2009 NMFS RPA			2018 draft BA
RPA Action	Objective	Action	Nearest equivalent action
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	Not in current PA
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.	Not in current PA other than to say "**After September, if storage** is such that a dry hydrology would **not provide sufficient cold water pool** to meet sufficient winter-run redd survival in the upcoming year using warm meteorology, Reclamation proposes to **ramp flows down and dewater the last few Winter-run redds**, if the risk/probability of mortality of this year's winter-run is less than the risk/probability of mortality of next year's winter-run population. After ramping down incorporating redd dewatering concerns, Reclamation would keep flows **as low as necessary, but no lower than 3,250 cfs**, to rebuild storage."
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.	Not in current PA
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**.	Not in current PA

2009 NMFS RPA			2018 draft BA
RPA Action	Objective	Action	Nearest equivalent action
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.	Current PA has Reclamation ramping flows down to "**no lower than 3,250cfs**" "**after September**" "if storage is such that a dry hydrology would not provide sufficient cold water pool to meet sufficient winter-run redd survival in the upcoming year using warm meteorology. **(if Relamation determines)**" The PA explicitly states that Reclamation would "**dewater the last few winter-run redds,** if the risk/probability of mortality of this year's winter-run is less than the risk/probability of mortality of next year's winter-run population. **(if Relamation determines)**"
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.	Objective not defined in PA. "Reclamation proposes to make **pulse releases** from Shasta **in March and April** for the purpose of increasing spring-run Chinook salmon survival in the lower Sacramento River **if Reclamation determines** that projected inflows to Shasta Reservoir allow sufficient certainty for Shasta cold water pool summer temperature management, meet water supply allocations, and does not interfere with other system-wide factors."
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.	Not in PA (When not operating for flood control, Reclemation will meet minimum flows and will hold them until demands require increased releases.)
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.	Not in PA

2009 NMFS RPA			2018 draft BA
RPA Action	Objective	Action	Nearest equivalent action
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.	Not in PA
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 cold water 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 Calved 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 suite, based on the independent contractor's report, may be adopted and implemented.	1) Starting **May 15** if **Reclamation determines** there is sufficent storage Reclamation proposes to operate to a daily average temperature of **53.5 F at** the Sacramento River temperature gage above Clear Creek (**CCR**). or, 2) If **Reclamation determines** there is not sufficent storage (example: less than 2.8 MAF cold water pool **end of May**) Reclamation proposes to operate to **life-stage-specific water temperatures** at the Sacramento River temperature gage above Clear Creek (**CCR**). or, 3) If **Reclamation determines** it cannot meet life-stage specific water temperatures (example: less than 2.3 MAF cold water pool **end of May**) Reclamation proposes to operate to the **least adverse effect**. or, 4) If there is **less than 2.5 MAF of total storage** in Shasta Reservoir at the **end of May**, Reclamation will seek technical assistance from NMFS and USFWS on operations.
I.2.5. Winter-Run Passage and Re-Introduction Program at Shasta Dam	See Fish Passage Program, Action V		Not in current PA.

2009 NMFS RPA			2018 draft BA
RPA Action	Objective	Action	Nearest equivalent action
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 and DWR 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**.	Adaptive management project for Upper Sacramento: Battle Creek Restoration: Reclamation would accelerate implementation of the Battle Creek Salmon and Steelhead Restoration Project, which is intended reestablish approximately 42 miles of prime salmon and steelhead habitat on Battle Creek, and an additional six miles on its tributaries. Winter-run Chinook salmon are currently limited to a single population that spawns in a 5-mile stretch of the Sacramento River, but they are being reintroduced to Battle Creek (around 200,000 juveniles were released in Battle Creek in 2018), and this new population would benefit from the restoration efforts. An additional population of Winter-run Chinook salmon on Battle Creek would provide temperature compliance flexibility.