	Title	Objective	Action	Status	Importance Level	Responsible Agency	Lead	Due Date	Point of Contact	Additional Point(s) of Contact
NMFS	11.2.1.2	Research and Adaptive Management	See also: I.5: Temp monitoring and modeling; I.6: Rearing habitat evaluation metrics; IV.2.2: 6-year study.	This is on-going.		USBR			Mike Hendrick	
NMFS	11.2.1.3	Monitoring and Reporting Requirements	1) Reclamation and DWR shall participate in the design, implementation, and funding of the comprehensive CV steelhead monitoring program, under development through ERP, that includes adult and juvenile direct counts, redd surveys, and escapement estimates on CVP- and SWP-controlled streams. This program is necessary to develop better juvenile production estimates that form the basis of incidental take limits and will also provide necessary information to calculate triggers for operational actions.	This is on-going.		USBR/DWR		Ongoing thru 2030	Mike Hendrick	
NMFS	11.2.1.3	Monitoring and Reporting Requirements	2) Reclamation and DWR shall ensure that all monitoring programs regarding the effects of CVP and SWP operations and which result in the direct take of winter-run, spring-run, CV steelhead, or Southern DPS of green sturgeon, are conducted by a person or entity that has been authorized by NMFS. Reclamation and DWR shall establish a contact person to coordinate these activities with NMFS.	This is on-going. As part of this effort, year-round beach seining occurs throughout the San Francisco Estuary and surface trawling at Chipps Island, Sacramento, and Mossdale to monitor the relative abundance and distribution (spatial and temporal) of juvenile Chinook Salmon and other native species in the Central Valley of California. There are also ongoing efforts that monitor the out-migrant juvenile Sacramento River Chinook salmon and steelhead utilizing rotary screw traps located near Knights Landing, CA on the Sacramento River.		DWR/USBR		Ongoing thru 2030	Mike Hendrick	
NMFS	11.2.1.3	Monitoring and Reporting Requirements	3) Reclamation and DWR shall submit weekly reports to the interagency Data Assessment Team (DAT) regarding the results of monitoring and incidental take of winter-run, spring-run, CV steelhead, and Southern DPS of green sturgeon associated with operations of project facilities.	Annually, Reclamation submits weekly DAT reports and an annual written report to NMFS describing the results of real-time monitoring of winter-run, spring-run, CV steelhead, and Southern DPS of green sturgeon associated with operations of the DCC and CVP Delta pumping facilities, and other Division level operations authorized through this RPA. In addition to the DAT process, we now utilize Real-Time data reporting. This data is housed within SacPAS. http://www.cbr.washington.edu/sacramento/		DWR/USBR		Ongoing thru 2030	Elissa Buttermore, Towns Burgess, Farida Islam (DWR)	
NMFS	11.2.1.3	Monitoring and Reporting Requirements	4) Reclamation and DWR shall provide an annual written report to NMFS no later than October 1, following the salvage season of approximately October to May. This report shall provide the data gathered and summarize the results of winter-run, spring-run, CV steelhead, and Southern DPS of green sturgeon monitoring and incidental take associated with the operation of the Delta pumping plants (including the Rock Slough Pumping Plant). All juvenile mortality must be minimized and reported, including those from special studies conducted during salvage operations. This report should be sent to NMFS (SW Region, Protected Resources Division, Sacramento Area Office, 650 Capitol Mall, Suite 500, Sacramento, CA 95814-4706).	Annually, Reclamation submits weekly DAT reports and an annual written report to NMFS describing the results of real-time monitoring of winter-run, spring-run, CV steelhead, and Southern DPS of green sturgeon associated with operations of the DCC and CVP Delta pumping facilities, and other Division level operations authorized through this RPA. In addition to the DAT process, we now utilize Real-Time data reporting. This data is housed within SacPAS. http://www.cbr.washington.edu/sacramento/		DWR/USBR		10/1/2013	Elissa Buttermore, Towns Burgess, Farida Islam (DWR)	
NMFS	11.2.1.3	Monitoring and Reporting Requirements	5) Reclamation and DWR shall continue the real-time monitoring of winter-run, spring-run, CV steelhead, and Southern DPS of green sturgeon in the lower Sacramento River, the lower San Joaquin River, and the Delta to establish presence and timing to serve as a basis for the management of DCC gate operations and CVP and SWP Delta pumping operations consistent with actions in the RPA. Reclamation and DWR shall conduct continuous real-time monitoring between October 1 and June 30 each year, commencing in 2009.	From October 1 - June 30, Reclamation continues the real-time monitoring of winter-run, spring-run, CV steelhead, and Southern DPS of green sturgeon in the lower Sacramento River, the lower San Joaquin River, and the Delta to establish presence and timing to serve as a basis for the management of DCC gate operations and CVP and SWP Delta pumping operations consistent with actions in this RPA. In addition to the DAT process, we now utilize Real-Time data reporting. This data is housed within SacPAS. http://www.cbr.washington.edu/sacramento/		DWR/USBR			Elissa Buttermore, Towns Burgess, Farida Islam (DWR)	
NMFS	11.2.1.3	Monitoring and Reporting Requirements	6) Reclamation and DWR shall submit weekly DAT reports and an annual written report to NMFS describing the results of real-time monitoring of winter-run, spring-run, CV steelhead, and Southern DPS of green sturgeon associated with operations of the DCC and CVP and SWP Delta pumping facilities, and other Division level operations authorized through this RPA.	Annually, Reclamation submits weekly DAT reports and an annual written report to NMFS describing the results of real-time monitoring of winter-run, spring-run, CV steelhead, and Southern DPS of green sturgeon associated with operations of the DCC and CVP Delta pumping facilities, and other Division level operations authorized through this RPA. In addition to the DAT process, we now utilize Real-Time data reporting. This data is housed within SacPAS. http://www.cbr.washington.edu/sacramento/		DWR/USBR		Ongoing thru 2030;	Elissa Buttermore, Towns Burgess, Farida Islam (DWR)	
NMFS	11.2.1.3 (NOTE: this item was not included in the original master matrix)	Monitoring and Reporting Requirements	7) Reclamation shall coordinate with NMFS, USFWS, and CDFG to continue implementation and funding of fisheries monitoring of spring-run and CV steelhead (including adult snorkel surveys, population estimates for steelhead, and rotary screw trapping) in Clear Creek to aid in determining the benefits and effects of flow and temperature management.	This is on-going.		NMFS/USFWS/CDFG/USBR			John Hannon	

	Title	Objective	Action	Status	Importance Level	Responsible Agency	Lead	Due Date	Point of Contact	Additional Point(s) of Contact
NMFS	11.2.1.3	Monitoring and Reporting Requirements	8) Reclamation and DWR shall jointly fund these monitoring locations for the duration of the Opinion (through 2030) to ensure compliance with the RPA and assess the performance of the RPA actions. a) Upstream: Adult escapement and juvenile monitoring for spring-run, winter-run, and steelhead on the Sacramento River, American River, Feather River, Clear Creek, Mill Creek, Deer Creek and Battle Creek. c) Sacramento River new juvenile monitoring station: The exact location to be determined, between RBDD and Knights Landing. d) Delta: Continuation of the following monitoring stations that are part of the IEP: Chipps Island Trawl, Sacramento Trawl, Knights Landings RST, and beach seining program. Additionally, assist in funding new studies to determine green sturgeon relative abundance and habitat use in the Delta. e) San Joaquin River monitoring shall include: Adult escapement and juvenile monitoring for steelhead on the Stanislaus River; Mossdale Kodiak Trawling to determine steelhead smolt passage; steelhead survival studies associated with VAMP; monitoring at HORB to determine steelhead movement in and around the barrier; predation studies in front of HORB and at the three agricultural barriers in the South Delta; and new studies to include the use of non-lethal fish guidance devices (e.g., sound, light, or air bubbles) instead of rock barriers to keep juveniles out of the area influenced by export pumping.	**Daily, Reclamation continues to follow monitoring stations that are part of the IEP: Chipps Island Trawl, Sacramento Trawl, Knights Landings RST, and beach seining program. Additionally, we assist in funding new studies to determine green sturgeon relative abundance and habitat use in the Delta.**		DWR/USBR		Ongoing thru 2030	Mike Hendrick/Josh Israel	
NMFS	I.1. Clear Creek		The proposed action includes a static flow regime (no greater than 200 cfs all year) and uncertainty as to the availability of b(2) water in the future pose significant risk to these species. The RPA actions described below were developed based on a careful review of past flow studies, current operations, and future climate change scenarios. Although not all of the flow studies have been completed, NMFS believes these actions are necessary to address adverse project effects on flow and water temperature that reduce the viability of spring-run and CV steelhead in Clear Creek.	**This is on-going. See below**						
NMFS	I.1.1 Spring Attraction Flows	Encourage spring-run movement to upstream Clear Creek habitat for spawning.	Reclamation shall annually conduct at least two pulse flows in Clear Creek in May and June of at least 600 cfs for at least three days for each pulse, to attract adult spring-run holding in the Sacramento River main stem. This may be done in conjunction with channel-maintenance flows (Action I.1.2).	**In 2018, two pulse flows were released to Lower Clear Creek from Whiskeytown Dam to encourage adult Spring-run Chinook Salmon migration. The May-June timing was chosen to coincide with previously observed peak migration and replicate the perceived success observed during past pulse flows.**		USBR	USBR	May and June, annually	Derek Rupert	Paul Zedonis
NMFS	I.1.2. Channel Maintenance Flows	Minimize project effects by enhancing and maintain previously degraded spawning habitat for spring-run and CV steelhead	Reclamation shall re-operate Whiskeytown Glory Hole spills during the winter and spring to produce channel maintenance flows of a minimum of 3,250 cfs mean daily spill from Whiskeytown for one day, to occur seven times in a ten-year period, unless flood control operations provide similar releases. Re-operation of Whiskeytown Dam should be implemented with other project facilities as described in the EWP Pilot Program (Reclamation 2008d)	**A review by Reclamation's Dam Safety Office (DSO) on the implementation of Environmental Water Program (EWP) flows was completed in 2018. Reclamation has determined that the safety risks inherent in EWP are too great and that the EWP flows will not be implemented. An official memorandum from Reclamation was issued on Oct 30, 2018. This decision inhibits the ability of Whiskeytown Dam releases to produce channel maintenance flows, using glory hole uncontrolled spill**	.	USBR	USBR	Winter and spring	Derek Rupert	Paul Zedonis
NMFS	I.1.3. Spawning Gravel Augmentation	Enhance and maintain previously degraded spawning habitat for spring-run and CV steelhead.	Reclamation, in coordination with the Clear Creek Technical team, shall continue spawning gravel augmentation efforts. By **December 31** each year, Reclamation shall provide a report to NMFS on implementation and effectiveness of the gravel augmentation program.	**Gravel augmentations continued in 2018 with the addition of 10,000 tons of clean size-sorted gravel which was injected at several locations throughout Lower Clear Creek. Additionally, planning for the next five years of gravel augmentations are being contemplated by a group of technical experts that will guide future actions (i.e. where and how much gravel to place annually).**		USBR	USBR	December, annually	Derek Rupert	Paul Zedonis
NMFS	I.1.4. Spring Creek Temperature Control Curtain (Note: This action benefits Sacramento River conditions, but is part of Clear Creek operations)	Reduce adverse impacts of project operations on water temperature for listed salmonids in the Sacramento River.	Reclamation shall replace the Spring Creek Temperature Control Curtain in Whiskeytown Lake by **June 2011**	**This was completed. In addition, however, significant maintenance of the SCTCC occurred in 2017 to ensure the functionality of design was retained. Oak Bottom Curtain was replaced a few years back and it too is functioning as designed.**		USBR	USBR		Derek Rupert	Paul Zedonis

	Title	Objective	Action	Status	Importance Level	Responsible Agency	Lead	Due Date	Point of Contact	Additional Point(s) of Contact
NMFS	I.1.5 Thermal Stress Reduction	To reduce thermal stress to over-summering steelhead and spring-run during holding, spawning, and embryo incubation.	Reclamation shall manage Whiskeytown releases to meet a daily water temperature of: 1) 60°F at the Igo gage from **June 1 through September 15**; and 2) 56°F at the Igo gage from **September 15 to October 31**. Reclamation, in coordination with NMFS, will assess improvements to modeling water temperatures in Clear Creek and identify a schedule for making improvements.	In 2018, Thermal Stress Reduction water temperature criteria were met at Igo for all but one of the 106-day period for holding (maximum mean daily 60°F). Spawning/incubation criteria (maximum mean daily 56°F) were met for all but 4 days for the spawning period. In 2018, like other years with warm dry fall seasons, CVO flow management has occasionally not been able to meet temperature targets as the reservoir begins to run out of cold water pool. Temperature targets at Igo are sometimes able to be addressed with additional release of cold water. By the end of the spawning/incubation criteria period this year however, the cold water pool of Whiskeytown Lake was exhausted.	Temperature management needs to remain however we may need to propose adjustments based on water year types. Look at new temperature targets. Biologically we may need to look at this requirement and its relevance to 'take' of listed fish. Pair the temperature importance to real time monitoring of fish locations. May need to look at locations of temp. gauges and the existing system temp monitoring.	USBR	USBR	Begin June-October, annually	Derek Rupert	Paul Zedonis
NMFS	I.1.6. Adaptively Manage to Habitat Suitability/IFIM Study Results	Decrease risk to Clear Creek spring-run and CV steelhead population through improved flow management designed to implement state-of-the-art scientific analysis on habitat suitability.	Reclamation shall operate Whiskeytown Reservoir as described in the Project Description with the modifications described in Action I.1 until **September 30, 2012**, or until 6 months after current Clear Creek salmonids habitat suitability (e.g., IFIM) studies are completed, whichever occurs later. When the salmonid habitat suitability studies are completed, Reclamation will, in conjunction with the CCTT, assess whether Clear Creek flows shall be further adapted to reduce adverse impacts on spring-run and CV steelhead, and report their findings and proposed operational flows to NMFS within 6 months of completion of the studies.	The FWS began an IFIM study on Clear Creek in 2004 looking at flow habitat relationships for salmon and steelhead. The results of the study are contained in four final reports. In addition, a fifth report known as the "Synthesis Report" takes the findings of the four IFIM studies and recommends flows based on flow habitat relationships. A final flow recommendation from Reclamation from these reports has not yet been proposed, but a conceptual process for developing annual flow needs for Clear Creek that considers more holistic needs of Clear Creek salmonid populations has been discussed with the CCTT.The CCTT (which includes a NMFS representative) intends this effort to address and meet the needs of both this RPA (Action I.1.6), and meet need of the CVPIA Clear Creek Restoration Program, which has a mandate under CVPIA to provide a long-term flow prescription to mitigate for the impacts of the CVP. Working with NMFS and the CCTT, Reclamation should continue to assess Clear Creek flows and determine if they should be further adapted to reduce adverse impacts on spring-run Chinook and steelhead and encourage the restoration of Clear Creek salmonids.		USBR	USBR	12/30/2012; 7/11/13 (synthesis report)	Derek Rupert	Paul Zedonis
NMFS	1.2.1 Performance Measures.	To establish and operate to a set of performance measures for temperature compliance points and End-of-September (EOS) carryover storage, enabling Reclamation and NMFS to assess the effectiveness of this suite of actions over time. Performance measures will help to ensure that the beneficial variability of the system from changes in hydrology will be measured and maintained.	The following long-term performance measures shall be attained. Reclamation shall track performance and report to NMFS at least every 5 years. If there is significant deviation from these performance measures over a 10-year period, measured as a running average, which is not explained by hydrological cycle factors (e.g., extended drought), then Reclamation shall reinitiate consultation with NMFS. Performance measures for EOS carryover storage at Shasta Reservoir: • 87 percent of years: Minimum EOS storage of 2.2 MAF • 82 percent of years: Minimum EOS storage of 2.2 MAF and end-of-April storage of 3.8 MAF in following year (to maintain potential to meet Balls Ferry compliance point) • 40 percent of years: Minimum EOS storage 3.2 MAF (to maintain potential to meet Jelly's Ferry compliance point in following year). Measured as a 10-year running average, performance measures for temperature compliance points during summer season shall be: • Meet Clear Creek Compliance point 95 percent of time • Meet Balls Ferry Compliance point 85 percent of time • Meet Jelly's Ferry Compliance point 40 percent of time • Meet Bend Bridge Compliance point 15 percent of time	This is on-going. See below		USBR	USBR			
NMFS	I.2.2. November through February Keswick Release Schedule (Fall Actions)	Minimize impacts to listed species and naturally spawning non-listed fall-run from high water temperatures by implementing standard procedures for release of cold water from Shasta Reservoir	Depending on EOS carryover storage and hydrology, Reclamation shall develop and implement a Keswick release schedule, and reduce deliveries and exports as detailed below.	This is on-going.		USBR	USBR		Randi Field, Josh Israel	

	Title	Objective	Action	Status	Importance Level	Responsible Agency	Lead	Due Date	Point of Contact	Additional Point(s) of Contact
NMFS	I.2.2.A Implementation Procedures for EOS Storage at 2.4 MAF and Above		If the EOS storage is at 2.4 MAF or above, by **October 15**, Reclamation shall convene a group including NMFS, USFWS, and CDFG, through B2IT or other comparable process, to consider a range of fall actions. A written monthly average Keswick release schedule shall be developed and submitted to NMFS by **November 1** of each year, based on the criteria below. The monthly release schedule shall be tracked through the work group.	This is on-going.		USBR	USBR	Meet by October 15; release schedule annually by November 1	Randi Field, Josh Israel	
NMFS	I.2.2.B Implementation Procedures for EOS Storage Above 1.9 MAF and Below 2.4 MAF		If EOS storage is between 1.9 and 2.4 MAF, then Reclamation shall convene a group including NMFS, USFWS, and CDFG, through B2IT or other comparable workgroup, to consider a range of fall actions. Reclamation shall provide NMFS and the work group with storage projections based on 50 percent, 70 percent, and 90 percent hydrology through February, and develop a monthly average Keswick release schedule based on the criteria below. The monthly release schedule shall be submitted to NMFS by **November 1**.	This is on-going.		USBR	USBR	Annually by November 1	Randi Field, Josh Israel	
NMFS	I.2.2.C. Implementation and Exception Procedures for EOS Storage of 1.9 MAF or Below		If the EOS storage is at or below 1.9 MAF, then Reclamation shall: 1) **In early October**, reduce Keswick releases to 3,250 cfs as soon as possible, unless higher releases are necessary to meet temperature compliance points (see action I.2.3). 2) Starting **in early October,** if cool weather prevails and temperature control does not mandate higher flows, curtail discretionary water deliveries (including, but not limited to agricultural rice decomposition deliveries) to the extent that these do not coincide with temperature management for the species.	This is on-going.	The NMFS initiated Shasta RPA adjustment process is not geared towards the re-initiation process. As such, coordination internally will need to occur as part of the Shasta RPA adjustment, current RPA requirements, and needs during re-initiation to avoid jeopardy. Path forward may be to create a more resilient process as part of re-initiation during the new BAs.	USBR/DWR	USBR	Annually in early October	Randi Field, Josh Israel	
NMFS	I.2.3. February Forecast; March – May 14 Keswick Release Schedule (Spring Actions)	To conserve water in Shasta Reservoir in the spring in order to provide sufficient water to reduce adverse effects of high water temperature in the summer months for winter-run, without sacrificing carryover storage in the fall.	1) Reclamation shall make its **February 15** forecast of deliverable water based on an estimate of precipitation and runoff within the Sacramento River basin at least as conservative as the 90 percent probability of exceedance. Subsequent updates of water delivery commitments must be based on monthly forecasts at least as conservative as the 90 percent probability of exceedance. 2) Reclamation shall make releases to maintain a temperature compliance point not in excess of 56 degrees between Balls Ferry and Bend Bridge from **April 15 through May 15**.	This is on-going.	See above	USBR	USBR	2/15/14: February 2014 forecast for March - May due	Randi Field, Josh Israel	
NMFS	I.2.3.A Implementation Procedures if February Forecast, Based on 90 Percent Hydrology, Shows that Balls Ferry Temperature Compliance Point and 2.2 MAF EOS are Both Achievable		NMFS will review the draft February forecast to determine whether both a temperature compliance point at Balls Ferry during the temperature control season (**May – October**), and EOS storage of at least 2.2 MAF, is likely to be achieved. If both are likely, then Reclamation shall announce allocations and operate Keswick releases in **March, April, and May** consistent with its standard plan of operation. Preparation of a separate Keswick release schedule is not necessary in these circumstances.	This is on-going.	See above	NMFS	NMFS	March, April, May for releases. May-October for temp control.	Randi Field, Josh Israel	

	Title	Objective	Action	Status	Importance Level	Responsible Agency	Lead	Due Date	Point of Contact	Additional Point(s) of Contact
NMFS	I.2.3.B Implementation Procedures if February Forecast, Based on 90 Percent Hydrology, Shows that Only Balls Ferry Compliance or 2.2 MAF EOS, but Not Both, Is Achievable		1) On or before **February 15**, Reclamation shall reduce Keswick releases to 3,250 cfs, unless NMFS concurs on an alternative release schedule. This reduction shall be maintained until a flow schedule is developed per procedures below. 2) In coordination with NMFS, by **March 1**, Reclamation shall develop an initial monthly Keswick release schedule, based on varying hydrology of 50 percent, 70 percent, and 90 percent (similar in format to the fall and winter action implementation procedures). These schedules shall be used as guidance for monthly updates and consultations. 3) Based on this guidance, Reclamation shall consult with NMFS monthly on Keswick releases. Reclamation shall submit a projected forecast, including monthly average release schedules and temperature compliance point to NMFS every month, within 7 business days of receiving the DWR runoff projections for that month. Within 3 business days of receiving this information from Reclamation, NMFS will review the draft schedule for consistency with the criteria below and provide written recommendations to Reclamation. 4) The initial monthly Keswick release schedule, and subsequent monthly updates, shall be developed.	**This is on-going.**		USBR	USBR		Randi Field, Josh Israel	
NMFS	I. 2.3. C. Drought Exception Procedures if February Forecast, Based on 90 Percent Hydrology, Shows that Clear Creek Temperature Compliance Point or 1.9 MAF EOS Storage is Not Achievable		Reclamation shall follow all procedures immediately above (Action I.2.3.B) and, in addition, shall: 1) By **March 1**, provide a contingency plan with a written justification that all actions within Reclamation's authorities and discretion are being taken to preserve cold water at Shasta Reservoir for the protection of winter-run. 2) The contingency plan shall also, at a minimum, include the following assessments and actions: a) Relaxation of Wilkins Slough navigation criteria to at most 4,000 cfs. b) An assessment of any additional technological or operational measures that may be feasible and may increase the ability to manage the cold water pool. c) Notification to State Water Resources Control Board that meeting the biological needs of winter-run and the needs of resident species in the Delta, delivery of water to nondiscretionary Sacramento Settlement Contractors, and Delta outflow requirements per D-1641, may be in conflict in the coming season and requesting the Board's assistance in determining appropriate contingency measures, and exercising their authorities to put these measures in place. 3) If, during the temperature control season, a Clear Creek TCP on the Sacramento River cannot be achieved, then Reclamation shall bypass power at Shasta Dam if NMFS determines a bypass is necessary for preserving the cold water pool. This power by-pass may be necessary to maintain temperature controls for winter-run, or later in the temperature season, for spring-run.	**This is on-going. The 'orange' on-going updates as they are related to Sac River Temperatures are due to communication concerns as part of the SRTTG and NMFS and others within Reclamation.**		USBR	USBR	3/1/2013: Contingency plan	Randi Field, Josh Israel	

	Title	Objective	Action	Status	Importance Level	Responsible Agency	Lead	Due Date	Point of Contact	Additional Point(s) of Contact
NMFS	1.2.4 May 15 Through October Keswick Release Schedule (Summer Action)	To manage the cold water storage within Shasta Reservoir and make cold water releases from Shasta Reservoir to provide suitable habitat temperatures for winter-run, spring-run, CV steelhead, and Southern DPS of green sturgeon in the Sacramento River between Keswick Dam and Bend Bridge, while retaining sufficient carryover storage to manage for next year's cohorts. To the extent feasible, manage for suitable temperatures for naturally spawning fall-run.	Reclamation shall develop and implement an annual Temperature Management Plan by May 15 to manage the cold water supply within Shasta Reservoir and make coldwater releases from Shasta Reservoir and Spring Creek to provide suitable temperatures for listed species, and, when feasible, fall run. Reclamation shall manage operations to achieve daily average water temperatures in the Sacramento River between Keswick Dam and Bend Bridge as follows: 1) Not in excess of 56°F at compliance locations between Balls Ferry and Bend Bridge from **May 15 through September 30** for protection of winter run, and not in excess of 56°F at the same compliance locations between Balls Ferry and Bend Bridge from **October 1 through October 31** for protection of mainstem spring run, whenever possible. 2) Reclamation shall operate to a final Temperature Management Plan starting **May 15 and ending October 31**. 3) As part of the adaptive management process, and in coordination with NMFS, by **March 2010**, Reclamation shall fund an independent modeler to review these procedures and the recommendations of the CALFED Science Panel report on temperature management and recommend specific refinements to these procedures to achieve optimal temperature management, with due consideration of the CALFED Science panel's recommendations (Deas et al., 2009) regarding temperature management. Upon written concurrence of NMFS, refinements to the implementation procedures for this action	**This is on-going, worth noting USBR does not always comply with temperature standards.**		USBR	USBR	May-September, October 1 through October 31 temp controls. May 2013: annual temperature monitoring plan. May 15 to October 31 operate final Temp management plan.	Randi Field, Josh Israel	
NMFS	I.2.5. Winter-Run Passage and Re-Introduction Program at Shasta Dam	See Fish Passage Program, Action V		**All fish passage actions are on hold.**					John Hannon	
NMFS	Action I.2.6. Restore Battle Creek for Winter-Run, Spring-Run, and CV Steelhead	To partially compensate for unavoidable adverse effects of project operations by restoring winter-run and spring-run to the Battle Creek watershed. A second population of winter-run would reduce the risk of extinction of the species from lost resiliency and increased vulnerability to catastrophic events.	Reclamation shall direct discretionary funds to implement the Battle Creek Salmon and Steelhead Restoration Project. Phase 1A funding is currently allocated through various partners and scheduled to commence in **Summer 2009** (Reclamation 2008c). DWR shall direct discretionary funds for Phase 1B and Phase 2, consistent with the proposed amended Delta Fish Agreement by **December 31** of each year, Reclamation will submit a written report to NMFS on the status of the project, including phases completed, funds expended, effectiveness of project actions, additional actions planned (including a schedule for further actions), and additional funds needed. The Battle Creek Salmon and Steelhead Restoration Project shall be completed no later than **2019**.	**Phase 1A funding was allocated through various partners and commenced in Summer 2009. DWR directed discretionary funds for Phase 1B and Phase 2, consistent with the proposed amended Delta Fish Agreement by December 31 of each year. Since 2012, I have provided annual written reports to the Bay-Delta Office, and then the Bay-Delta Office has sent each annual report to NMFS.** **Construction related to the Battle Creek Salmon and Steelhead Restoration Project is anticipated to be complete in 2021. An additional $24 million in funds are estimated to be required. For FY17, the Phase 1A North Forks Screens and Ladders Completion Contract was awarded in July 2016, and construction under this contract is occurring in 2017 and into 2018. Also, Phase 2 design efforts are proceeding in 2017.** **Please see 2016 annual report for further information.**		USBR/DWR	USBR	Annual reporting by December 31, 2013	John Hannon	
NMFS	I.3.1. Operations after May 14, 2012: Operate RBDD with Gates Out		No later than **May 15, 2012**, Reclamation shall operate RBDD with gates out all year to allow unimpeded passage for listed anadromous fish. If the Red Bluff Alternative Intake Structure is not anticipated to be operational by **May 15, 2012**, Reclamation may submit a request to NMFS, no later than **January 31, 2012**, to close the gates from **June 15 to September 1, 2012**. This request must document that all milestones for construction of the alternative pumping plant have been met and that all other conservation measures (see below) have been implemented.	**N/A**		USBR	USBR	5/15/2012, 1/31/2012	N/A	
NMFS	I.3.2. Interim Operations		Until **May 14, 2012**, Reclamation shall operate RBDD according to the following schedule: • **September 1 - June 14**: Gates open. No emergency closures of gates are allowed. • **June 15 - August 31**: Gates may be closed at Reclamation's discretion, if necessary to deliver water to TCCA.	**N/A**		USBR	USBR		N/A	
NMFS	I.3.3. Interim Operation for Green Sturgeon	Allow passage of green sturgeon during interim operations.	When gates are in, Reclamation shall retain a minimum 18-inch opening under the gates that are open, to allow safe downstream passage of adult green sturgeon. The 18-inch opening may be modified to 12 inches by the RBDD technical team if necessary to maintain the structural integrity of the dam and/or adequate attraction flows for salmonids at the fish ladders, or in consideration of other real-time fish migratory issues.	**N/A**		USBR	USBR	6/15/2009	N/A	

	Title	Objective	Action	Status	Importance Level	Responsible Agency	Lead	Due Date	Point of Contact	Additional Point(s) of Contact
NMFS	I.3.4: Measures to Compensate for Adverse Effects of Interim Operations on Green Sturgeon	Offset short-term effects to green sturgeon due to interim gate operations by investing in geographically specific research needed to determine green sturgeon life history and recovery needs.	Reclamation shall continue ongoing funded research to characterize green sturgeon populations in the upper Sacramento River Basin, their movements, and habitat usage, as planned through **fiscal year 2009**. In addition, Reclamation (or TCCA) shall convene a technical team, including representatives from NMFS, CDFG, USFWS, Corps, the University of California at Davis (UCD), and other cooperators, to review studies and results and coordinate research needs for green sturgeon. Reclamation and/or TCCA shall provide the necessary funding to insure that research will continue to be conducted in a coordinated and cooperative manner with the express intent of fully implementing the research projects described in the UCD proposal in Appendix 2-B to this Opinion.	**Completed. Documentation available.**	**Reclamation and DWR may need to look at long-term funding for related monitoring. Perhaps can go to CVPIA for adaptive monitoring management. Need to mention in the BiOps regarding our path forward. Specifically regarding to RBDD, N/A; however, we need to make sure we cover long-term monitoring as part of the project description.**	USBR	USBR	End of summer 2013	Josh I and Paul Zedonis	
NMFS	I.3.5. Measures to Compensate for Adverse Effects of Interim Operations on Spring-Run	Offset unavoidable short-term effects to spring-run from passage impediments of RBDD by restoring spring-run passage elsewhere in the Sacramento River system.	Reclamation shall provide $500,000 for implementation of spring-run passage improvement projects in the Sacramento River. Appendix 2-B describes specific projects that may be implemented. By **December 15, 2009**, Reclamation shall provide NMFS with a prioritized list of projects from Appendix 2-B and an implementation schedule. Reclamation shall provide an annual report to NMFS on implementation and effectiveness of projects. Reclamation shall monitor and maintain these projects for five years.	**In 2009/2010, a letter was provided regarding $500K for spring run passage improvements.**		USBR/NMFS		12/15/2009: list of projects from Appendix 2B and implementation schedule. Annual report required.	N/A	
NMFS	I.4. Wilkins Slough Operations	Enhance the ability to manage temperatures for anadromous fish below Shasta Dam by operating Wilkins Slough in the manner that best conserves the dam's cold water pool for summer releases.	Reclamation shall convene the SRTTG to review past operational data, hydrology, and fisheries needs for Wilkins Slough. The SRTTG shall recommend Wilkins Slough minimum flows for anadromous fish in critically dry years, in lieu of the current 5,000 cfs navigation criterion. Recommendations shall be made to NMFS by **December 1, 2009**. The recommendations will be implemented upon NMFS' concurrence. In years other than critically dry years, the need for a variance from the 5,000 cfs navigation criterion will be considered during the process of developing the Keswick release schedules (Action I.2.2-4).	**This is on-going.**		USBR	USBR	12/1/2009	Randi Field	
NMFS	I.5. Funding for CVPIA Anadromous Fish Screen Program (AFSP)	To reduce entrainment of juvenile anadromous fish from unscreened diversions.	Reclamation shall screen priority diversions as identified in the CVPIA AFSP, consistent with previous funding levels for this program. In addition, Reclamation/CVPIA Program shall evaluate the potential to develop alternative screened intakes that allow diverters to withdraw water below surface levels required by the antiquated Wilkins Slough navigation requirement criterion of 5,000 cfs.	**This is essentially complete. Probably does not need to be a part of the re-initiation.**		USBR	USBR	Annually in September		
NMFS	I.6.1. Restoration of Floodplain Rearing Habitat	To restore floodplain rearing habitat for juvenile winter-run, spring-run, and CV steelhead in the lower Sacramento River basin. This objective may be achieved at the Yolo Bypass, and/or through actions in other suitable areas of the lower Sacramento River.	In cooperation with CDFG, USFWS, NMFS, and the Corps, Reclamation and DWR shall, to the maximum extent of their authorities (excluding condemnation authority), provide significantly increased acreage of seasonal floodplain rearing habitat, with biologically appropriate durations and magnitudes, from **December through April**, in the lower Sacramento River basin, on a return rate of approximately one to three years, depending on water year type. In the event that this action conflicts with Shasta Operations Actions I.2.1 to I.2.3, the Shasta Operations Actions shall prevail. By December 31, 3011, Reclamation and DWR shall submit to NMFS a plan to implement this action. The plan should include an evaluation of options to restore juvenile rearing areas, increase inundation of acreage within the Yolo Bypass, modify operations of the Sacramento Weir or Fremont weir to increase rearing habitat, and achieve the restoration objective through other operational or engineering solutions.	**This is on-going. The Yolo Bypass Salmonid Habitat Restoration and Fish Passage EIS/EIR Final is to be completed at February 2019. Construction planned for 2020 or 2021.**	**High Importance. However, this is on-going and should be completed prior to start of re-initiation. We need to make sure this occurs as planned.**	USBR/DWR	DWR	9/30/2009, 6/30/2010, 6/30/2012, 12/31/2011 -- STATUS: Updated deadline dates are currently under development	Ben Nelson/ Josh Israel	

	Title	Objective	Action	Status	Importance Level	Responsible Agency	Lead	Due Date	Point of Contact	Additional Point(s) of Contact
NMFS	I.6.2. Near-Term Actions at Liberty Island/Lower Cache Slough and Lower Yolo Bypass		By **September 30, 2010**, Reclamation and/or DWR shall take all necessary steps to ensure that an enhancement plan is completed and implemented for Liberty Island/Lower Cache Slough, as described in Appendix 2-C. This action shall be monitored for the subsequent five years, at a minimum, to evaluate the use of the area by juvenile salmonids and to measure changes in growth rates. Interim monitoring reports shall be submitted to NMFS annually, by September 30 each year, and a final monitoring report shall be submitted on **September 30, 2015**, or in the fifth year following implementation of enhancement actions. NMFS will determine at that time whether modification of the action or additional monitoring is necessary to achieve or confirm the desired results. This action shall be designed to avoid stranding or migration barriers for juvenile	**This is on-going. DWR leading this effort**		USBR/DWR	DWR	Annual report due December 31, 2012 per 10/10/12 letter with FRPA implementation strategy. 9/30/2010, then annually to 9/30/2015	Ben Nelson/ Josh Israel	
NMFS	I.6.3. Lower Putah Creek Enhancements		By **December 31, 2015**, Reclamation and/or DWR shall develop and implement Lower Putah Creek enhancements as described in Appendix 2-C, including stream realignment and floodplain restoration for fish passage improvement and multi-species habitat development on existing public lands. By **September 1** of each year, Reclamation and/or DWR shall submit to NMFS a progress report towards the successful implementation of this action. This action shall not result in stranding or migration barriers for juvenile salmon.	**This is on-going. DWR leading this effort**		USBR/DWR	DWR	9/1/09, then annually to 2015. 9/1/2013	Ben Nelson/ Josh Israel	
NMFS	I.6.4. Improvements to Lisbon Weir		By **December 31, 2015**, Reclamation and/or DWR shall, to the maximum extent of their authorities, assure that improvements to the Lisbon Weir are made that are likely to achieve the fish and wildlife benefits described in Appendix 2-C. Improvements will include modification or replacement of Lisbon Weir, if necessary to achieve the desired benefits for fish. If neither Reclamation nor DWR has authority to make structural or operational modifications to the weir, they shall work with the owners and operators of the weir to make the desired improvements, including providing funding and technical assistance. By **September 1** of each year, Reclamation and/or DWR shall submit to NMFS a report on progress toward the successful implementation of this action. Reclamation and DWR must assure that this action does not result in migration barriers or stranding of juvenile salmon.	**This is on-going. DWR leading this effort. The flapgates were replaced and research is ongoing to determine if this was sufficient.**		USBR/DWR	DWR	9/30/2009, 6/30/2010, 6/30/2012, 12/31/2011 -- STATUS: Updated deadline dates are currently under development	Ben Nelson/ Josh Israel	
NMFS	I.7. Reduce Migratory Delays and Loss of Salmon, Steelhead, and Sturgeon at Fremont Weir and Other Structures in the Yolo Bypass	Reduce migratory delays and loss of adult and juvenile winter-run, spring-run, CV steelhead and Southern DPS of green sturgeon at Fremont Weir and other structures in the Yolo Bypass.	By **December 31, 2011**, as part of the plan described in Action I.6.1, Reclamation and/or DWR shall submit a plan to NMFS to provide for high quality, reliable migratory passage for Sacramento Basin adult and juvenile anadromous fishes through the Yolo Bypass. By **June 30, 2012**, Reclamation and/or DWR shall obtain NMFS concurrence and, to the maximum extent of their authorities, and in cooperation with other agencies and funding sources, begin implementation of the plan, including any physical modifications. By **September 30, 2009**, Reclamation shall request in writing that the Corps take necessary steps to alter Fremont Weir and/or any other facilities or operations requirements of the Sacramento River Flood Control Project or Yolo Bypass facility in order to provide fish passage and shall offer to enter into a Memorandum of Understanding, interagency agreement, or other similar mechanism, to provide technical assistance and funding for the necessary work. By J**une 30, 2010**, Reclamation shall provide a written report to NMFS on the status of its efforts to complete this action, in cooperation with the Corps, including milestones and timelines to complete passage improvements. Reclamation and/or DWR shall assess the performance of improved passage and flows through the bypass, to include an adult component for salmonids and sturgeon (i.e., at a minimum, acoustic receivers placed at the head and tail of the bypass to detect use by adults).	**Fremont Weir construction project had is groundbreaking on May 30, 2018. The Fremont Weir modification project modernized the structure and widen the channel through which the fish swim to ease their passage to upstream habitat. Adult fish passage at Fremont Weir was addressed as part of the Yolo Bypass Salmonid Habitat Restoration and Fish Passage EIS/EIR. Other fish passage improvements associated with Yolo Bypass are still under review for solutions.**		USBR/DWR	DWR	9/30/2009, 6/30/2010, 6/30/2012, 12/31/2011 -- STATUS: Updated deadline dates are currently under development	Ben Nelson/ Josh Israel	

	Title	Objective	Action	Status	Importance Level	Responsible Agency	Lead	Due Date	Point of Contact	Additional Point(s) of Contact
NMFS	II.1. Lower American River Flow Management	To provide minimum flows for all steelhead life stages.	Implement the flow schedule specified in the Water Forum's Flow Management Standard (FMS), which is summarized in Appendix 2-D of this Opinion. The FMS flow schedule has been developed by the Water Forum, Reclamation, USFWS, NMFS, and CDFG in order to establish required minimum flows for anadromous salmonids in the lower American River. The flow schedule specifies minimum flows and does not preclude Reclamation from making higher releases at Nimbus Dam. Reclamation shall ensure that flow, water temperature, steelhead spawning, and steelhead rearing monitoring is conducted annually in order to help inform the ARG process and to evaluate take associated with flow fluctuations and warm water temperatures. Steelhead monitoring surveys should follow the objectives and protocols specified in the FMS Monitoring and Evaluation Program relating to steelhead spawning and rearing.	**The Nimbus Dam releases to the LAR and the MRR prescribed by the FMS for water year 2016 are shown in the ARG 2016 Annual Report. Operational decisions were closely coordinated with agencies to offer protection to the Sacramento River fishery. Hydrologic conditions for both an "Off-Ramp" and "Conference Year" were satisfied in 2015 and carried into early 2016. During the fall and winter the FMS MRR operational decisions were outside "normal conditions" and were decided based on multi-agency input. Coordination occurred during ARG and Real-Time Drought Operations Management Team meetings.**		USBR	USBR		Peggy Manza	
NMFS	II.2. Lower American River Temperature Management	Maintain suitable temperatures to support over-summer rearing of juvenile steelhead in the lower American River.	Each year, Reclamation shall prepare a draft Operations Forecast and Temperature Management Plan based on forecasted conditions and submit the draft Plan to NMFS for review by **May 1** of each year. The information provided in the Operations Forecast will be used in the development of the Temperature Plan. The draft plan shall contain: (1) forecasts of hydrology and storage; (2) a modeling run or runs, using these forecasts, demonstrating that the temperature compliance point can be attained (see Coldwater Management Pool Model approach in Appendix 2-D); (3) a plan of operation based on this modeling run that demonstrates that all other non-discretionary requirements are met; and (4) allocations for discretionary deliveries that conform to the plan of operation.	**Reclamation submitted a Temperature Management Plan to NMFS on May 10, 2016. The Plan was updated on June 30, 2016 and concurred by NMFS after releases on the Sacramento River were finalized. Between May 15th and October 31st a total of eleven days exceeded the daily average temperature target, all during periods where summer ambient air temperatures were the hottest, despite active operational blending changes. The November desired daily average temperature target at Watt Ave. was 58°F. The average daily temperature at Watt Ave. during the bypass operation in November was approximately 58.5°F.**		USBR	USBR		CVO contact for American River in WY18 is Sarah Perrin	
NMFS	II.3. Structural Improvements	Improve the ability to manage the cold water pool to provide suitable temperatures for listed fish through physical and structural improvements at the dams.	Reclamation shall evaluate physical and structural modifications that may improve temperature management capability, as detailed below. Upon completion of the evaluation, Reclamation shall select the most promising projects and shall submit, by **June 30th 2010**, a proposed plan to NMFS to implement selected projects. Reclamation shall seek NMFS' concurrence that the proposed projects are likely to be effective in reducing adverse effects of warm water temperatures on listed fish. With NMFS' concurrence, Reclamation shall implement selected projects by **December 15, 2012**. Modifying the following structures may substantially improve the ability to manage temperature in the Lower American River to reduce adverse effects of unsuitably warm water on listed species. The comparative benefits and costs of alternative modifications that will achieve objectives have not been fully analyzed. The objective of this action is to provide effective tools to make transparent temperature management decisions. Alternatives include decision impact analyses, regular analysis of a broad array of operational scenarios, improved operations group processes, and monitoring.	**Reclamation completed evaluation of alternatives and sent summary email to NMFS on 6/30/2010. Recently have met with USACE, NMFS, and SAFECA. NMFS gave Reclamation a delay but has requested some interim work. Doing some work on the temperature control device at Folsom.**		USBR	USBR	12/15/2012 for chosen project implementation	Sarah Perrin	
NMFS	II.4. Minimize Flow Fluctuation Effects	Reduce stranding and isolation of juvenile steelhead through ramping protocols.	The following flow fluctuation objectives shall be followed: 1) From **January 1 through May 30**, at flow levels <5,000 cfs, flow reductions shall not exceed more than 500 cfs/day and not more than 100 cfs per hour. 2) From **January 1 through May 30**, Reclamation shall coordinate with NMFS, CDFG, and USFWS to fund and implement monitoring in order to estimate the incidental take of salmonids associated with reductions in Nimbus Dam releases. 3) Minimize the occurrence of flows exceeding 4,000 cfs throughout the year, except as may be necessary for flood control or in response to natural high precipitation events.	**On going.**		USBR	USBR	Jan through May monitoring	Sarah Perrin	
NMFS	II.5. Fish Passage at Nimbus and Folsom Dams	Provide access for steelhead to historic cold water habitat above Nimbus and Folsom dams.	See Fish Passage Program, Action V.	**As of 2016 not much to report on this RPA. Through agreement with NMFS, Reclamation's focus has been on passage at Shasta.**		USBR	USBR		John Hannon	

	Title	Objective	Action	Status	Importance Level	Responsible Agency	Lead	Due Date	Point of Contact	Additional Point(s) of Contact
NMFS	II.6.1. Preparation of Hatchery Genetic Management Plan (HGMP) for Steelhead		Reclamation shall fund CDFG to prepare a complete draft HGMP for steelhead production at Nimbus Fish Hatchery, in accordance with current NMFS guidelines, and submit that draft for NMFS review by **June 2011**. Specific actions shall include: 1) Reclamation shall fund genetic screening at Nimbus Fish Hatchery for steelhead to determine most appropriate brood stock source. This action shall be completed by **March 31, 2012**. 2) Reclamation shall fund a study examining the potential to replace the Nimbus Fish Hatchery steelhead broodstock, with genetically more appropriate sources. This action shall be completed by **March 31, 2012**	This is on-going but stalled due to genetics and CDFW review. Items 1 has been completed and continues at all steelhead hatcheries. Item 2 was funded and a report prepared on study status at the completion of the work. Now working on next steps to address the broodstock needed to be settled for fish passage to occur.		USBR	USBR	6/1/2011, 3/31/2012	Sarah Perrin	
NMFS	II.6.2. Interim Actions Prior to Submittal of Draft HGMP for Steelhead		Reclamation shall use its authorities to ensure that, prior to completion of the draft HGMP, the hatchery is operated according to the following protocols: 1) Release all hatchery-produced steelhead juveniles in the American River at Nimbus Fish Hatchery or at a location in the American River as close to Nimbus Fish Hatchery as is feasible to reduce straying. This action shall be implemented within 30 days of issuance of this Opinion. 2) Release all unclipped steelhead adults returning to Nimbus Fish Hatchery back into the lower American River so they can spawn naturally. This action shall be implemented within 30 days of issuance of this Opinion. 3) Stop inter-basin transfers of steelhead eggs or juveniles to other hatcheries, except upon specific written concurrence of NMFS. This action shall be implemented within 30 days of issuance of this Opinion.	This is not complete. Still a genetic issue with Eel River steelhead. Items 1, 2, and 3 are now standard operating procedures.		USBR	USBR		Sarah Perrin	
NMFS	II.6.3: Develop and Implement Fall-run Chinook Salmon Hatchery Management Plans for Nimbus and Trinity River Fish Hatcheries		By **June 2014**, develop and begin implementation of Hatchery Management Plans for fall-run production at Nimbus Fish Hatchery and spring-run and fall-run at Trinity River Fish Hatchery. Reclamation shall fund CDFG to develop and submit draft plans for NMFS review by **June 2013**. The goal of the plans shall be to reduce impacts of hatchery Chinook salmon on natural fall-run and spring-run, and increase the genetic diversity and diversity of run-timing for these stocks.	This is on-going. Reclamation developed a plan, sent to CDFW where it stalled, was then delivered to NMFS. NMFS commented and Reclamation made edits and has been again sent to CDFW. Awaiting review.		USBR	USBR	6/30/2014	Sarah Perrin and Paul Zedonis	
NMFS	III.1.1. Establish Stanislaus Operations Group for Real-Time Operational Decision-Making as Described in These Actions and Implementation Procedures		Reclamation shall create a SOG to provide a forum for real-time operational flexibility implementation of the alternative actions defined in this RPA and for clarification of decision-making processes regarding other allocations of the NMTP. This group shall include Reclamation, NMFS, USFWS, DWR, CDFG, SWRCB, and outside expertise at the discretion of NMFS and Reclamation. This group shall provide direction and oversight to ensure that the East Side Division actions are implemented, monitored for effectiveness and evaluated. Reclamation, in coordination with SOG, shall submit an annual summary of the status of these actions. See introduction to RPA for further information on group procedures.	This is on-going.		USBR	USBR		Zarela Guerrero	
NMFS	III.1.2. Provide Cold Water Releases to Maintain Suitable Steelhead Temperatures		Reclamation shall manage the cold water supply within New Melones Reservoir and make cold water releases from New Melones Reservoir to provide suitable temperatures for CV steelhead rearing, spawning, egg incubation smoltification, and adult migration in the Stanislaus River downstream of Goodwin Dam in order to maintain the temperature compliance schedule. Temperature compliance shall be measured based on a seven-day average daily maximum temperature. **Exception:** If any of these criteria is or is expected to be exceeded based on a three-day average daily maximum temperature, Reclamation shall immediately notify NMFS of this condition and shall submit to NMFS a written determination that, after taking all actions within its authorities, it is unlikely to meet the above temperature requirement and the extent and duration of the expected exceedance. This determination must be supported by specific iterative modeling techniques that vary allocations and delivery schedules.	This is on-going.		USBR	USBR	Final report due October 2013	Zarela Guerrero	

	Title	Objective	Action	Status	Importance Level	Responsible Agency	Lead	Due Date	Point of Contact	Additional Point(s) of Contact
NMFS	III.1.3. Operate the East Side Division Dams to Meet the Minimum Flows, as Measured at Goodwin Dam, Characterized in Figure 11-1, and as Specified in Appendix 2-E	To maintain minimum base flows to optimize CV steelhead habitat for all life history stages and to incorporate habitat maintaining geomorphic flows in a flow pattern that will provide migratory cues to smolts and facilitate out-migrant smolt movement on declining limb of pulse.	Reclamation shall operate releases from the East Side Division reservoirs to achieve a minimum flow schedule as prescribed in Appendix 2-E and generally described in figure 11-1 above. This flow schedule specifies minimum flows and does not preclude Reclamation from making higher releases for other operational criteria. When operating at higher flows than specified, Reclamation shall implement ramping rates for flow changes that will avoid stranding and other adverse effects on CV steelhead. In particular, flows that exceed 800 cfs will inundate known side channels that provide habitat, but that also pose stranding risks. When spring pulses greater than 800 cfs are identified in figure 11-1, the declining limb is not reduced below 800 cfs until the late spring flows occur.	**This is on-going.**		USBR	USBR	Final Report to NMFS due 12/2012	Zarela Guerrero	
NMFS	Action III.2.1. Increase and Improve Quality of Spawning Habitat with Addition of 50,000 Cubic Yards of Gravel by 2014 and with a Minimum Addition of 8,000 Cubic Yards per Year for the Duration of the		Reclamation shall minimize effects of their operations through improving spawning habitat with addition of 50,000 tons of gravel by **2014**. Reclamation shall submit a plan, including monitoring, and schedule to NMFS for gravel augmentation by **June 2010**. Reclamation shall begin gravel augmentations no later than **summer 2011**. Reclamation shall submit to NMFS a report on implementation and effectiveness of action by **2015**. Spawning gravel replenishment sites shall be monitored for geomorphic processes, material movement, and salmonid spawning use for a minimum of three years following each addition of sediment at any given site.	**Gravel augmentation is ongoing. 2015 Report has not been submitted.**		USBR	USBR	6/1/2010, summer 2011, 6/1/2014, 2015	Zarela Guerrero	
NMFS	Action III.2.2. Conduct Floodplain Restoration and Inundation Flows in Winter or Spring to Inundate Steelhead Juvenile Rearing Habitat on 1-3 Year Schedule.		Reclamation shall seek advice from SOG to develop an operational strategy to achieve floodplain inundation flows that inundate CV steelhead juvenile rearing habitat on a one- to three-year return schedule. Reclamation shall submit a proposed plan of operations to achieve this flow regime by **June 2011**. This plan shall include the minimum flow schedule identified in Action III.1.2, or shall provide justification for any proposed modification of the minimum flow schedule. NMFS will review and, if satisfactory, approve the operational strategy. Reclamation will implement strategy starting in **2012.**	**This is on-going. Some projects completed, others are not. Refer to SOG Annual Report.**		USBR	USBR	8/31/11, 2012; Need to coordinate and finalize	Zarela Guerrero	
NMFS	III.2.3. Restore Freshwater Migratory Habitat for Juvenile Steelhead by Implementing Projects to Increase Floodplain Connectivity and to Reduce Predation Risk During Migration	This action is necessary to compensate for continued operational effects on rearing and freshwater migratory habitat due to flood control operations. The goal of this action is to improve habitat quality of freshwater migratory habitat for juvenile steelhead.	By **June 2010**, in cooperation with the SOG, Reclamation shall develop a list of projects to improve the habitat values of freshwater migratory habitat in the Stanislaus River, and associated monitoring, for implementation and submit the list to NMFS for review. Reclamation shall begin implementation of NMFS-approved projects by **June 2011**. Reclamation shall submit a report of project implementation and effectiveness by **June 2016**. These projects may include actions that reduce exposure to predation directly, or projects that may offset predation effects by improving rearing habitat values to allow juveniles to grow larger before outmigration. These projects may include both flow- and non-flow-related actions. Flow-related actions shall be coordinated with operational flows as defined in Action III.2.2 and Action III.1.2. These projects may also include, but shall not be limited to, evaluations to identify locations or sources of higher juvenile mortality in order to identify and implement projects with the highest likelihood to prevent CV steelhead mortality.	**The Button Bush Restoration Project was completed in Fall 2017. Monitoring for juvenile use of the site's side channels and flood plain habitat was done in June 2018 and monitoring is still on-going. A report will be compiled once monitoring is complete.**		USBR	USBR	6/1/2010, 6/1/2011, 6/1/2016	Zarela Guerrero	
NMFS	III.2.4. Evaluate Fish Passage at New Melones, Tulloch, and Goodwin Dams	Evaluate access for steelhead to historic cold water habitat above New Melones, Tulloch, and Goodwin dams.	See Fish Passage Program, Action V	**Not complete…Per inter agency discussions, focus of rim dam fish passage has been Shasta. All fish passage activities are on hold as of July 2018.**		USBR	USBR		John Hannon	

	Title	Objective	Action	Status	Importance Level	Responsible Agency	Lead	Due Date	Point of Contact	Additional Point(s) of Contact
NMFS	IV.1.1 Monitoring and Alerts to Trigger Changes in DCC Operations	To provide timely information for DCC gate operation that will reduce loss of emigrating winter-run, spring-run, CV steelhead, and green sturgeon.	Monitoring of Chinook salmon migration in the Sacramento River Basin and the Delta currently occurs at the RBDD, in spring-run tributaries to the Sacramento River, on the Sacramento River at Knights Landing and Sacramento, and sites within the Delta. Reclamation and DWR shall continue to fund these ongoing monitoring programs, as well as the monitoring of salvage and loss of Chinook salmon juveniles at the Delta fish collection facilities operated by the CVP and SWP. Funding shall continue for the duration of the proposed action (2030). Reclamation and DWR may use their own fishery biologists to conduct these monitoring programs, or they may provide funds to other agencies to do the required monitoring. Monitoring protocols shall follow established procedures utilized by the USFWS, CDFG, Reclamation, and DWR. Information collected from the monitoring programs will be used to make real-time decisions regarding DCC gate operation and export pumping. The DOSS group (Action IV.5) and WOMT will use information from monitoring to make decisions regarding DCC closures consistent with procedures below. The DCC gate operations in the fall are initiated through a series of alerts. These alerts are signals that gate operations may need to be altered in the near future to avoid diversion of juvenile Chinook salmon migrating down the Sacramento River.	**This action describes two alerts that are signals that juvenile Chinook salmon may be migrating down the Sacramento River and indicate that DCC gate operations may need to be altered in the near future per the triggers in Action IV.1.2. In the 2009 BiOp, the first component of the first alert was triggered when there was capture of yearling-sized (>70 mm) spring-run Chinook salmon at the rotary screw traps (RSTs) in Mill Creek or Deer Creek. In October 20141 , NMFS approved a request from Reclamation and DWR that the first component of the first alert based on fish monitoring be replaced by a hydrologic criterion which triggers when mean daily flows are greater than 95 cfs in Deer or Mill creeks . The two alerts in effect during WY 2016 were thus: First Alert: Mean daily flow in Mill Creek or Deer Creek (a) greater than 95 cfs, or (b) more than 50 percent higher than observed on the previous day. Second Alert: Flow greater than 7,500 cfs at Wilkins Slough and water temperatures are less than 56.3°F as measured at Knights Landing. The alerts in Action IV.1.1 were tracked by DOSS from October through 12/14/15. During this period, the first alert was triggered multiple times.**		USBR/DWR	Joint	Ongoing	Elissa Buttermore, Towns Burgess, Farida Islam (DWR)	
NMFS	IV.1.2 DCC Gate Operation	Modify DCC gate operation to reduce direct and indirect mortality of emigrating juvenile salmonids and green sturgeon in November, December, and January.	During the period between **November 1 and June 15**, DCC gate operations will be modified from the proposed action to reduce loss of emigrating salmonids and green sturgeon. The operating criteria provide for longer periods of gate closures during the emigration season to reduce direct and indirect mortality of yearling spring-run, winter-run, and CV steelhead. From **December 1 to January 31**, the gates will remain closed, except as operations are allowed using the implementation procedures/modified Salmon Decision Tree (below).	**RPA Action IV.1.2 manages DCC gate operations to reduce the direct and indirect mortality of emigrating juvenile salmonids and green sturgeon. This effort continues and is on-going.**		USBR/DWR	Joint	Ongoing	Tom Patton	
NMFS	IV.1.3 Consider Engineering Solutions to Further Reduce Diversion of Emigrating Juvenile Salmonids to the Interior and Southern Delta, and Reduce Exposure to CVP and SWP Export Facilities	Prevent emigrating salmonids from entering the Georgiana Slough channel from the Sacramento River during their downstream migration through the Delta. Prevent emigrating salmonids from entering channels in the south Delta (e.g., Old River, Turner Cut) that increase entrainment risk to CV steelhead migrating from the San Joaquin River through the Delta.	Reclamation and/or DWR shall convene a working group to consider engineering solutions to further reduce diversion of emigrating juvenile salmonids to the interior Delta and consequent exposure to CVP and SWP export facilities. The working group, comprised of representatives from Reclamation, DWR, NMFS, USFWS, and CDFG, shall develop and evaluate proposed designs for their effectiveness in reducing adverse impacts on listed fish and their critical habitat. Reclamation or DWR shall subject any proposed engineering solutions to external independent peer review and report the initial findings to NMFS by **April 30, 2013**. Reclamation or DWR shall provide a final report on recommended approaches by **March 30, 2015**. If NMFS approves an approach in the report, Reclamation or DWR shall implement it. To avoid duplication of efforts or conflicting solutions, this action should be coordinated with USFWS' Delta smelt biological opinion and BDCP's consideration of conveyance alternatives.	**Mike Hendrick of BDO is coordinating with DWR on current modeling efforts at Georgiana Slough and other potential barrier sites in the Delta (including Steamboat and Sutter sloughs). Construction is slated to begin in 2019 and new barrier program in place by 2020. The modeling and design efforts and meant to determine the best course of action to entrain listed species into the migration corridors that lead to the best survival.**		USBR/DWR	DWR	Final Report from DWR to NMFS: 3/30/2015.	Bill McLaughlin (DWR) and Mike Hendrick	

	Title	Objective	Action	Status	Importance Level	Responsible Agency	Lead	Due Date	Point of Contact	Additional Point(s) of Contact
NMFS	IV.2.1 San Joaquin River Inflow to Export Ratio	To reduce the vulnerability of emigrating CV steelhead within the lower San Joaquin River to entrainment into the channels of the South Delta and at the pumps due to the diversion of water by the export facilities in the South Delta, by increasing the inflow to export ratio. To enhance the likelihood of salmonids successfully exiting the Delta at Chipps Island by creating more suitable hydraulic conditions in the main stem of the San Joaquin River for emigrating fish, including greater net downstream flows.	Phase I: Interim Operations in 2010-2011. From April 1 through May 31: 1. Flows at Vernalis (7-day running average shall not be less than 7 percent of the target requirement) shall be based on the New Melones Index. In addition to the Goodwin flow schedule for the Stanislaus River prescribed in Action III.1.3 and Appendix 2-E, Reclamation shall increase its releases at Goodwin Reservoir, if necessary, in order to meet the flows required at Vernalis, as provided in the following table. NMFS expects that tributary contributions of water from the Tuolumne and Merced rivers, through the SJRA, will continue through 2011 and that the installation of a fish barrier at the Head of Old River will continue to occur during this period as permitted. 2. Combined CVP and SWP exports shall be restricted through the following. In addition: 1) Reclamation/DWR shall seek supplemental agreement with the SJRGA as soon as possible to achieve minimum long term flows at Vernalis (see following table) through all existing authorities. Phase II: Beginning in 2012: From April 1 through May 31: 1. Reclamation shall continue to implement the Goodwin flow schedule for the Stanislaus River prescribed in Action III.1.3 and Appendix 2-E. 2. Reclamation and DWR shall implement the Vernalis flow-to-combined export ratios in the following table, based on a 14-day running average Exception procedure for multiple dry years: If the previous 2 years plus current year of San Joaquin Valley “60-20-20” Water Year Hydrologic Classification and Indicator as defined in D-1641	**Based on the water year type and flow projections, this RPA action is ongoing.**		USBR/DWR	Joint	Annually	Tom Patton	
NMFS	IV.2.2 Six-Year Acoustic Tag Experiment	To confirm proportional causes of mortality due to flows, exports and other project and non-project adverse effects on steelhead smolts out-migrating from the San Joaquin basin and through the southern Delta.	Reclamation and DWR shall fund a 6-year research-oriented action concurrent with Action IV.2.1. The research shall be composed of studies utilizing acoustically tagged salmonids, and will be implemented to assess the behavior and movement of the outmigrating fish in the lower San Joaquin River. The studies will include three releases of acoustically tagged fish, timed to coincide with different periods and operations: March 1 through March **31, April 1 through May 31, and June 1 through June 15**. NMFS anticipates that studies will utilize clipped hatchery steelhead and hatchery fall-run as test fish. During the period from **March 1 through March 30**, the exports will be operated in accordance with the requirements dictated by action IV.2.3. During the 60-day period between **April 1 and May 30**, exports will be dictated by the requirements of action IV.2.1. Reclamation shall operate to a minimum 1:1 inflow to export ratio during the period between **June 1 and June 15**, allowing exports to vary in relation to inflows from the San Joaquin to test varying flow to export ratios during this period. If daily water temperatures at Mossdale exceed 72°F for seven consecutive days during the period between **June 1 and June 15**, then the inflow to export ratio may be relaxed. NMFS anticipates that warm water conditions in the lower San Joaquin River will not be suitable for steelhead under these conditions.	**Steelhead release dates and environmental conditions for the 2016 field season of the 6-year acoustic tag experiment are summarized in the 2016 DOSS Annual Report.**		USBR/DWR	Joint	March through June releases.	Tom Patton	
NMFS	IV.2.3 Old and Middle River Flow Management	Reduce the vulnerability of emigrating juvenile winter-run, yearling spring-run, and CV steelhead within the lower Sacramento and San Joaquin rivers to entrainment into the channels of the South Delta and at the pumps due to the diversion of water by the export facilities in the South Delta. Enhance the likelihood of salmonids successfully exiting the Delta at Chipps Island by creating more suitable hydraulic conditions in the mainstem of the San Joaquin River for emigrating fish, including greater net downstream flows.	From **January 1 through June 15**, reduce exports, as necessary, to limit negative flows to -2,500 to -5,000 cfs in Old and Middle Rivers, depending on the presence of salmonids. The reverse flow will be managed within this range to reduce flows toward the pumps during periods of increased salmonid presence.	**The action to manage Old and Middle River (OMR) flow at no more than -5,000 cfs is in effect from January 1 through June 15, or until the average daily water temperature at Mossdale is >72°F for 7 consecutive days in June, whichever is earlier. In WY 2016, temperatures at Mossdale ("MSD" station data reported on CDEC) exceeded 72°F for the first seven days of June. Effective 6/8/16, the OMR flow restrictions were lifted. The older juvenile loss density of 2.70 fish/TAF on 1/2/16 exceeded the first stage action trigger of 2.5 fish/TAF. The first day of the required action response (at least 5 days of OMR no more negative than -3,500 cfs) was Sunday, 1/3/16. Rapid genetic testing results received late on 1/5/16 showed the older juvenile (which resulted in exceeding the loss density) was a fall-run Chinook, not a winter-run Chinook. On Wednesday, 1/6/16, NMFS informed WOMT that, based on the genetic results “…the CVP and SWP do not need to continue to operate to the action response of the first stage trigger in RPA Action IV.2.3, but rather, can revert back to an OMR no more negative than -5,000 cfs.” A summary of OMR limits in effect during WY 2016 can be found in the 2016 DOSS Annual Report.**		USBR/DWR	Joint	Annually	CVO's WY17 DOSS contact is Tom Patton	

	Title	Objective	Action	Status	Importance Level	Responsible Agency	Lead	Due Date	Point of Contact	Additional Point(s) of Contact
NMFS	IV.3 Reduce Likelihood of Entrainment or Salvage at the Export Facilities	Reduce losses of winter-run, spring-run, CV steelhead, and Southern DPS of green sturgeon by reducing exports when large numbers of juvenile Chinook salmon are migrating into the upper Delta region, at risk of entrainment into the central and south Delta and then to the export pumps in the following weeks.	From **November 1 through April 30**, operations of the Tracy and Skinner Fish Collection Facilities shall be modified according to monitoring data from upstream of the Delta. In conjunction with the two alerts for closure of the DCC (Action IV.1.1), the Third Alert shall be used to signal that export operations may need to be altered in the near future due to large numbers of juvenile Chinook salmon migrating into the upper Delta region, increasing their risk of entrainment into the central and south Delta and then to the export pumps. Third Alert: The catch index is greater than 10 fish captured per day from **November 1 to February 28**, or greater than 15 fish captured per day from **March 1 to April 30**, from either the Knights Landing catch index or the Sacramento catch index.	**From January 1 through April 30, Action IV.2.3 is implemented which includes restrictions on OMR flows rather than set levels of combined export pumping. Alert triggers from Action IV.3 will remain in effect to notify the operators of the CVP and SWP that large numbers of juvenile Chinook salmon are entering the Delta system.**		USBR/DWR	Joint	Annually beginning in November	CVO's WY17 DOSS contact is Tom Patton	
NMFS	Action Suite IV.4 Modifications of the Operations and Infrastructure of the CVP and SWP Fish Collection Facilities	Achieve 75 percent performance goal for whole facility salvage at both state and Federal facilities. Increase the efficiency of the Tracy and Skinner Fish Collection Facilities to improve the overall salvage survival of winter-run, spring-run, CV steelhead, and green sturgeon.	Reclamation and DWR shall each achieve a whole facility salvage efficiency of 75 percent at their respective fish collection facilities. Reclamation and DWR shall implement the following actions to reduce losses associated with the salvage process, including: (1) conduct studies to evaluate current operations and salvage criteria to reduce take associated with salvage, (2) develop new procedures and modifications to improve the current operations, and (3) implement changes to the physical infrastructure of the facilities where information indicates such changes need to be made. Reclamation shall continue to fund and implement the CVPIA Tracy Fish Facility Program. In addition, Reclamation and DWR shall fund quality control and quality assurance programs, genetic analysis, louver cleaning loss studies, release site studies and predation studies. Funding shall also include new studies to estimate green sturgeon screening efficiency at both facilities and survival through the trucking and handling process.	**This is on-going. In 2018 DWR and Reclamation began pilot work on a dual operations study evaluating the loss and predation impacts of various dual operational strategies. The full study is planned to begin in late 2019 early 2020.**		USBR/DWR			Carl Dealy	
	IV.4.1 Tracy Fish Collection Facility (TFCF) Improvements to Reduce Pre-Screen Loss and Improve Screening Efficiency	Implement specific measures to reduce pre-screen loss and improve screening efficiency at Federal facilities.	Reclamation shall undertake actions at the TFCF to reduce pre-screen loss and improve screening efficiency. There are items 1 through 8 with different deadlines.	**The first round of whole facility evaluation (WFE) tests to determine present day efficiencies for salmon and sturgeon. Subject to funding, authorizations, and available resources, results published and available. Additional mark and recapture field testing with salmon and steelhead is planned for FY2018-21, when funding is available. Continued work on the development of new acoustic technologies, such as predation detection tags, as well as installation of more expansive hydrophone arrays, will allow for more refined estimates of facility efficiency for Chinook salmon and steelhead. Additional in late 2018 expect to have installed a PIT Tag array for complementary mark and release studies. WFE tests for green sturgeon have not commenced as of yet due to the difficulties in obtaining hatchery fish to use in the studies per DFG.**		USBR	USBR	1/2/2010	Carl Dealy	
	IV.4.1 Tracy Fish Collection Facility (TFCF) Improvements to Reduce Pre-Screen Loss and Improve Screening Efficiency		1a) By December 31, 2011, reclamation shall complete studies to determine methods for removal of predators in the primary channel, leading to the primary louver screens with the goal of reducing predation loss to 10% or less. Findings shall be reported to NMFS within 90 days of study completion. By December 31, 2012, Reclamation shall implement measures to reduce pre-screen predation in the primary channel to less than 10% of exposed salmonids.	**Reclamation has completed studies to assess presence, impact and movement of predators within the primary channel of the TFCF. Reclamation is also in the process of developing measures to reduce their impact on salvage survival, such as the use of CO2 to remove predators from the bypass channels. Completed a CO2 trial and removal of piscivorous predator fish in the primary channel in May 2018.**		USBR	USBR	12/31/2011 (study), March 31, 2012 (report), 12/31/2012 (implementation)	Carl Dealy	
	IV.4.1 Tracy Fish Collection Facility (TFCF) Improvements to Reduce Pre-Screen Loss and Improve Screening Efficiency		1b) By March 31, 2011, Reclamation shall complete studies for the redesign of the secondary channel to enhance the efficiency of screening, fish survival, and reduction of predation within the secondary channel structure and report study findings to NMFS. NMFS shall review study findings and if changes are deemed feasible, Reclamation shall initiate the implementation of the study findings by January 31, 2012.	**Reclamation Denver Technical Service Center engineering efforts commenced in 2010, using CVPIA restoration funds, related to design of potential new secondary bypass and holding system. Preliminary designs were completed in FY2010. There is no funding programmed at this time to continue the effort. Funding needed.**		USBR/NMFS	USBR	3/31/2011 (study), 1/31/2012 (implementation)	Carl Dealy	

	Title	Objective	Action	Status	Importance Level	Responsible Agency	Lead	Due Date	Point of Contact	Additional Point(s) of Contact
			1c) No later than June 2, 2010, Reclamation shall submit to NMFS one or more potential solutions to the loss of Chinook salmon and green sturgeon associated with the cleaning and maintenance of the primary louver and secondary louver systems at the TFCF. In the event that a solution acceptable to NMFS is not in place by June 2, 2011, pumping at the Tracy Pumping Plant shall cease during louver cleaning and maintenance operations to avoid loss of fish during these actions.	**In 2013 Reclamation completed the NEPA and ESA documentation for the replacement of the TFCF secondary channel louvers only. Design was completed and the Contractor completed the installation of the new screen and debris handling system in May 2014.** **Design for the replacement of the primary channel louvers is on hold pending complete data analysis of the secondary channel installation. This activity is currently unfunded. Contract award and installation is pending funding availability.** **Reclamation is currently considering using a double louver panel hoist to cut the overall cleaning time in half and possibly a screened panel during cleaning of primary louvers as a potential solution to fish loss.**		USBR/NMFS	USBR	6/2/2010 (report), 6/2/2011 (in place)	Carl Dealy	
			2) By December 31, 2011, Reclamation shall implement operational procedures to optimize the simultaneous salvage of juvenile salmonids and delta smelt at the facility.			USBR	USBR	12/31/2011 (implementation); FY 2013: Analysis results due.		
			3) Upon issuance of this BiOp, Reclamation shall begin removing predators in the secondary channel at least once per week. By June 2, 2010, Reclamation shall install equipment to monitor for the presence of predators in the secondary channel during operations.	**Procedure in place with informal consultation with NMFS for predator removal at the bypasses and secondary channel. Removal takes place on a monthly basis. Currently the equipment to monitor has been removed and we are researching and testing newer fish finder transducers that may work. the new installation should take place by FY2019.**		USBR	USBR	2009 (predator removal), 6/2/2010 (install equipment)	Carl Dealy	
			4) Reclamation shall operate the facility to meet design criteria for louver bypasses and channel flows at least 75% efficiency.	**Reclamation currently operates the TFCF within design criteria as much as possible, however, south Delta hydrology coupled with export pumping rates, tidal actions, and high debris entrainment makes this difficult at best at times. Recent research suggests that predation is the main source of fish loss at the TFCF. It has been posited that diligent control of predation alone would result in 75% facility efficiency or better. In fact we may be at 75% or better for most of the year.**		USBR	USBR			
			5) Reclamation shall maintain a head differential at the trash rack of less than 1.5 ft. between the ambient Old River water surface elevation and the primary intake channel at all times.	**Completed. Reclamation Tracy Office installed a new trash rack cleaner in 2010 that will allow Reclamation to meet 1.5 ft. differential objective.**		USBR	USBR		Carl Dealy	
			6) By January 2, 2010, Reclamation shall install and maintain flow meters in the primary and secondary channels to continuously monitor and record the flow rates in the channel.	**Completed 2011. Flow meters installed and operational. We are scheduling regular maintenance. Flow rates are continuously monitored and recorded. Calibrations are planned subject to resources availability.**		USBR	USBR		Carl Dealy	
			7) Reclamation shall change its operations of the TFCF to meet salvage criteria, while emphasizing the following actions: (a) Primary Bypass Ratio; (b) Secondary bypass ratio; (c) Primary Average Channel Velocity; and (d) Secondary Average Channel Velocity.	**Reclamation Tracy Office currently conducting studies to assess impacts of bypass ratios vs. average channel velocity on effectiveness of salvage operations. Preliminary results are available. Reclamation currently abiding by SWRCB D-1485 salvage operations criteria, adjusting to the latest data.**		USBR	USBR		Carl Dealy	
NMFS			8) Records of all operating actions shall be kept and made available to NMFS engineers upon request. NMFS shall be notified of any major or long-term deviations from normal operating design criteria within 24 h of occurrence.	**Reclamation TFCF records are available upon request. Reclamation will notify NMFS of any major or long-term deviations from normal operating design criteria.**		USBR	USBR	12/31/2013	Carl Dealy	

	Title	Objective	Action	Status	Importance Level	Responsible Agency	Lead	Due Date	Point of Contact	Additional Point(s) of Contact
NMFS	IV.4.2 Skinner Fish Collection Facility Improvements to Reduce Pre-Screen Loss and Improve Screening Efficiency	Implement specific measures to reduce pre-screen loss and improve screening efficiency at state facilities.	DWR shall undertake the following actions at the Skinner Fish Collection Facility: 1) By **December 31, 2012**, operate the whole Skinner Fish Protection Facility to achieve a minimum 75 percent salvage efficiency for CV salmon, steelhead, and Southern DPS of green sturgeon after fish enter the primary channels in front of the louvers. 2) Immediately commence studies to develop predator control methods for Clifton Court Forebay that will reduce salmon and steelhead pre-screen loss in Clifton Court Forebay to no more than 40 percent. a) On or before**March 31, 2011**, improved predator control methods. Full compliance shall be achieved by **March 31, 2014**. Failure to meet this timeline shall result in the cessation of incidental take exemption at SWP facilities unless NMFS agrees to an extended timeline. b) DWR may petition the Fish and Game Commission to increase bag limits on striped bass caught in Clifton Court Forebay. 3) Remove predators in the secondary channel at least once per week.	**Ongoing. In 2017 the following was completed: 8 experimental releases of late-fall run Chinook Salmon totaling 1,349 fish. • 8 experimental releases of fall run Chinook Salmon totaling 777 fish. • Conducted 4 experimental releases of Predation Detection Acoustic Tagged (PDAT) Chinook Salmon to evaluate whole SWP losses and pre-screen losses in the CCF. • Prepared a draft annual report documenting pre-screen losses in the CCF and Whole Facility Efficiency for the Skinner Fish Facility for WY 2017. • Conducted 6 experimental releases of Chinook Salmon to evaluate Whole Facility Efficiency for the Skinner Fish Facility. In 2018 DWR and Reclamation began pilot work on a dual operations study evaluating the loss and predation impacts of various dual operational strategies. The full study is planned to begin in late 2019 early 2020.**		DWR	DWR	February 2013: monitoring of salmon survival begins. Spring 2013: New IS and CEQA docs due. December 2014: pubic fishing access structure completed. December 2017: Final report of effectiveness due.		
	IV.4.3 Tracy Fish Collection Facility and the Skinner Fish Collection Facility Actions to Improve Salvage Monitoring, Reporting and Release Survival Rates	To improve overall survival of listed species at facilities through accurate, rapid salvage reporting and state-of-the-art salvage release procedures. This reporting is also necessary to provide information needed to trigger OMR actions.	Reclamation and DWR shall undertake the following actions at the TFCF and the Skinner Fish Collection Facility, respectively. Actions shall commence by **October 1, 2009**, unless stated otherwise.	**Predator and debris flushes are conducted as part of routine operations at the SDFPF at least once per week and sometimes more often when debris loads are heavy. This work continued for 2017.**		USBR/DWR	USBR	Immediately, 10/1/2009, 10/1/2010, 6/15/2011, Consultant work to begin: September 2013; 6/15/2014		
			1) Sampling rates at the facilities for fish salvage counts shall be no less than 30 minutes every 2 hours (25 percent of operational time) year round to increase the accuracy of salvage estimates used in the determination of trigger levels. Exceptions to the 30-minute count may occur with NMFS' concurrence under unusual situations, such as high fish densities or excessive debris loading.	**Presently sample 30 minutes every 2 hours as a rule except during times of high debris loading impacts where a waiver is requested through NMFS and in which case sampling is temporarily set to a smaller duration while still keeping a sampling time of 25% of normal operations if possible.**					Carl Dealy	
			2) By October 1, 2010, websites shall be created or improved to make salvage count data publicly available within 2 days of observations of the counts. Information available on the website shall include at a minimum: 1) duration of count in minutes, b) species of fish salvaged; c) number of fish salvaged including raw counts and expanded counts; d) volume of water in acre-feet and average daily flow in cfs; e) daily average channel velocity and bypass ratio in each channel, primary and secondary; f) average daily water temperature and electrical conductivity data for each facility, and g) periods of non-operation due to cleaning, power outages, or repairs.	**DFW, under contract to DWR, is the lead on this action. Fish Salvage data is available through the DFW website and FTP server at: http://www.dfg.ca.gov/delta/apps/salvage/Default.aspx and ftp://ftp.delta.dfg.ca.gov/salvage/.**					Carl Dealy	
			3) Release Site Studies shall be conducted to develop methods to reduce predation at the "end of the pipe" following release of salvaged fish. Studies shall examine but are not limited to: a) potential use of barges to release the fish in different locations within the western Delta with slow dispersion of fish from barge holding tanks to Delta waters; b) multiple release points (up to six) in western Delta with randomized release schedule; and c) conducting a benefit to cost analysis to maximize this ratio while reducing predation at release site to 50% of the current rate.	**In response to the NMFS BiOp, specifically Action IV.4.3 (3), DWR fully reconstructed the fish release site at Curtis Landing. During 2017, staff coordinated with DOE Construction Branch, Levee Repair Headquarters Office, Operation and Maintenance (O&M)-Electrical Branch, and Delta Field Division for the contractor to make trip breaker upgrades to the electrical panels as directed by the O&M-Electrical Branch. Figure 2 is a view of the Curtis Landing fish release site illustrating the equipment platform with DWR's fish haul truck.**				12/31/16: Construction on additional sites to be completed.	Carl Dealy	

	Title	Objective	Action	Status	Importance Level	Responsible Agency	Lead	Due Date	Point of Contact	Additional Point(s) of Contact
			4) By June 15, 2011, predation reduction methods shall be implemented according to analysis in 3. By June 15, 2014, achieve a predation rate that has been reduced 50 percent from current rate.	**The team met throughout WY 2017, and a final work plan for Fiscal Year (FY) 18 was submitted to the Tracy Technical Advisory NMFS 2017 Annual Report 9 California Department of Water Resources Bay-Delta Office January 2018 Team (TTAT) in May 2017 as part of the FY 18 proposal package for the Tracy Fish Facility Improvement Program. The proposal was approved and funded by Reclamation, and additional work to evaluate release site predation losses is scheduled for March through June of 2018. In addition, in April and May of 2017, Reclamation and DWR staff completed a pilot project to assess the utility of various predation monitoring methods at the salvage release site. Methods assessed included the performance of Predation Detection Acoustic Tags, Predation Event Recorders (tethers), and acoustic tagging of predators. The results of this effort will be reported in a Tracy Fish Facility Improvement Program Technical Bulletin in 2018, and were used to develop the WY 2018 workplan.**				6/15/11: Overdue for methods to be implemented??	Carl Dealy	
			5) Add salt to water within the tanker trucks hauling fish to reduce stress of transport. Assess use of other means to reduce stress, protect mucous slime coat on fish, and prevent infections from abrasions (i.e., commercially available products for this purpose).	**This is on-going.**					Carl Dealy	
			6) All personnel conducting fish counts must be trained in juvenile fish identification and have working knowledge of fish physiology and biology.	**This is on-going.**					Carl Dealy	
			7) Tanker truck runs to release salmonids should be scheduled at least every 12 hours, or more frequently if required by the "Bates Table" calculations (made at each count and recorded on the monthly report).	**Tanker truck runs to release salmonids should be scheduled at least every 12 hours, or more frequently if required by the "Bates Table" calculations.**					Carl Dealy	
NMFS			8) Reclamation and DWR shall use the Bates Table to maintain suitable environmental conditions for fish in hauling trucks. Trucks should never be overcrowded so that the carrying capacity of the tanker truck is exceeded.	**Tanker truck runs to release salmonids should be scheduled at least every 12 hours, or more frequently if required by the "Bates Table" calculations. We are in the process of replacing the trucks and plan to investigate the new carrying capacity.**					Carl Dealy	
NMFS	IV.5 Formation of Delta Operations for Salmon and Sturgeon (DOSS) Technical Working Group	Create a technical advisory team .that will provide recommendations to WOMT and NMFS on measures to reduce adverse effects of Delta operations of the CVP and SWP to salmonids and green sturgeon and will coordinate the work of the other technical teams	The DOSS group will be comprised of biologists, hydrologists, and other staff with relevant expertise from Reclamation, DWR, CDFG, USFWS, and NMFS. Invitations to EPA, USGS, and Regional Water Quality Board biologists will be extended to provide expertise on issues pertinent to Delta water quality, hydrology and environmental parameters. By **October 1, 2009,** Reclamation shall, jointly with NMFS, convene the DOSS working group.	**This is on-going.**		USBR/DWR/ NMFS	USBR	2014: 5-year summary due	Tom Patton	
NMFS	IV.6 South Delta Improvement Program—Phase I (Permanent Operable Gates)		DWR shall not implement the South Delta Improvement Program, which is a proposal to replace temporary barriers with permanent operable gates.			DWR	DWR	Immediately		
NMFS	NF 1. Formation of Interagency Fish Passage Steering Committee	To charter, and support through funding agreements, an interagency steering committee to provide oversight and technical, management, and policy direction for the Fish Passage Program.	By **December 2009,** Reclamation shall establish, chair and staff the Interagency Fish Passage Steering Committee. The Committee shall be established in consultation with and the approval of NMFS and shall include senior biologists and engineers with experience and expertise in fish passage design and operation, from Reclamation, NMFS, DWR, CDFG, and USFWS. The Steering Committee also shall include academic support by including at least one academic member from a California University with and established fishery program. The committee shall be limited to agency membership unless otherwise approved by Reclamation and NMFS. Steering committee membership shall include on lead member and one alternate	**Committee has been meeting regularly since 2010 and focused solely on Shasta since 2013. All fish passage activities are on hold as of July 2018. Steering committee and leadership group is continuing to meet every other month to update the agencies on status.**		USBR/DWR	USBR	12/1/2009	John Hannon	

	Title	Objective	Action	Status	Importance Level	Responsible Agency	Lead	Due Date	Point of Contact	Additional Point(s) of Contact
NMFS	NF 2. Evaluation of Salmonid Spawning and Rearing Habitat Above Dams	To quantify and characterize the location, amount, suitability, and functionality of existing and/or potential spawning and rearing habitat for listed species above dams operated by Reclamation.	Beginning in **January 2010 and continuing through January 2012**, Reclamation, shall conduct habitat evaluations to quantify and characterize the location, amount, suitability, and functionality of existing and/or potential spawning and rearing habitat for listed species above the project reservoirs. Reclamation shall obtain the Steering Committee's assistance in designing and implementing the habitat evaluations. Evaluations shall be conducted using established field survey protocols such as the USFS Region 5 Stream Condition Inventory, Field Intensive and Field Extensive protocols; and habitat models including the Salmon Habitat Integrated Resource Analysis (Shiraz) in combination with the Distributed Hydrology Soil Vegetated Model (DHSVM) or RIPPLE. Shiraz is a life-cycle model that incorporates stream flow and temperature inputs from DHSVM to develop future projections of salmon population sizes. Ripple uses digital terrain information with aquatic habitat and biological data to identify habitat limitations that affect salmon production.	**Partially complete. Completed for Shasta passage: https://www.usbr.gov/mp/BayDeltaOffice/shasta-dam-fish-pass.html There is a habitat subcommittee for Shasta to deal with any habitat issues.** **Folsom and New Melones have not been done.**		USBR/DWR	USBR	1/2010-1/2012	John Hannon	
NMFS	NF 3. Development of Fish Passage Pilot Plan		From **January 2010 through January, 2011**, Reclamation, with assistance from the Steering Committee, shall complete a 3-year plan for the Fish Passage Pilot program.	**This has been done in regards to Shasta passage and is currently in NEPA stage. Has not been done for other rim dams. Draft EIS was completed at the MP region level and not transmitted to Washington for review. Activities are on hold as of July 2018.**		USBR/DWR	USBR		John Hannon	
NMFS	NF 4. Implementation of Pilot Reintroduction Program	To implement short-term fish passage actions that will inform the planning for long-term passage actions.	From **January 2012 through 2015**, Reclamation shall begin to implement the Pilot Reintroduction Program (see specific actions below). The Pilot Program will, in a phased approach, provide for pilot reintroduction of winter-run and spring-run to habitat above Shasta Dam in the Sacramento River, and CV steelhead above Folsom Dam in the American River. This interim program will be scalable depending on source population abundance, and will not impede the future installation of permanent facilities, which require less oversight and could be more beneficial to fish. This program is not intended to achieve passage of all anadromous fish that arrive at collection points, but rather to phase in passage as experience with the passage facilities and their benefits is gained.	**Not complete…**		USBR	USBR	1/2012-1/2015	John Hannon	
NMFS	NF 4.1. Adult Fish Collection and Handling Facilities		Beginning in **2012**, Reclamation, with assistance from the Steering Committee, shall design, construct, install, operate and maintain new or rebuilt adult fish collection, handling and transport facilities at the sites listed below. The objective is to provide interim facilities to pass fish above project facilities and reservoirs. Reclamation and partner agencies shall incorporate NMFS' Fish Screening Criteria for Anadromous Salmonids (NMFS 1997a) and the best available technology. During the design phase, Reclamation and partner agencies shall coordinate with NMFS to determine if the design should accommodate possible later connection to improved facilities, if necessary in years beyond 2015. Reclamation and partner agencies shall complete all interim steps in a timely fashion to allow them to meet the following deadlines for completing construction and beginning operation of the facilities listed below. These steps may include completing plans and specifications. Reclamation and partner agencies shall give NMFS periodic updates on their progress. The order in which these facilities are completed may be modified with NMFS' concurrence, based on interim analyses and biological priorities. 1) Sacramento River Fish Facility – Collection facility shall be operational no later than **March 2012**. 2) American River Fish Facility – Collection facility shall be operational no later than **March 2012.**	**Plan to use existing trap for Shasta. All activities on hold as of July 2018.**		USBR/DWR	USBR	TBD, Based on NF 3	John Hannon	
NMFS	NF 4.2. Adult Fish Release Sites above Dams and Juvenile Fish Sites Below Dams		Reclamation shall provide for the safe, effective, and timely release of adult fish above dams and juvenile fish below dams. The Fish Passage Plan must identify and release sites. Fish transport and release locations and methods shall follow existing State and Federal protocols. With assistance from the Steering Committee, and in coordination with applicable landowners and stakeholders, Reclamation shall complete construction of all selected sites by **March 2012**	**This is on-going. Behind on this effort, lots to do… on hold as of July 2018.**		USBR	USBR	TBD, Based on NF 3		

	Title	Objective	Action	Status	Importance Level	Responsible Agency	Lead	Due Date	Point of Contact	Additional Point(s) of Contact
NMFS	NF 4.3. Capture, Trapping, and Relocation of Adults		By **March 2012**, Reclamation shall implement upstream fish passage for adults via "trap and transport" facilities while it conducts studies to develop and assess long-term upstream and downstream volitional fish passage alternatives. At least one fish facility must be in place at terminal upstream passage points for each river that is subject to this measure. Facilities to capture adults currently exist at or below Keswick and Nimbus Dams, though these may need to be upgraded. The Pilot Program is a first step in providing anadromous fish passage to historical habitat above Project dams but will not be sufficient by itself. The number of fish that shall be relocated is expected to vary depending on the source population, source population size, and the results of fish habitat evaluations and modeling of carrying and production capacity.	**This is on-going. Behind on this effort, lots to do… on hold as of July 2018.**		USBR	USBR	TBD, Based on NF 3	John Hannon	
NMFS	NF 4.4. Interim Downstream Fish Passage through Reservoirs and Dams		Beginning in **2012**, following the emergence of the first year class of reintroduced fish, and until permanent downstream passage facilities are constructed or operations are established at Project dams, Reclamation shall carry out interim operational measures to pass downstream migrants as safely and efficiently as possible through or around Project reservoirs and dams under current dam configurations and physical and operational constraints, consistent with authorized Project purposes. Near-term operating alternatives shall be identified, evaluated, and implemented if determined to be technically and economically feasible and biologically justified by Reclamation and partner agencies, within the framework of the Annual Operating Plan updates and revisions, and in coordination with the Fish Passage Plan Steering Committee. Interim devices shall be constructed to collect emigrating juvenile salmonids and emigrating post-spawn adult steelhead from tributaries, main stems above project reservoirs, or heads of reservoirs	**This is part of what the EIS that is out as of March 2017. Reclamation had funding and contracting package prepared in 2016 and had to cancel to address cultural resource issues. This will not be completed until EIS process is complete. A financial assistance agreement with CDWR has first year funding still in place and DWR is working on development of juvenile collection technology under the statement of work although Reclamation activities and any new funding is on hold as of July 2018.**		USBR	USBR	TBD, Based on NF 3	John Hannon	
NMFS	NF 4.5. Juvenile Fish Collection Prototype	To determine whether the concept of a head-of-reservoir juvenile collection facility is feasible, and if so, to use head-of-reservoir facilities in Project reservoirs to increase downstream fish survival. Safe and timely downstream passage of juvenile Chinook salmon and juvenile and adult post-spawn steelhead is a critical component to the success of the Fish Passage Program.	Beginning in **January, 2010**, with input from the CVP/SWP operations Fish Passage Steering Committee, Reclamation shall plan, design, build, and evaluate a prototype head-of-reservoir juvenile collection facility above Shasta Dam. Construction shall be complete by **September 2013**. Because the head-of-reservoir fish collection concept is virtually untested, it would be imprudent to require such facilities without prior field studies, design, and prototype testing to validate the concept. For this measure, NMFS defines "prototype" to refer to temporary facilities intended for concept evaluation, not long-term operations. Further, "prototype" does not necessarily refer to a single concept; multiple concepts may be tested simultaneously. Possible options include, among others: (1) floating collectors in the reservoir near the mouths of tributaries, (2) use of curtained or hardened structures near mouths of tributaries, that block surface passage into reservoirs, (3) fish collection facilities on tributaries above the reservoir pools, and (4) a combination of the above to maximize collection in high flow and low flow conditions.	**This is on-going. Contracting package was prepared to fabricate, install, maintain, remove, and store the designed head of reservoir and in-river collection systems. Implementation on hold pending NEPA process. A financial assistance agreement with CDWR has first year funding still in place and DWR is working on development of juvenile collection technology under the statement of work although Reclamation activities and any new funding is on hold as of July 2018.**		USBR/DWR	USBR	TBD, Based on NF 3	John Hannon	
NMFS	NF 4.6. Pilot Program Effectiveness Monitoring and Evaluation		From **2012 to 2015**, Reclamation shall study, and provide annual reports on, the elements of the pilot program, including adult reintroduction locations, techniques, survival, distribution, spawning, and production; and juvenile rearing, migration, recollection, and survival. The objective is to gather sufficient biological and technical information to assess the relative effectiveness of the program elements and determine the feasibility of long-term passage alternatives. A final summary report of the 5-year pilot effort shall be completed by **December 31, 2015**.	**This has not been completed. A few individual reports have been released on monitoring activities, but most of the activities proposed for the Stan have not occurred. Activities on hold as of July 2018.**		USBR	USBR	TBD, Based on NF 3	John Hannon	

	Title	Objective	Action	Status	Importance Level	Responsible Agency	Lead	Due Date	Point of Contact	Additional Point(s) of Contact
NMFS	NF 4.7. Stanislaus River Fish Passage Assessment	To develop information needed in order to evaluate options for achieving fish passage on the Stanislaus River above Goodwin, Tulloch, and New Melones Dams.	By **March 31, 2011**, Reclamation shall develop a plan to obtain information needed to evaluate options for fish passage on the Stanislaus River above Goodwin, Tulloch and New Melones Dams and shall submit this plan to NMFS for review. This plan shall identify reconnaissance level assessments that are needed to support a technical evaluation of the potential benefits to CV steelhead that could be achieved with passage above the dams, a general assessment of logistical and engineering information needed, and a schedule for completing those assessments by **December 31, 2016.**	**This has not been completed; plan was submitted by due date, no response from NMFS.**		USBR	USBR	TBD, Based on NF 3	John Hannon	
NMFS	NF 5. Comprehensive Fish Passage Report	To evaluate the effectiveness of fish passage alternatives and make recommendations for the development and implementation of long-term passage alternatives and a long-term fish passage program.	By **December 31, 2016**, Reclamation shall prepare a Comprehensive Fish Passage Report. The Report shall include preliminary determinations by Reclamation and partner agencies regarding the feasibility of fish passage and other related structural and operational alternatives. The report should include specific recommendations for improvements to highest priority sub-basins and/or features and to include recommendations for major operational changes. It will also include identification and evaluation of high priority actions and may suggest modifying the scope or timelines of these high priority actions, based on the predicted outcome of long-term efforts.	**Will not be completed until after Reclamation is done with the pilot study which is waiting on the EIS so it can start. E59**		USBR	USBR	TBD, Based on NF 3	John Hannon	
NMFS	LF 1. Long-term Funding and Support to the Interagency Fish Passage Steering Committee		If the Comprehensive Fish Passage Report indicates that long-term fish passage is feasible and desirable, Reclamation shall continue to convene, fund, and staff the Fish Passage Steering Committee.	**pending pilot efforts**		USBR	USBR	TBD, Based on NF 3		
NMFS	LF 2. Action Suite: Long-Term Fish Passage Plan and Program	Provide structural and operational modifications to allow safe fish passage and access to habitat above and below Project dams in the Central Valley.	Based on the results of the Comprehensive Fish Passage Report, Reclamation, with assistance from the Steering Committee, shall develop a Long-term Fish Passage Plan and implement a Long-term Fish Passage Program. Reclamation and partner agencies shall submit a plan to NMFS on or before **December 31, 2016**, which shall describe planned long-term upstream and downstream fish passage facilities and operations, based on the best available information at that time. The plan shall include a schedule for implementing a long-term program for safe, timely, and effective anadromous fish passage by **January 31, 2020**.	**pending pilot efforts**		USBR	USBR	TBD, Based on NF 3		
NMFS	LF 2.1. Long-term Adult and Juvenile Fish Passage Facilities		Based on the results of the Comprehensive Fish Passage Report and the Fish Passage Plan, and with the assistance of the Steering Committee, Reclamation shall construct long-term fish passage facilities necessary to successfully allow upstream and downstream migration of fish around or through project dams and reservoirs on the Sacramento and American Rivers by **2020**, and Stanislaus River depending on results of study provided for in Action NF 4.7.	**pending pilot efforts**		USBR	USBR	TBD, Based on NF 3		
NMFS	LF 2.2. Supplementation and Management Plan		Based on the results of the Comprehensive Fish Passage Report and the Fish Passage Plan, and with the assistance of the Steering Committee, in consultation with the NMFS Southwest Fishery Science Center, Reclamation shall develop and implement a long-term population supplementation plan for each species and fish passage location identified in V. Fish Passage Program, with adult recruitment and collection criteria developed with consideration for source population location, genetic and life history diversity, abundance and production. The purpose is to ensure that long-term abundance and viability criteria are met for all reintroduced populations, with contingencies for supplementing populations with wild and/or conservation hatchery fish if necessary. The plan shall be developed by **2020**. The plan shall identify wild and/or hatchery sources for adult reintroductions and long-term supplementation, and the specific NMFS-approved hatchery management practices that qualify a hatchery for conservation purposes. Species-specific conservation hatchery programs may be developed to supplement reintroductions and maintain long-term performance standards for abundance and viability.	**pending pilot efforts**		USBR/NMFS		TBD, Based on NF 3		

	Title	Objective	Action	Status	Importance Level	Responsible Agency	Lead	Due Date	Point of Contact	Additional Point(s) of Contact
NMFS	LF 2.3. Long-term Fish Passage Monitoring and Evaluation		Reclamation, through the Steering Committee shall develop a Long-term Fish Passage Monitoring and Evaluation Plan by **2020**, to monitor all elements of the Long-term Fish Passage Program including adult reintroduction locations, techniques, survival, distribution, spawning, and production; and juvenile rearing, migration, recollection, and survival. The objective is to gather sufficient biological and technical information to assess the relative effectiveness of the program elements and determine the feasibility of long-term passage alternatives. Annual reports shall be submitted to NMFS by **September 30** of each year.	**pending pilot efforts**		USBR	USBR	TBD, Based on NF 3		
NMFS Terms & Conditions	1	Reclamation and DWR shall monitor the extent of incidental take of winter-run, spring-run, green sturgeon, and CV steelhead, associated with the operation of the CVP's Jones and SWP's Harvey Banks pumping facilities.	a. Reclamation and DWR shall calculate winter-run, spring-run, CV steelhead, and Southern DPS of green sturgeon loss at the Jones and Banks pumping plants on a real- time basis from October 1 through June 30 each year. Loss and salvage shall be computed using formulas developed in consultation with CDFG and USFWS and approved by NMFS.							
			b. Reclamation and DWR shall monitor the loss of juvenile winter-run at the CVP and SWP Delta pumping facilities and will use that information to determine whether the anticipated level of loss is likely to exceed the authorized level of 2 percent, cumulatively, of the estimated number of juvenile winter-run entering the Delta annually.							
			c. Reclamation and DWR shall monitor the loss of identified spring-run surrogate release groups at the CVP and SWP Delta pumping facilities and use that information to determine whether the cumulative estimated level of loss is expected to exceed 1%.							
			d. Reclamation and DWR shall monitor the salvage of CV steelhead at the CVP and SWP Delta pumping facilities and use that information to determine whether the cumulative estimated level of salvage is expected to exceed 3,000 unclipped steelhead (juveniles and adults combined) at the CVP and SWP Delta pumping facilities. Incidental take of CV steelhead shall be reported as salvage and calculated loss.							
			e. Reclamation and DWR shall monitor the loss of juvenile green sturgeon at the CVP and SWP Delta pumping facilities and use that information to determine whether the cumulative estimated level of loss is expected to exceed 110 juveniles annually (previous 10-year average).							
			f. If the estimated rate of loss approaches the incidental take level anticipated for any of the anadromous fish species at the SWP Harvey Banks pumping facility combined with the estimated take at the CVP Jones pumping facility is exceeded, Reclamation and DWR shall immediately convene the WOMT to explore additional measures which can be taken.							
			g. DWR shall collect additional data at the Clifton Court Forebay, the John Skinner Fish Collection Facility, and the Harvey Banks pumping plant to monitor the incidental take of winter-run, spring-run, steelhead, and green sturgeon and to develop and implement improvements to pumping facility operations to further reduce or minimize losses of listed salmonids.							
			h. DNA tissue samples and CWT samples from juvenile winter-run, spring-run, and steelhead at the Tracy and Skinner fish collection facilities shall be collected by DWR or CDFG for genetic analysis or tag removal/reading pursuant to the sampling protocols established by the IEP Salmon Genetics Project Work Team. Tissues shall be stored at the CDFG tissue bank at Rancho Cordova for subsequent analysis by Oregon State University or similar lab approved by NMFS. Whole fish or heads for CWT processing and identification shall be stored at the USFWS Bay/Delta Office in Stockton. All samples shall be clearly marked according to office protocol and a log maintained at each storage facility.							

	Title	Objective	Action	Status	Importance Level	Responsible Agency	Lead	Due Date	Point of Contact	Additional Point(s) of Contact
		(Note: This is actually "b" in the document)	b. Reclamation and DWR shall submit weekly reports to the interagency DAT and an annual written report to NMFS describing, as a minimum, the estimated salvage and loss of winter-run, spring-run, steelhead, and green sturgeon associated with operations of the Jones and Harvey Banks pumping facilities, respectively.							
	2	Reclamation shall seek to develop an alternative technique to quantify incidental take of listed anadromous salmonid species at the Federal and State export facilities.	a. In coordination with NMFS, Reclamation shall select and fund an independent contractor to determine the best technique to quantify incidental take of winter-run, spring-run, CV steelhead, and the Southern DPS of green sturgeon at the Federal and State export facilities. Reclamation shall submit a final report to NMFS by December 31, 2010, summarizing the recommendations for quantifying incidental take, with the selection of a proposed technique. The technique for quantifying take shall be implemented immediately upon NMFS' concurrence. In the event that this measure is not implemented immediately and reflected in the annual report per term and condition 3.a. below, take authorization for CV steelhead shall cease on December 31, 2011. Incidental take, especially for CV steelhead, but for the other listed anadromous fish species as well, may be adjusted based on the application of the new technique to quantify incidental take at the Federal and State export facilities. 1) Reclamation & DWR with feedback from IMT, work to development a recommendation that will be provided to the IRP in 2013 as part of the annual review. provide the written recommendation to IMT by 7/31/13. 2) following issuance of the IRP report and no later than 2/28/14, NMFS and Reclamation will meet to discuss how best to implement the IRP's recommendation. NMFS expects that			USBR	USBR	TBD		
	3	Reclamation shall minimize the adverse effects of flow fluctuations associated with CVP-controlled stream operations on listed anadromous fish species spawning, egg incubation, and fry and juvenile rearing.	a. Reclamation shall schedule maximum ramping down rates of non-Glory Hole (i.e., non- flood control) releases from Whiskeytown Reservoir according to the table, below (estimated at RM 3.03). Ramping rates for releases greater than 300 cfs shall be made after consultation with the Clear Creek Technical Team, considering: time of year, time of day, timing the change to occur with natural changes in-flow and/or turbidity, size of fish present in the creek, species and protected status of vulnerable fish, the amount of water required, and relative costs or benefits of proposed flow. Reclamation shall time flow decreases so that the most juvenile Chinook salmon and steelhead experience the stage decrease during darkness. Maximum ramping rate of flow releases from Whiskeytown Dam into Clear Creek shall be accomplished based on the following targets within the precision of the outlet works or the City of Redding powerplant equipment.							
			b. During periods outside of flood control operations and to the extent controllable during flood control operations, Reclamation shall ramp down releases in the American River below Nimbus Dam as follows:							
			c. During periods outside of flood control operations and to the extent controllable during flood control operations, Reclamation shall ramp releases in the Stanislaus River below Goodwin Dam as follows							
	4	Reclamation and DWR shall monitor all incidental take associated with CVP and SWP operations.	a. Reclamation shall implement all aspects of RPA section 11.2.1.3							
	5	Reclamation and DWR shall annually report to NMFS the incidental take resulting from the implementation of the Proposed Action.	a. Reclamation and DWR shall provide an annual written report to NMFS no later than October 1 of each year. This report shall provide the data gathered and summarize the results of winter-run, spring-run, CV steelhead, and green sturgeon monitoring and incidental take associated with the CVP and SWP operations. All mortalities must be minimized and reported, including those from special studies conducted during salvage operations.					10/1/13: annual report on incidental take		

	Title	Objective	Action	Status	Importance Level	Responsible Agency	Lead	Due Date	Point of Contact	Additional Point(s) of Contact
			b. Reclamation and DWR shall provide reports and updates to NMFS by the specified dates, as provided in various RPA actions (*e.g* ., section 11.2.1.3 #3, Action I.1.3, Action Suite I.2).							
			c. Unless otherwise specified during the implementation of these terms and conditions, all reports and updates shall be sent to: Supervisor, Sacramento Area Office, NMFS, 650 Capitol Mall, 8 300, Sacramento, CA 95814.							