Draft CVPIA Fiscal Year 2012 Annual Work Plan

September 11, 2011

Program Title:

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

Responsible Entities:

Staff Name	Agency	Role
John Hannon	*Reclamation*	*[Lead]*
Julie Zimmerman	*Service*	*[Co-Lead]*
Tom Kisanuki	*Reclamation*	*Sacramento River Activity Manager*
Fred Jurick	*CDFG*	*State Lead / Partner*
Patricia Bratcher	*CDFG*	*State Point of Contact (Sacramento River)*
Mike Healey	*CDFG*	*State Point of Contact (American River)*
Pat Brantley	*CDFG*	*State Point of Contact (Stanislaus River)*

The lead and co-lead are responsible for overall coordination of budget and projects between the three program rivers (Sacramento, American, and Stanislaus). Activities include project identification, planning, permitting, construction oversight, monitoring, and reporting. Reclamation is the lead agency in project implementation and manages contracts associated with project work. Tom Kisanuki serves as activity manager for the Sacramento River projects. The State lead and points of contact from CDFG provide professional input and guidance to program activities for each of the rivers.

Program Goals and Objectives for FY 2012

The major program CPAR performance goals are as follows:

- Increase the availability of spawning and rearing habitat for Sacramento River Basin Chinook salmon and steelhead trout by placing 10,000 tons of gravel. Support at least 25% of riverwide spawning salmonids in gravel placement reaches.
- Increase the availability of spawning and rearing habitat for American River Basin Chinook salmon and steelhead trout by placing 7,000 tons of gravel. Support at least 25% of riverwide spawning salmonids on gravel placement projects. Less than 10% egg retention in Chinook salmon.
- Increase the availability of spawning and rearing habitat for Stanislaus River Basin Chinook salmon and steelhead trout by placing 3,000 tons of gravel and meet the NMFS OCAP RPA Action prescribing 50,000 cubic yards of gravel placed by 2014. Support at least 10% of riverwide spawning salmonids on gravel placement projects.

Source Documents and Plans that Guide the Program

CALFED Bay-Delta Program EIS/EIR Ecosystem Restoration Plan, Vol. 3 Strategic Plan for Ecosystem Restoration; CALFED Bay-Delta Program Programmatic Record of Decision, Vol. 1

– Record of Decision and Attachments1 through 4; CALFED Bay-Delta Program Phase II Report, Final Programmatic EIS/EIR Technical Appendix; CVPIA Final PEIS; CVPIA Final Programmatic Environmental Impact Statement. (PEIS), Attachment F; CVPIA Draft PEIS, Technical Appendix Vol. 3; Upper Sacramento River Fisheries and Riparian Habitat Management Plan (State Advisory Council 1989); Fisheries and Instream Habitat Management and Restoration Plan for the Lower American River (Water Forum 2003); Lower American River Channel and Floodplain Restoration Planning Framework (Water Forum 2011); Stanislaus River Restoration Prioritization (Stanislaus Fish Group 2003); and 2009 NMFS Biological Opinion on CVP and SWP Water Operations .

Work performed in this program compliments the objectives in CVPIA Section 3406(b)(1). Staff involved in the two programs coordinate the development of the activities in the respective watersheds and share the data developed from this work.

Status of the Program

Gravel placement sites in each of the three rivers have been identified based on key habitat location (fish presence and habitat availability) and on ready river access. All gravel placed in the rivers conforms to criteria developed by the Fish and Wildlife Service, California Department of Fish and Game and the National Marine Fisheries Service. These criteria relate to size and relative proportion of the various sizes, and to particular times of the year when the gravel can be placed. Gravel placement methods and quantities correlate to the timing and location of use by spawning anadromous salmonids.

Sacramento River

Gravel has been placed each year on at least one of three sites in the Upper Sacramento River – (1) - on the right bank 300 yards downriver from Keswick Dam, (2) - 1.5 miles downriver from Keswick Dam at Salt Creek, and (3) - approximately 10 miles downriver from Keswick Dam in Redding. The gravel is placed on the edge of the channel and high flows distribute the gravel within the river channel to be subsequently utilized for spawning and rearing. Since 1997, the CVPIA program has placed approximately 191,000 tons of gravel at these three sites (including the FY11 placement of 5,000 tons). Examination of CDFG aerial redd survey data since the 1960's and instream gravel locations show that Chinook salmon are preferentially using injected gravel that was placed at the Keswick Dam and Salt Creek sites. Preliminary substrate data shows a lack of spawning gravel between ACID Dam to the confluence with Clear Creek. Plans are underway to identify potential new sites in this reach and possible injection methods.

American River

The gravel in the American River and Stanislaus River has been placed to create habitat features anticipated to be immediately usable by salmonids. Gravel has been placed at six sites in the American River in 1999 and 2008 - 2011 - two locations at Sailor Bar, two locations at upper Sunrise, downstream of Lower Sunrise Bridge, and at Sacramento Bar. The substrate at the sites was manipulated prior to gravel placement in order to improve water quality conditions within the gravel (the area where eggs develop) after the gravel was in place. The conditions in the regions where gravel was placed has been monitored and compared with pre-project conditions and to conditions in adjacent areas. A five year series of projects began in

implementation 2008. Reclamation contracted with the Water Forum (City of Sacramento) for assistance in the permitting, placement, and monitoring of projects. Placements through 2011 totaled 50,000 tons (the FY11 placement amount is a pre-project estimate). Work has occurred at four of the nine sites (six main channel and three side channel sites) identified in the initial planning document. The program is finalizing a planning framework to help guide American River project selection, design, and monitoring.

Stanislaus River
Several sites have been selected for gravel placement in the Stanislaus River in the reach within two miles downriver of Goodwin Dam and at Knights Ferry. Gravel has been placed by conventional front end loader, by sluice delivery, and by helicopter since 1997. Approximately 27,000 tons of gravel has been placed to date. The program is currently working on implementation of a channel enhancement project at Two Mile Bar where gravel on a floodplain bench will be sorted and placed in the river leaving the resulting floodplain elevation lower to provide side channel habitat and increased floodplain inundation during spring high flows. This helps to meet the NMFS RPA actions prescribing increased spawning gravel injections and enhanced floodplain rearing habitat, specifically for steelhead.

Overall
Salmonids have been observed spawning on the placed gravel at the gravel placement sites on each river. Aerial photography and onsite ground surveys have documented the location of salmon redds and determined that juvenile salmonid rearing occurs at and in the vicinity of the projects. Intragravel conditions have been monitored for selected gravel placement projects and shown that gravel placement has provided high quality conditions for salmonid egg incubation.

The (b)(13) program is increasingly emphasizing restoration of side channels, channel margins, meander belts, and complexity to address the current potentially limited amount of juvenile rearing habitat, particularly in dryer years. Restoration of these habitats is being incorporated into the program as overall CVPIA Fisheries Program priorities are refined.

Adaptive Management

Sacramento River
Monitoring of Chinook salmon spawning distributions in the Sacramento River has shown that spawning, particularly for the endangered winter-run Chinook, is concentrated near Keswick Dam where water temperatures are coolest for successful incubation during the summer. This reach of the river has a gravel deficit due to the location of the dam and absence of significant tributary sediment sources in this upstream reach. Because of the monitoring information showing fish distribution, water temperature, and gravel deficit information, projects in the Sacramento River have focused on sites near Keswick Dam to best meet the needs of the species for spawning habitat.

American River
Projects in the American River initially placed gravel on channel margins where use by fish was possible only during higher flow years. Lack of use during low water years influenced the decision to design projects spanning the river channel so that material was available to fish

under nearly all flow conditions likely to occur during spawning periods. Monitoring of adult fish concentrations and egg retention identified that Chinook salmon and steelhead both congregate in the upper river where substrate conditions are most degraded. Chinook salmon escapement monitoring provided by DFG identified high levels of egg retention (fish dying before spawning) in the American River. This could potentially be due to a lack of suitable spawning habitat in areas where fish are concentrated resulting in a high level of competition for spawning sites that stresses fish in the often warm water conditions. This resulted in a focus on projects in the stretch of the river near the dam in order to address the egg retention issue and improve degraded conditions by providing additional spawning habitat where the fish are most abundant.

Stanislaus River

Projects in the Stanislaus River sometimes used gravel mixtures that lacked material smaller than ½". Chinook salmon readily spawned in the gravel mixtures without a smaller size fraction, but egg to fry survival was unknown. Experiments conducted through AFRP in the Stanislaus in 2006, using experimental gravel mixtures provided by the program, examined egg to fry survival in various gravel mixtures and showed that gravel lacking smaller material supported only minimal egg to fry survival. As a result of this work gravel mixtures now contain material down to ¼" or smaller to attempt to provide conditions most conducive to high egg to fry survival.

Overall

Gravel projects have traditionally focused primarily on spawning habitat due to the gravel deficit that is present below most dams. The recognition that rearing habitat conditions in the lower rivers and delta are particularly degraded and emigration survival is low has resulted in an increased attempt to design both spawning and rearing habitat features into projects. It is anticipated that with increased rearing habitat in close proximity to spawning areas higher numbers of juvenile Chinook salmon will remain to rear and grow larger in these areas. Larger juveniles obtain higher survival rates during emigration to the ocean. Juvenile steelhead rearing habitat is expected to be enhanced by providing more habitat complexity in these areas where steelhead are present year round and water is coolest during summer. Features such as incorporation of side channel habitat, inundated floodplain habitat, inclusion of woody material, rock piles, boulders, and island creation have been included in recently constructed projects and are providing increased rearing habitat to increase carrying capacity for juvenile salmonids in the project rivers.

Table 1. FY2012 Activities and Costs

	CVPIA Section: 3406 (b)(13)
	CVPIA Program: Spawning Gravel

	2012 Requested Funding					
	State Cash	State In-Kind	Restoration Fund	Water and Related Resources	Other Sources*	Total All Sources
Total Funding	$0	$30,000	$1,000,000	$0	$0	$1,030,000
Reclamation			$895,281	$0	$0	$895,281
Service			$104,719	$0	$0	$104,719
CA DFG	$0	$30,000			$0	$30,000
CA DWR	$0	$0			$0	$0
Other	$0	$0			$0	$0

AWP Activity Number	Type of Activity	# of FTE's	Activity Name & Description	Agency	NMFS OCAP RPA#	Performance Metric	Performance Target	2012 Requested Funding: State Cash	State In-Kind	Restoration Fund	Water and Related Resources	Other Sources*	Total All Sources
1.1	**Program Management**												
1.1.1		0.14	Lead: Works with the FWS co-lead and activity managers for each of the three river systems in which spawning and rearing habitat restoration projects are authorized. Plans projects conducts monitoring, oversees construction.	BOR	-	-		$0	$0	$30,000	$0	$0	$30,000
1.1.2		0.27	Co-lead: Coordinates with Reclamation staff and is the primary point of contact with the Fish and Wildlife Service. Plans projects conducts monitoring, oversees construction.	FWS	-	-		$0	$0	$60,000	$0	$0	$60,000

	Anticipated Funding: State Cash	State In-Kind	Restoration Fund	Water and Related Resources	Other Sources*	Total All Sources
Subtotal Funding	$0	$0	$90,000	$0	$0	$90,000
Reclamation			$30,000	$0	$0	$30,000
Service			$60,000	$0	$0	$60,000
CA DFG	$0	$0			$0	$0
CA DWR	$0	$0			$0	$0
Other*	$0	$0			$0	$0

*** List other funding source here:** None

AWP Activity Number	Type of Activity	# of FTE's	Activity Name & Description	Agency	NMFS OCAP RPA#	Performance Metric	Performance Target	2012 Requested Funding: State Cash	State In-Kind	Restoration Fund	Water and Related Resources	Other Sources*	Total All Sources
1.2	**Program Support**												
1.2.1		0.14	Upper Sacramento River Activity Manager	BOR	-	-		$0	$30,000	$35,328	$0	$0	$65,328
1.2.2		-	R8 Program Administration	FWS	-	-		$0	$0	$30,612	$0	$0	$30,612
1.2.3		-	FWS Budget Finance Contracting Support P20	FWS	-	-		$0	$0	$4,716	$0	$0	$4,716

	Anticipated Funding: State Cash	State In-Kind	Restoration	Water and	State or Other	Total All Sources
Subtotal Funding	$0	$30,000	$35,328	$0	$0	$65,328
Reclamation			$30,612	$0	$0	$30,612
Service			$4,716	$0	$0	$4,716
CA DFG	$0	$30,000			$0	$30,000
CA DWR	$0	$0			$0	$0
Other*	$0	$0			$0	$0

*** List other funding source here:** None

	CVPIA Section: 3406 (b)(13)
	CVPIA Program: Spawning Gravel

	2012 Requested Funding					
	State Cash	State In-Kind	Restoration Fund	Water and Related Resources	Other Sources*	Total All Sources
Total Funding	$0	$30,000	$1,000,000	$0	$0	$1,030,000
Reclamation			$895,281	$0	$0	$895,281
Service			$104,719	$0	$0	$104,719
CA DFG	$0	$30,000			$0	$30,000
CA DWR	$0	$0			$0	$0
Other	$0	$0			$0	$0

AWP Activity Number	Type of Activity	# of FTE's	Activity Name & Description	Agency	NMFS OCAP RPA#	Performance Metric	Performance Target	2012 Requested Funding: State Cash	State In-Kind	Restoration Fund	Water and Related Resources	Other Sources*	Total All Sources
1.3	**Technical Support**												
1.3.1		0.20	Survey and Monitoring for gravel projects in the American and Stanislaus	FWS	-	-		$0	$0	$40,000	$0	$0	$40,000
1.3.2		0.20	Oversee gravel processing on the American River	BOR	-	-		$0	$0	$40,000	$0	$0	$40,000
1.3.3		0.10	Engineering support for Stanislaus and American River gravel projects	BOR	-	-		$0	$0	$20,000	$0	$0	$20,000

	Anticipated Funding: State Cash	State In-Kind	Restoration Fund	Water and Related Resources	State or Other Sources*	Total All Sources
Subtotal Funding	$0	$0	$100,000	$0	$0	$100,000
Reclamation			$60,000	$0	$0	$60,000
Service			$40,000	$0	$0	$40,000
CA DFG	$0	$0			$0	$0
CA DWR	$0	$0			$0	$0
Other*	$0	$0			$0	$0

*** List other funding source here:** None

	CVPIA Section: 3406 (b)(13)
	CVPIA Program: Spawning Gravel

	2012 Requested Funding					
	State Cash	State In-Kind	Restoration Fund	Water and Related Resources	Other Sources*	Total All Sources
Total Funding	$0	$30,000	$1,000,000	$0	$0	$1,030,000
Reclamation			$895,281	$0	$0	$895,281
Service			$104,719	$0	$0	$104,719
CA DFG	$0	$30,000			$0	$30,000
CA DWR	$0	$0			$0	$0
Other	$0	$0			$0	$0

AWP Activity Number	Type of Activity	# of FTE's	Activity Name & Description	Agency	NMFS OCAP RPA#	Performance Metric	Performance Target	2012 Requested Funding: State Cash	State In-Kind	Restoration Fund	Water and Related Resources	Other Sources*	Total All Sources
1.4	**Restoration Actions**												
1.4.1		-	Sacramento River gravel project - Chinook salmon and steelhead, priority watershed, non-structural, spawning and rearing habitat	BOR	-	b13:Sacramento R; Spawning gravel placed annually (tons)	10,000	$0	$0	$200,000	$0	$0	$200,000
1.4.2		-	American River gravel project - year 5 - steelhead and fall Chinook, gravel processing and placement, priority watershed, non-structural, spawning and rearing habitat, cost includes design and permitting	BOR	-	b13:American R; Spawning gravel placed annually(tons)	7,000	$0	$0	$160,000	$0	$0	$160,000
1.4.3		-	Stanislaus River gravel project - Two Mile Bar - year 1 gravel sorting and placement and side channel/floodplain enhancement, steelhead and fall Chinook, non-structural, spawning and rearing habitat, cost encompasses design and permitting	BOR	III.2.3	b13:Stanislaus R; Spawning gravel placed annually (tons)	3,000	$0	$0	$125,281	$0	$0	$125,281
1.4.4		-	Stanislaus River gravel project - Goodwin - gravel placement at float tube pool (using sluice), steelhead and fall Chinook, non-structural, spawning and rearing habitat	BOR	III.2.1	b13:Stanislaus R; Spawning gravel placed annually (tons)	3,000	$0	$0	$100,000	$0	$0	$100,000
								Anticipated Funding					
								State Cash	**State In-Kind**	**Restoration Fund**	**Water and Related Resources**	**State or Other Sources***	**Total All Sources**
							Subtotal Funding	$0	$0	$581,290	$0	$0	$581,290
							Reclamation			$581,290	$0	$0	$581,290
							Service			$0	$0	$0	$0
							CA DFG	$0	$0			$0	$0
							CA DWR	$0	$0			$0	$0
							Other*	$0	$0			$0	$0
						*** List other funding source here:** None							

1.9	**Environmental Compliance**												
1.9.1		0.05	Permitting assistance for American River and Stanislaus River	BOR	-	-		$0	$0	$10,000	$0	$0	$10,000
								Anticipated Funding					
								State Cash	**State In-Kind**	**Restoration Fund**	**Water and Related Resources**	**State or Other Sources***	**Total All Sources**
							Subtotal Funding	$0	$0	$10,000	$0	$0	$10,000
							Reclamation			$10,000	$0	$0	$10,000

	CVPIA Section: 3406 (b)(13)
	CVPIA Program: Spawning Gravel

	2012 Requested Funding					
	State Cash	State In-Kind	Restoration Fund	Water and Related Resources	Other Sources*	Total All Sources
Total Funding	$0	$30,000	$1,000,000	$0	$0	$1,030,000
Reclamation			$895,281	$0	$0	$895,281
Service			$104,719	$0	$0	$104,719
CA DFG	$0	$30,000			$0	$30,000
CA DWR	$0	$0			$0	$0
Other	$0	$0			$0	$0

AWP Activity Number	Type of Activity	# of FTE's	Activity Name & Description	Agency	NMFS OCAP RPA#	Performance Metric	Performance Target	2012 Requested Funding					
								State Cash	State In-Kind	Restoration Fund	Water and Related Resources	Other Sources*	Total All Sources
							Service			$0	$0	$0	$0
							CA DFG	$0	$0			$0	$0
							CA DWR	$0	$0			$0	$0
							Other*	$0	$0			$0	$0
						*** List other funding source here:**		None					
1.12	**Monitoring**												
1.12.1	-		Sacramento River project monitoring	BOR	-	-		$0	$0	$75,000	$0	$0	$75,000
1.12.2	-		American River project monitoring	BOR	-	-		$0	$0	$100,000	$0	$0	$100,000
1.12.3	-		Stansislaus River project monitoring	BOR	-	-		$0	$0	$5,000	$0	$0	$5,000
								Anticipated Funding					
								State Cash	State In-Kind	Restoration Fund	Water and Related Resources	State or Other Sources*	Total All Sources
							Subtotal Funding	$0	$0	$180,000	$0	$0	$180,000
							Reclamation			$180,000	$0	$0	$180,000
							Service			$0	$0	$0	$0
							CA DFG	$0	$0			$0	$0
							CA DWR	$0	$0			$0	$0
							Other*	$0	$0			$0	$0
						*** List other funding source here:**		None					

	CVPIA Section: 3406 (b)(13)
	CVPIA Program: Spawning Gravel

	2012 Requested Funding					
	State Cash	State In-Kind	Restoration Fund	Water and Related Resources	Other Sources*	Total All Sources
Total Funding	$0	$30,000	$1,000,000	$0	$0	$1,030,000
Reclamation			$895,281	$0	$0	$895,281
Service			$104,719	$0	$0	$104,719
CA DFG	$0	$30,000			$0	$30,000
CA DWR	$0	$0			$0	$0
Other	$0	$0			$0	$0

AWP Activity Number	Type of Activity	# of FTE's	Activity Name & Description	Agency	NMFS OCAP RPA#	Performance Metric	Performance Target	2012 Requested Funding: State Cash	State In-Kind	Restoration Fund	Water and Related Resources	Other Sources*	Total All Sources
1.16	**Unfunded Needs**												
1.16.1		-	Stanislaus River Spawning and Rearing Habitat Restoration to meet NMFS RPA - Two Mile Bar gravel processing, floodplain lowering, gravel addition, and side channel creation. (H)	-	III.2.3	b13:Stanislaus R; Spawning gravel placed annually (tons)	3,000	$0	$0	$250,000	$0	$0	$250,000
1.16.2		-	Stanislaus River Spawning and Rearing Habitat Restoration to meet NMFS RPA - Two Mile Bar gravel processing, floodplain lowering, gravel addition, and side channel creation. (L)	-	III.2.1	b13:Stanislaus R; Spawning gravel placed annually (tons)	3,000	$0	$0	$250,000	$0	$0	$250,000
1.16.3		-	American River spawning and rearing habitat restoration - make up shortfall to fully fund a gravel processing and placement project. (M)	-	-	b13:American R; Spawning gravel placed annually(tons)	7,000	$0	$0	$250,000	$0	$0	$250,000
1.16.4		-	American River juvenile production estimate - contribute funding to be used towards monitoring to estimate the production of wild juvenile Chinook salmon and steelhead in the American River or to estimate survival of juveniles within and emigrating from the river. (H)	-	-	-		$0	$0	$100,000	$0	$0	$100,000

	Anticipated Funding: State Cash	State In-Kind	Restoration Fund	Water and Related Resources	State or Other Sources*	Total All Sources
Subtotal Funding	$0	$0	$850,000	$0	$0	$850,000
Reclamation			$0	$0	$0	$0
Service			$0	$0	$0	$0
CA DFG	$0	$0			$0	$0
CA DWR	$0	$0			$0	$0
Other*	$0	$0			$0	$0

*** List other funding source here:** None

Table 2. Three-Year Budget Plan FY 2013 – 2015

Table 2. Three-Year Funding Plan FY 2013 – 2015 **($ amounts in thousands)**						
FY Year	**Description of Activities**	**Funding Needs**				
		RF	**W&RR**	**Other**	**DFG**	**DWR**
2013	1.1 Project managment 1.2 Program support 1.3 Technical support 1.4 Restoration Projects – American River at Sailor Bar, Stanislaus River at Two Mile Bar, Sacramento River 1.9 Environmental Compliance – Assist with NEPA and Permit Acquisition for restoration projects. 1.12 Monitoring – Fish use and gravel condition in each river to determine project effectiveness **Total**	80,000 40,000 100,000 700,000 50,000 250,000 1,220,000				
2014	1.1 Project managment 1.2 Program support 1.3 Technical support 1.4 Restoration Projects – American River at River Bend, Stanislaus River at Two Mile Bar, Sacramento River 1.9 Environmental Compliance 1.12 Monitoring – Fish use and habitat condition in each river to determine project effectiveness. **Total**	100,000 50,000 120,000 750,000 50,000 250,000 1,320,000				
2015	1.1 Project managment 1.2 Program support 1.3 Technical support 1.4 Restoration Projects – American River at Nimbus Basin, Stanislaus River at Lover's Leap, Sacramento River 1.9 Environmental Compliance 1.12 Monitoring– Fish use and habitat condition in each river to determine project effectiveness. **Total**	110,000 55,000 130,000 800,000 50,000 250,000 1,395,000				

Note: The FY 2013 – 2015 Budget Plan provides estimates of capability only. The amounts are displayed are those that might be reasonably appropriated each year. These figures do not reflect the future Congressional Appropriations process. All of these estimates will be adjusted pending appropriations and annual Restoration Fund collections are realized.

Table 3. Monitoring

Table 3 – Proposed Monitoring Activity 1 of 3	
Project Description:	Sacramento River Spawning Gravel Monitoring
FY 2012 Project Complete?	No, gravel augmentation is a continuing program needing continued effectiveness monitoring.
CVPIA annual work plan subtask number:	1.12.1
Scope of the monitoring effort:	Sacramento River
Product/deliverable:	Annual report and data files
Cost:	$75,000
Questions posed:	How much spawning habitat is created (or maintained) through gravel augmentation? How much gravel augmentation is needed to increase (or maintain) spawning habitat? What is the rate of gravel movement downstream?
Objectives:	Monitor and collect data during 2012 Produce annual report for 2012
Results – expected or actual:	Spawning habitat may increase due to gravel augmentation. Utilization of salmonids for spawning may increase due to gravel augmentation. Spawning may occur in newly created spawning habitat. Gravel will move downstream during high flows.
Data collection methods:	GPS- and aerial image referencing, site surveys using topographic and ocular surveys in concert with various spawning survey maps and databases.
Data management:	Electronic databases to be retained by consultant and transferred to the USBR upon completion of the monitoring. Final report and data will be archived in Reclamation's NCAO computer database.
Assessment:	Monitoring to verify increase in spawning habitat and use by anadromous salmonids.
Use of information in future decision making:	Monitoring results will provide basis for evaluating the benefits of gravel distribution and movement, and utilization by salmonids for spawning. Specifically, the relationships between amounts and locations of gravel placed into the river system and the amount of spawning habitat created will help drive future gravel placement (and volume) decisions.

Table 3 – Proposed Monitoring Activity 2 of 3	
Project Description:	American River Spawning and Rearing Habitat Projects - Effectiveness Monitoring
FY 2012 Project Complete?	No, this is a continuing series of restoration projects with ongoing monitoring.
CVPIA annual work plan subtask number:	1.12.2
Scope of the monitoring effort:	Evaluates an ongoing series of seven yearly projects in the American River from Nimbus Dam to River Bend Park
Product/deliverable:	Reports and data files
Cost:	$100,000
Questions posed:	Are steelhead and Chinook spawning on gravel projects? Are gravel conditions conducive to high egg to fry survival? Can gravel project designs enhance invertebrate production? Do the projects provide increased juvenile salmonid rearing habitat? Can the onsite rock source be used cost effectively? How much gravel should be added yearly? Can woody material be safely incorporated into projects?
Objectives:	Determine effectiveness of projects by answering the questions listed above. Use results to inform future projects.
Results – expected or actual:	Spawning use is high. Intragravel conditions should be good for survival. Invertebrates quickly recolonize. Rearing habitat can be successfully incorporated into gravel projects. Onsite rock sources can be used cost effectively.
Data collection methods:	Ground and aerial redd surveys, intragravel permeability and water quality measurements, pebble counts, tracer rocks, snorkel surveys, invertebrate sampling, topographic mapping, hydraulic modeling
Data management:	Reports in regional library. GIS shapefiles, Excel files, and Access database will be available and maintained by USBR and USFWS
Assessment:	Spawning and rearing habitat use, habitat quality, and distribution will be evaluated to determine whether key limiting factors are being addressed and to help in design of future habitat improvement projects.
Use of information in future decision making:	Future project designs will be based on monitoring results. Species data is included in ESA consultations on CVP operations.

Table 3 – Proposed Monitoring Activity 3 of 3	
Project Description:	Stanislaus River Redd Surveys at Gravel Projects
FY 2012 Project Complete?	Continuing
CVPIA annual work plan subtask number:	1.12.3
Scope of the monitoring effort:	Maps redds at gravel projects to compare with river-wide surveys conducted by DFG during Chinook carcass surveys. This work is sometimes conducted by DFG and sometimes by USBR on a time available basis…funding set aside in case DFG can't do.
Product/deliverable:	Map and shapefile of yearly redd locations
Cost:	$5,000
Questions posed:	Are salmonids spawning on gravel placement projects? How does habitat use at project sites compare to riverwide spawning habitat use?
Objectives:	Determine effectiveness of projects by answering the questions above.
Results – expected or actual:	Habitat use is concentrated in upstream areas. Spawning distribution is influenced by escapement level.
Data collection methods:	Ground surveys collect GPS points with habitat parameters at redds. Carcass surveys count redds by river reach.
Data management:	ESRI shapefiles maintained by USBR in GIS library
Assessment:	This is a low intensity monitoring activity used to track habitat use through time.
Use of information in future decision making:	Future project designs will be based on monitoring results. Species data is included in ESA consultations on CVP operations.