

2009 CVP/SWP Operations RPA Shasta Division Operations Adjustment Outline
July 18, 2016

DRAFT, FOR DISCUSSION PURPOSES ONLY

1. Background and rationale for adjustment
 - a. Temperature-related mortality led to winter-run Chinook salmon year class failures in 2014 and 2015.
 - b. The stressor of water operations resulting in elevated water temperatures that have lethal and sub-lethal effects on egg and alevin incubation and juvenile rearing in upper Sacramento River still exists, including new science:
 - i. Critical temperature of 53.7°F, at which egg and fry mortality increases disproportionately with increasing water temperatures
 - ii. Martin temperature-dependent mortality model
 - iii. California WaterFix modeling indicating worsening of temperature effects
 - c. There is a lack of sufficient cold water in storage to allow for cold water releases to reduce downstream temperatures at critical times.
 - d. Temperature needs for early life stages of winter-run Chinook salmon have not been met.
2. Ideas for adjustments:
 - a. Interagency teams:
 - i. Add Shasta Water Interagency Management Team (SWIM Team) and associated descriptive language
 - ii. Explicitly state the objectives, roles and responsibilities Sacramento River Temperature Task Group (SRTTG)
 - b. Research and Adaptive Management:
 - i. Investigate new ways to operate the Central Valley Project based on new and future meteorological and hydrological conditions due to climate change (*i.e.*, shifting baselines)
 - ii. Invest in new reservoir and water temperature tools and monitoring.
 1. Develop a collaborative science plan for model improvements
 2. Require RAFT model into real-time operations
 3. Develop and implement Shasta Reservoir stratification modeling into monthly forecasts
 4. Develop and implement an integrated Shasta/Whiskeytown/Trinity/Lewiston operations and temperature model.
 - iii. Research and implement engineering solutions to access cold water pool in Shasta Reservoir and prevent warm water leaks through the Shasta Dam temperature control device.
 - iv. Fund further studies to understand other stressors associated with water temperatures and operations, such as disease, predation, lack of spawning and rearing habitat, food web supply, bioenergetics, *etc.*
 - c. Monitoring and Reporting:
 - i. Fund redd-dewatering and juvenile stranding monitoring
 - ii. Fund additional temperature and dissolved oxygen monitoring in the Sacramento River
 - iii. Fund spawning gravel and juvenile rearing habitat monitoring

- d. Specific Shasta Division RPA Actions:
 - i. Action I.2.1: Performance Measures:
 - 1. Discuss utility of 10-year running average metric
 - 2. Storages based on water year types; for discussion:
 - a. End of April or May storage requirements
 - b. End of September storage requirements
 - ii. Action I.2.2: November through February Keswick Release Schedule (Fall Actions):
 - 1. Update language to reflect storage requirements
 - 2. Stabilize flows to minimize fall-run redd de-watering, and winter-run and spring-run juvenile stranding
 - iii. Action I.2.3: February Forecast: March – May 14 Keswick Release Schedule (Spring Actions):
 - 1. Require a March forecast instead (*i.e.*, for better accuracy) prior to initial water allocation decisions
 - 2. Update language to require initial monthly Keswick release schedules with consultation with NMFS regardless of storage
 - a. Impose minimum and maximum monthly Keswick releases
 - b. Delay full side gate operations as long as possible in low storage years
 - 3. Change temperature compliance point language to 61°F 7DADM during winter-run adult holding period
 - 4. Add pulse flows in spring for emigrating spring-run juveniles from Deer and Mill creeks and for bed load movement (if needed)
 - iv. Action I.2.4 May 15 – October 31 Keswick Release Schedule (Summer Action)
 - 1. Establish temperature compliance point during summer season of 55°F 7DADM to downstream most Sacramento River winter-run Chinook redd
 - 2. Stabilize Keswick releases to minimize the potential for redd dewatering
 - 3. Keswick release flow schedules by water year type as necessary to meet criteria
 - 4. Build in conservation to plan until model changes are completed
 - 5. Triggers built in to May plan
 - v. Action I.4 Wilkins Slough Operations
 - 1. Change current 5,000 cfs navigation criterion to 3,800 cfs
- 3. Update RPA:
 - a. Enclosure 1: track changes of pages in the RPA that have changes (not limited to the Shasta RPA, as there are other clarifications, *etc.*, needed since the 2011 adjustment)
 - b. Enclosure 2: clean version of entire RPA, including revised section 11.3 Analysis of RPA
- 4. Update Appendix 2-A, Decision Criteria and Processes for Sacramento River Water Temperature Management, to reflect current information and processes and resolve inconsistencies with RPA regarding acceptable criteria exceedances