chinook from hybridization and competition with fall Chinook. Careful maintenance of the weir revealed the operational limits of the weir which will be helpful in designing a counting weir in the future. The experience also points to the importance of active maintenance and monitoring of the weir to protect spring Chinook.

Monitoring continues to document the overall success of the project. In 2009, fall-run Chinook escapement was 3,228 compared to the average baseline escapement of 1,689 between 1967 and 1991. Fall Chinook escapement was 45% of the average post-CVPIA (1992 to 2008) escapement. In the past few years, the Central Valley fall Chinook fishery has collapsed, in 2009 producing less than 20 percent of the 1992 to 2008 average. No other Central Valley watershed has survived the collapse as well as Clear Creek. Juvenile fall Chinook production in 2008 was 30% higher than the average of the 10 previous years since monitoring began.

The adult spring-run Chinook population index continues to increase. All cohorts of adult spring Chinook have increased since restoration began in 1999. The 2009 index of 120 adults was 55% greater than the ten-year average. Adult steelhead populations also continue to increase, as indicated from redd counts, increasing from 38 in 2001 to 230 in 2010. Steelhead counts were 62% greater than the nine-year average.

Table 1. FY 2011 Activities and Costs

AWP Activity Number	Type of Activity	# of FTEs	Activity Name & Description	NMFS OCAP RPA#	Performance Metric	Performance Target	Complete this FY? Y/N	Total Project Cost	FY2011 Anticipated Funding				
									Restoration Fund	Water and Related Resources	State or Other Sources*	Total All Sources	
1.1	Program Management												
1.1.1		0.45	Reclamation-overall program management, budget, prepare and oversee contracts					\$80,000	\$0	\$80,000	\$0	\$80,000	
1.1.2		0.45	FWS-overall program management, budget, conducts monitoring					\$80,000	\$80,000	\$0	\$0	\$80,000	
1.1.3		0.022	R8 Program Administration contribution					\$4,823	\$4,823	\$0	\$0	\$4,823	
								Subtotal Funding	\$164,823	\$84,823	\$80,000	\$0	\$164,823
								<i>Reclamation</i>	\$80,000	\$0	\$80,000	\$0	\$80,000
								<i>Service</i>	\$84,823	\$84,823	\$0	\$0	\$84,823
								<i>Other</i>	\$0	\$0	\$0	\$0	\$0
1.4	Restoration Actions												
1.4.1		0.23	Assist Environmental Water Program with channel maintenance flows. Planning, implementation and monitoring of channel maintenance releases from Whiskeytown Dam. AFRP Final Restoration Plan Clear Creek action #8. Fall-run (FCS), late-fall-run (LFC), spring-run Chinook (SCS) and steelhead (STT) benefit. High priority to create and maintain habitat for anadromous fish. Non-structural action improving 18.1 miles of stream habitat. \$810,000 of Other Funding is a FWS contract from CALFED.	Action I.1.2	Number of 3,250 cfs mean daily spill from Whiskeytown for one day, in a ten year period.	7	N	\$860,000	\$50,000	\$0	\$810,000 ^a	\$860,000	
1.4.2			Spawning gravel injections contracted by Reclamation. AFRP Final Restoration Plan Clear Creek action #5. Fall-run (FCS), late-fall-run (LFC), spring-run Chinook (SCS) and steelhead (STT) benefit. High priority to create and maintain habitat for anadromous fish. Non-structural action improving 18.1 miles of stream habitat. Fifteen thousand tons injected at five sites representing 60 percent of CPAR/PART goal.	Action I.1.3	Tons	25,000 tons	N	\$331,000	\$160,000	\$171,000	\$0	\$331,000	

AWP Activity Number	Type of Activity	# of FTEs	Activity Name & Description	NMFS OCAP RPA#	Performance Metric	Performance Target	Complete this FY? Y/N	Total Project Cost	FY2011 Anticipated Funding				
									Restoration Fund	Water and Related Resources	State or Other Sources*	Total All Sources	
1.4	Restoration Actions continued												
1.4.3			Erosion inventory and control contracted by Reclamation. AFRP Final Restoration Plan Clear Creek action #4. Fall-run (FCS), late-fall-run (LFC), spring-run Chinook (SCS) and steelhead (STT) benefit. High priority to inventory and restore damage from 2008 fire and subsequent clear cutting which have resulted in large amounts of fine sediment in spawning gravels. Non-structural action improving 10 miles of stream habitat.		Reduction in fine sediment in Clear Creek (cubic yards/ dollar)		N	\$90,000	\$90,000	\$0	\$0	\$90,000	
								Subtotal Funding	\$1,281,000	\$300,000	\$171,000	\$0	\$1,281,000
								Reclamation	\$421,000	\$250,000	\$171,000	\$0	\$421,000
								Service	\$50,000	\$50,000	\$0	\$0	\$50,000
								Other	\$810,000^a	\$0	\$0	\$810,000^a	\$810,000^a
1.12	Monitoring												
1.12.1			FWS RBFWO will conduct adult and juvenile salmonid monitoring using walking surveys, rotary screw trap, and other techniques. AFRP Final Restoration Plan Clear Creek actions 10, 14, 15, 16 and evaluation #1. Fall-run (FCS), late-fall-run (LFC), spring-run Chinook (SCS) and steelhead (STT) benefit. High priority for adaptive management of flows and restoration actions. Non-structural action improving 18.1 miles of stream habitat.	Action 1.1.3. and 11.2.1.3 on page 585.			N	\$175,000	\$175,000	\$0	\$0	\$175,000	
1.12.2			Reclamation will contract for geomorphic studies to monitor effectiveness of program, and changes in salmonid habitat due to restoration projects and operation of Whiskeytown Reservoir. AFRP Final Restoration Plan Clear Creek action #14. Fall-run (FCS), late-fall-run (LFC), spring-run Chinook (SCS) and steelhead (STT) benefit. High priority for adaptive management of flows and restoration actions. Non-structural action improving 18.1 miles of stream habitat.	Action 1.1.3			N	\$115,177	\$115,177	\$0	\$0	\$115,177	
								Subtotal Funding	\$290,177	\$290,177	\$0	\$0	\$290,177
								Reclamation	\$115,177	\$115,177	\$0	\$0	\$115,177
								Service	\$175,000	\$175,000	\$0	\$0	\$175,000
								Other	\$0	\$0	\$0	\$0	\$0

AWP Activity Number	Type of Activity	# of FTEs	Activity Name & Description	NMFS OCAP RPA#	Performance Metric	Performance Target	Complete this FY? Y/N	Total Project Cost	FY2011 Anticipated Funding				
									Restoration Fund	Water and Related Resources	State or Other Sources*	Total All Sources	
1.13	Modeling												
1.13.1			FWS Sacramento Field Office will conduct IFIM studies to determine long-term instream flow needs. AFRP Final Restoration Plan Clear Creek action # 11. Fall-run (FCS), late-fall-run (LFC), spring-run Chinook (SCS) and steelhead (STT) benefit. High priority for establishing long-term flow schedule. Non-structural action improving 18.1 miles of stream habitat.	Action I.1.6			Y	\$100,000	\$100,000	\$0	\$0	\$100,000	
								Subtotal Funding	\$100,000	\$100,000	\$0	\$0	\$100,000
								<i>Reclamation</i>	\$0	\$0	\$0	\$0	\$0
								<i>Service</i>	\$100,000	\$100,000	\$0	\$0	\$100,000
								<i>Other</i>	\$0	\$0	\$0	\$0	\$0
1.15	Other - Describe												
1.15.1			Reclamation fund Bella Vista water conveyance costs associated with Saeltzer Dam removal agreement.				N	\$25,000	\$25,000	\$0	\$0	\$25,000	
								Subtotal Funding	\$25,000	\$25,000	\$0	\$0	\$25,000
								<i>Reclamation</i>	\$25,000	\$25,000	\$0	\$0	\$25,000
								<i>Service</i>	\$0	\$0	\$0	\$0	\$0
								<i>Other</i>	\$0	\$0	\$0	\$0	\$0
	TOTAL FUNDING								\$1,861,000	\$800,000	\$251,000	\$810,000	\$1,861,000
	Total Funding Breakdown by Agency:												
								Reclamation	\$641,177	\$390,177	\$251,000	\$0	\$641,177
								Service	\$409,823	\$409,823	\$0	\$0	\$409,823
								Other	\$810,000 ^a	\$0	\$0	\$810,000 ^a	\$810,000
1.16	Unfunded Needs												
1.16.1			Implement long-term spawning gravel supply project	Action I.1.3				\$3,100,000	\$3,100,000	\$0	\$0	\$3,100,000	
	Total Unfunded Need								\$3,100,000	\$3,100,000	\$0	\$0	\$3,100,000

^a CALFED

Table 2. FY 2011 Budget Breakout

Task	Agency	FTE	LABOR		CONTRACTS		USBR Only Misc. Costs	Total Costs
			Direct Salary and Benefits Costs ^{1/}	FWS Only Overhead Assess: 22% of Direct Salary and Benefits Costs ^{2/}	Contract, Grant, and Agreement Costs	FWS Only Overhead Assess: 6% Contract Costs ^{2/}		
1.1 Program Management	FWS	0.472	\$84,823	\$0	\$0	\$0		\$84,823
	USBR	0.45	\$80,000		\$0		\$0	\$80,000
1.4 Restoration Actions	FWS	0.23	\$50,000	\$0	\$0	\$0		\$50,000
	USBR		\$0		\$421,000		\$0	\$421,000
1.12 Monitoring	FWS		\$0	\$0	\$175,000	\$0		\$175,000
	USBR		\$0		\$115,177		\$0	\$115,177
1.13 Modeling	FWS		\$0	\$0	\$100,000	\$0		\$100,000
	USBR		\$0		\$0		\$0	\$0
1.14 Other	FWS		\$0	\$0	\$0	\$0		\$0
	Other		\$0		\$0	\$0		\$0
	Other		\$0		\$0	\$0		\$0
	USBR		\$0		\$25,000		\$0	\$25,000
	Other		\$0		\$0		\$0	\$0
	Other		\$0		\$0		\$0	\$0
Administrative Total - FWS			\$134,823	\$0		\$0		\$134,823
Contracts, Grants and Agreements					\$275,000			\$275,000
FWS Total Costs		0.702	\$134,823	\$0	\$275,000	\$0		\$409,823
Administrative Total - USBR			\$80,000				\$0	\$80,000
Contracts, Grants and Agreements					\$561,177		\$0	\$561,177
USBR Total Costs		0.45	\$80,000		\$561,177		\$0	\$641,177
Other*			\$0		\$810,000		\$0	\$810,000
TOTAL ALL		1.152	\$214,823	\$0	\$1,646,177	\$0	\$0	\$1,861,000

^{1/} For FWS only: The FWS develops a bio-rate which is the combination of both the salary/benefit and related administrative costs. The FWS simple definition reads, "It is an average \$\$ rate that is developed and used for estimating project costs. It incorporates a biologist's salary and benefits, supervisory, clerical and biologist support costs and all other office operating costs related to completing project tasks.

^{2/} FWS assesses an O/H Burden charge of 6% on all contracts/agreements related to budget object codes starting with 25, 41, and 32, and a charge of 22% on costs under all other budget object codes.

*\$810,000 from CALFED

Table 3. Three Year Budget Plan FY 2012-2014

(\$ amounts in thousands)

Year	Description of Activities	Requested RF Funding	Requested W&RR Funding
2012	1.1 and 1.2 Program Management.	\$160	\$0
	1.4.1 (1.16.1- "Unfunded Need" in FY 2011) Implement Cloverview Long-Term Gravel Supply Project Phase 1 to provide an inexpensive supply of spawning gravel	\$2,500	\$0
	1.4.2 Gravel additions at about 8 sites to provide approximately 25,000 tons (100 percent of CPAR gravel goal).	\$750	\$0
	1.12.1 Salmonid monitoring conducted by the FWS will include: spawning area mapping, juvenile salmonid production, spawning gravel quality, benthic macro-invertebrate sampling, and water temperature.	\$225	\$0
	TOTAL	\$3,635	\$0
2013	1.1 and 1.2 Program Management.	\$180	\$0
	1.4.1 Implement Cloverview Long-Term Gravel Supply Project Phase 2 to provide an inexpensive supply of spawning gravel	\$1,100	\$0
	1.4.2 Gravel additions at about 8 sites to provide approximately 25,000 tons (100 percent of CPAR gravel goal).	\$750	\$0
	1.12.1 Salmonid monitoring conducted by the FWS will include: spawning area mapping, juvenile salmonid production, spawning gravel quality, benthic macro-invertebrate sampling, and water temperature.	\$225	\$0
	1.12.2 Multi-year contract to conduct geomorphic stream monitoring to determine amount of gravel needed to recharge the system and evaluate the success of restoration projects. Evaluate relationship between amount of gravel added and the amount of spawning habitat created.	\$150	\$0
TOTAL	\$2,405	\$0	
2014	1.1 and 1.2 Program Management.	\$180	\$0
	1.4.2 Gravel additions at about 8 sites to provide approximately 25,000 tons (100 percent of CPAR gravel goal).	\$750	\$0
	1.12.1 Salmonid monitoring conducted by the FWS will include: juvenile habitat use, spawning area mapping, juvenile salmonid production, spawning gravel quality, benthic macro-invertebrate sampling, and water temperature.	\$300	\$0
TOTAL	\$1,230	\$0	

Table 4. FY 2011 CVPIA Clear Creek Fish Restoration Program Monitoring Projects

Project Description:	Fall Chinook Spawning Area Mapping (SAM)
FY 2010 Project Complete?	Yes, although this is an ongoing monitoring project.
CVPIA annual work plan subtask number:	Monitoring 1.12.1
Scope of the monitoring effort:	Clear Creek
Product/deliverable:	Annual report.
Cost:	•\$62,049.
Questions posed:	<ul style="list-style-type: none"> • Where are fall Chinook spawning? • How much area was used for spawning? • Are salmon using the spawning gravel or restored habitat provided by the program? • How effective is the program at increasing spawning habitat? • Where is additional restoration needed?
Objectives:	<ul style="list-style-type: none"> • Describe the distribution and amount of spawning in relationship to restoration actions as spawning changes over time. • Evaluate the effectiveness of spawning habitat restoration. • Evaluate environmental factors and restoration actions affecting salmonid spawning. • Provide direction for future habitat restoration.
Results – expected or actual:	Spawning area mapped in 2008 was greater than in all of the 8 previous years, suggesting that the program has been successful at creating new spawning habitat, perhaps due to implementation of stream channel restoration Phase 3B. Our prediction that phase 3B would increase spawning habitat by 15% was right on, as 16% of the spawning in the creek occurred in this reach in 2008 but less than 2% in the past.
Data collection methods:	Two data collection techniques will be compared in 2010: 1) drawing the shapes of redd aggregates on aerial photos while in the field at the end of the spawning season, and subsequently digitizing the shapes for analysis in GIS and 2) using sub-foot accuracy GPS units to outline redd aggregates while in the field and directly imported into GIS.
Data management:	Final reports and data are archived in the central

	computer system at the RBFWO.
Assessment:	<ul style="list-style-type: none"> •Spawning area is summarized by both 1,000 foot reaches and by geomorphic-based reaches and compared between years and between reaches. •Relationships between changes in spawning area and spawning escapement, redd counts, water temperature, stream flow, and restoration actions including spawning gravel supplementation are examined to evaluate success at the watershed and project level.
Use of information in future decision making:	<ul style="list-style-type: none"> •Information will be used in determining future stream flow requirements in NMFS OCAP BO Action I.1.2. “Channel Maintenance Flows”. •Information will be used to improve the placement, particle size, and amount of supplemental spawning gravel used in NMFS OCAP BO Action I.1.3 “Spawning Gravel Addition”. •Information will be used to evaluate ongoing benefits of restoration projects and applied to the planning of future projects.
NMFS OCAP BO RPA	<ul style="list-style-type: none"> •Action I.1.3. “Spawning Gravel Augmentation” states "Reclamation shall provide a report to NMFS on implementation and effectiveness of the gravel augmentation program." FWS currently provides reports on effectiveness of the gravel program by documenting use of the spawning gravel by fall Chinook using this method. This information is used to learn what works in creating fall Chinook spawning habitat and is applied to spring Chinook habitat restoration projects. •Action I.1.6. “Adaptively Manage to Habitat Suitability/IFIM Study Results” The SAM habitat suitability evaluation provides biological validation for the IFIM studies needed to implement the Action.

Table 4. (cont.)

Project Description:	Juvenile Spring Chinook Production Monitoring (Rotary Screw Trapping)
FY 2009 Project Complete?	This is an ongoing monitoring project.
CVPIA annual work plan subtask number:	Monitoring 1.12.1
Scope of the monitoring effort:	Clear Creek
Product/deliverable:	Annual Report.
Cost:	\$112,951.
Questions posed:	<ul style="list-style-type: none"> •How many juvenile spring Chinook were produced in 2011? •What environmental factors or management actions affected juvenile production?
Objectives:	<ul style="list-style-type: none"> • Produce annual report for 2010. • Collect data for 2011.
Results – expected or actual:	Most juvenile spring Chinook leave the upper Clear Creek watershed as fry rather than at juvenile size.
Data collection methods:	Data will be collected using a rotary screw trap. Regular efficiency trials (10 to 20 per year) will be used to produce passage estimates. Data will be entered directly into an electronic database in the field.
Data management:	Final reports and data will be archived in the central computer system at the RBFWO.
Assessment:	Passage estimates will be analyzed relative to environmental variables, population parameters and restoration activity.
Use of information in future decision making:	Information is used to evaluate the benefits of habitat restoration and flow and temperature management, to suggest future restoration actions, and to estimate carrying capacity which will be used to set overall program goals.
NMFS OCAP BO RPA	RPA requirement 11.2.1.3. “Monitoring and Reporting” on page 585, bullets 7 and 8a.

Table 4. (cont.)

Project Description:	Conduct Geomorphic Monitoring
FY 2009 Project Complete?	No, project expected to continue 2-3 additional years
CVPIA annual work plan subtask number:	Monitoring 1.12.2
Scope of the monitoring effort:	Clear Creek
Product/deliverable:	Report
Cost:	\$115,177
Questions posed:	<ul style="list-style-type: none"> • Do gravel injections alter the creek's geomorphology in ways that benefit anadromous fish? • Do gravel injections create spawning habitat? • Does created spawning habitat support active spawning?
Objectives:	<ul style="list-style-type: none"> • Complete geomorphic field work, habitat and redd mapping, and report • Assess effectiveness of spawning gravel injections at creating useable spawning habitat • Quantify newly created spawning habitat and use by salmonids
Results – expected or actual:	<ul style="list-style-type: none"> • Complete report
Data collection methods:	<ul style="list-style-type: none"> • Data collected in the field using topographic and visual surveys coupled with the FWS spawning survey data and mapping
Data management:	Final report and data will be archived in the central computer system at Reclamation's NCAO and the FWS' RBFWO
Assessment	<ul style="list-style-type: none"> • Monitoring conducted to verify increases in available spawning habitat and use by anadromous fish
Use of information in future decision making:	<ul style="list-style-type: none"> • Information will assist in determining future gravel addition amounts, injection locations and injection methods
NMFS OCAP BO RPA	Action I.1.3. Spawning Gravel Augmentation