



Pacific Fishery Management Council

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Dorothy M. Lowman, Chair | Donald O. McIsaac, Executive Director

Mr. Tom Howard
Executive Director
State Water Resources Control Board
P.O. Box 100
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Mr. Ron Milligan
Operations Manager
Central Valley Project
U.S. Bureau of Reclamation
3310 El Camino Avenue, Suite 300
Sacramento, California 95821

Re: Conservation of Sacramento River Winter Chinook

Mr. Howard and Mr. Milligan:

The Pacific Fishery Management Council (Council) is greatly concerned about freshwater habitat conditions for the 2016 brood of Sacramento River winter-run Chinook salmon. The Council has restricted fisheries on this endangered stock, but we are concerned that the Central Valley Project (CVP) and State Water Project (SWP) water management plan for 2016 does not provide adequate protection of this year's brood, frustrating our work to protect this stock. We request that the California State Water Resources Control Board (SWRCB) and Bureau of Reclamation (Reclamation) provide measures to optimize habitat protection for this important salmon stock, given the severe drought conditions of Water Year 2015 and the second year of record low egg-to-fry survival of winter-run Chinook salmon.

As you are aware, Sacramento River winter-run Chinook salmon are listed as endangered under both Federal and California Endangered Species Acts (ESA). The Federal ESA requires the Council to implement fisheries restrictions to conserve this run. These restrictions constrain commercial and recreational salmon fisheries south of Pt. Arena, California through a combination of area and time closures and other regulatory restrictions. In light of the current dire drought situation and the very low egg-to-fry survival of both the 2014 and 2015 broods, the Council has enacted restrictions more stringent than the ESA requirements.

The Council believes that your water management actions are likely to substantially affect salmon habitat and therefore is obligated under the Magnuson-Stevens Fishery Conservation and Management Act (MSA) to provide comments and recommendations to you (MSA §305(b)(3)).

The Council is pleased to see that the CVP and SWP 2016 Drought Contingency Plan for Water Project Operations February - November 2016, February Update recognizes the very dire circumstances facing winter-run Chinook salmon along with other fish resources. Following discussions with representatives from the California Department of Fish and Wildlife (CDFW) and National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries), the Council has come to believe success of the Drought Contingency Plan is once again at risk, and elements of the draft plan need additional measures to elevate the chances of success. Based on the following statements and sequence of events, we ask that you seriously consider our recommendations in refining and optimizing such a plan.

2015 Water Management Effects

As Reclamation is aware, the 2015 winter-run Chinook salmon brood had an egg-to-fry survival rate currently estimated at 4.5 percent, well below the long-term average egg-to-fry survival rate. Considerable analysis of the actions taken by Reclamation during water year 2015 to comply with the Long-term Operations Biological Opinion's (LOBO) Reasonable and Prudent Alternative Actions (RPA) have been produced^{1,2}. Our review of these actions have led us to observe that in spite of an agreed plan of action, several issues arose that were deleterious for egg incubation. These issues are listed below, with recommendations based on the shortcomings of operations in WY2015.

As described in citation 2, "Reclamation submitted a revised draft Temperature Management Plan for review and approval by the Executive Director in mid-April, and an updated plan on 5/4/15. The Executive Director provisionally approved the Temperature Management Plan on 5/14/15. Reclamation continued to update temperature profile measurements taken at Shasta Lake and associated temperature modeling information and submitted another revised plan for the Executive Director's review and approval on 6/26/15."

After the provisional approval of the May 14, 2015 Temperature Management Plan, inaccuracies in the temperature profile measurements, resulting from Reclamation using a single uncalibrated temperature probe, were discovered. The updated temperature profile indicated that substantially less cold water was available in Shasta Lake to accomplish 56°F daily average temperature at the Bonnyview Bridge temperature compliance point (also known as Above Clear Creek, CDEC ID: CCR) throughout the temperature control season. The updated Temperature Monitoring Plan would provide for 57°F daily average temperature at Bonnyview Bridge and maintain summer Keswick releases at 7,250 cfs, among other provisions (Sacramento River Temperature Task Group annual report page 11).

¹ Independent Review Panel (IRP) Report for the 2015 Long-term Operations Biological Opinions (LOBO) Annual Science Review

² Sacramento River Temperature Task Group. "Annual Report of Activities, October 1, 2014 through September 30, 2015"

Detailed hourly temperature data³ show that daily average water temperatures from June to mid-October routinely exceeded 58°F and daily maximum water temperatures peaked above 60°F several times in June and again in September.

Additionally, an approximately two-hour⁴ flow interruption occurred on July 26, 2015 which produced minimum flow of approximately 3,800 cfs during this interruption. Flow was again deviated from the approved temperature management plan from August 10-15 to accomplish North American Electric Reliability Corporation-mandated testing. These deviations likely resulted in some redd dewatering that created conditions known to be lethal to egg and/or alevin survival.

Recommendations

The Council has extensive experience with biologically-based harvest models. In all our modeling experience, we rely on design principles that seek to ensure inadequacies in modeling and inaccuracies in data still produce conservative harvest regimes. From our observation of 2014 and 2015 water operations and in view of the dismal results for winter-run Chinook salmon egg-to-fry survival, we believe the model Reclamation uses to predict winter-run Chinook salmon survival through operations does not provide any such conservative buffer. Therefore, any inaccuracies in temperature measurements or other factors result in inadequate temperature conditions that reduce the egg-to-fry survival of endangered winter-run Chinook salmon. These models must be systematically revised. However, even if such a systematic model rewrite was to be undertaken, it would not be available for the 2016 water year. We therefore provide the following recommendations:

1. Reclamation should put safety margins on the volume and temperature of the cold water storage and releases intended to benefit fish.
 - Establish a buffer in water operations to ensure there is enough cold water available to meet temperature needs through the end of October.
 - Modify the temperature compliance criterion from 56°F daily average temperature to 55.0°F seven-day average of the daily maximums, as recommended by the Environmental Protection Agency⁵, at Bonnyview Bridge.
 - If there are constraints on changing how compliance is measured, establish a 56.0°F daily average temperature at Jellys Ferry Bridge.
2. A thorough review of Reclamation's internal communications protocol is needed to ensure that all operation management decisions are consistent with providing agreed to flows. Internal alarms and alerts should be established such that software errors that result in unintended flow disruption are observed and corrected before damaging or lethal dewatering of redds can occur. CDFW and NOAA Fisheries should receive communications of flow disruptions in near real time, 24 hours a day, seven days a week.

³ Shasta Reservoir Operations Update, Garwin Yip - NMFS, August 21, 2015 and presentation slides 3/8/16

⁴ Shasta Reservoir Operations Update, Garwin Yip - NMFS, August 21, 2015 and presentation slides 3/8/16

⁵ EPA Region 10 Guidance for Pacific Northwest State and Tribal Temperature Water Quality Standards, EPA 910-B-03-002, April 2003

3. Begin efforts to change models and methodologies used to plan operations consistent with meeting the LOBO RPA.
 - Improve Lake Shasta temperature profile modeling to provide a forecast of the available volume of cold water prior to stratification.
 - Improve reliability and accuracy of downriver temperature and flow modeling to allow operation decisions to actually meet fisheries needs under the RPA.
 - Assure modeling of survival and mortality during incubation and migration periods.
4. Support the acquisition and use of accurate data for the models.
 - Support the NOAA-Southwest Fisheries Science Center temperature profiling tool for Lake Shasta.
 - Support monitoring tools of sufficient number and accuracy to provide inputs to incubation and migration models.
5. Continue to use 90 percent and 99 percent hydrology scenarios for Reclamation modeling and planning.
6. Use the Temperature Criteria Adjustments and Suggested Model Inputs provided by NOAA Fisheries in attachment 4 of the CVP and SWP 2016 Drought Contingency Plan for Water Project Operations February - November 2016, February Update. These parameters provide the types and magnitudes of buffers to the operations intended to conserve winter-run Chinook salmon recommended above.
7. Elevate the conservation of Sacramento River winter-run Chinook salmon to the highest priority, and work towards longer time scale recovery action plans as called out in the NOAA “Species in the Spotlight” section for this stock.
8. Conserve storage in Lake Shasta, particularly the cold water pool, in order to provide for the needs of Sacramento River winter-run Chinook salmon eggs and alevin throughout the spawning and egg incubation season. However, this should be undertaken with due consideration to protecting Trinity River water resources in order to protect the needs of Klamath River fall-run Chinook salmon.
 - Agency forecasts for Klamath River fall-run Chinook salmon⁶ predict low adult abundance that will result in significant fisheries closures or curtailments by the Council. The Council encourages Reclamation to prioritize Shasta Reservoir for winter-run Chinook temperature compliance over the use of Trinity River water resources which are necessary for in-basin protection of Klamath-Trinity fall-run Chinook salmon.
9. Utilize water flow strategies that stabilize the river, such that stranding of juvenile fish rearing in river side channels and dead end bays does not occur, and that when any lowering of flows occurs, the draw-downs will be gradual. Establish a stable flow regime

⁶ Preseason Report I Stock Abundance Analysis and Environmental Assessment Part I for 2016 Ocean Salmon Fishery Regulations Regulation Identifier Number 0648-Bf56

immediately following winter-run emergence that remains consistent until fall-run emergence is finished.

In closing, the Council urges the SWRCB and Reclamation to finalize a strong plan to limit releases from Shasta Reservoir in order to retain an adequate cold water pool and provide stable flows for the 2016 brood Sacramento River winter-run Chinook salmon throughout its freshwater phase, including spawning, egg incubation and emergence, and juvenile rearing and outmigration.

Thank you for your consideration of our comments.

We look forward to hearing from you at your earliest convenience.

Sincerely,

D. O. McIsaac, Ph.D.
Executive Director

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cc: Pacific Council Members
Pacific Council Habitat Committee
Pacific Council Salmon Technical Team
Pacific Council Salmon Advisory Subpanel
Pacific Council Scientific and Statistical Committee
Mr. Mark Cowin, Director, California Department of Water Resources
Ms. Maria Rea, Asst. Regional Administrator, California Central Valley Office, NMFS
Mr. Chuck Bonham, Director, California Department of Fish and Wildlife
Mr. David Murillo, Regional Director Mid-Pacific Region, Bureau of Reclamation
Dr. Steve Lindley, Director, Fisheries Ecology Division, NOAA
Mr. Don Hansen, Pacific Council Staff
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Ms. Jennifer Gilden, Pacific Council Staff