State Water Resources Control Board

June 10, 2021

Kristin White
Central Valley Project Operations Manager
U.S. Bureau of Reclamation
knwhite@usbr.gov

ORDER 90-5 SACRAMENTO RIVER DRAFT TEMPERATURE MANAGEMENT PLAN

Dear Ms. White:

This letter is in regard to the Final Temperature Management Plan (TMP) submitted by the U.S. Bureau of Reclamation (Reclamation) on May 28, 2021, pursuant to State Water Resources Control Board (State Water Board) Water Right Order 90-5.

On May 5, 2021, Reclamation submitted a draft TMP. The draft TMP included an end of September (EOS) storage level of 1.2 million acre-feet (MAF), but did not yet account for the fact that there were significant reductions in projected inflows of nearly 700 thousand acre-feet to the Sacramento River watershed that occurred between April and May of 2021. On May 21, 2021, I provided comments on Reclamation's Draft TMP identifying that I would not approve the final TMP unless it included an EOS storage requirement of at least 1.25 million acre-feet (MAF). This minimum storage level took into account the significant reductions in projected inflows while improving Reclamation's ability to control temperatures in the Sacramento River and decreasing temperature dependent mortality (TDM) to winter-run Chinook salmon as compared to the draft TMP.

The final TMP includes a schedule of releases from Keswick Dam that is intended to meet a 1.25 MAF EOS storage target. Unfortunately, more recent modeling submitted with the final TMP indicates that this carryover storage level will not result in the anticipated decrease in TDM. I am nonetheless approving the final TMP, but with the condition that Reclamation evaluate additional temperature control measures that could

improve Reclamation's ability to control temperatures and minimize TDM. Additionally, I am reserving authority to require changes to the TMP based on that evaluation.

When I commented on Reclamation's draft TMP, the minimum 1.25 MAF EOS storage level was expected to provide TDM levels as low as 50 percent for winter-run Chinook salmon eggs. This estimate was based on modeling dated May 19, 2021, from the National Marine Fisheries Service Southwest Fisheries Science Center (SWFSC).[1] The SWFSC evaluated window shaping scenarios for a range of different reservoir release scenarios/EOS storage volumes. For each reservoir release scenario/EOS storage volume, SWFSC evaluated a range of 120 window shaping scenarios targeting and optimizing different temperature management strategies. The SWFSC did not specifically evaluate a scenario that reached a 1.25 MAF EOS storage level, but did evaluate scenarios of 1.2 MAF EOS storage and 1.33 MAF EOS storage.

With each scenario, results were provided for TDM and first side gate use, or the date when the Shasta dam temperature control device begins releasing the last of the cold water. Early use of side gates (before mid to late September) can result in loss of temperature control before the temperature management season is over, which is not well captured by Reclamation's HEC5Q model and may not be captured by the SWFSC model or in modeling by the Sacramento River Settlement Contractors. Historically, sustained use of both side gates has occurred between one and two weeks following first side gate use. For the 1.2 MAF and 1.33 MAF scenarios run by SWFSC, the lowest TDM results out of all window shaping scenarios considered were 53 percent and 41 percent, and had side gate use on July 16 and July 24, respectively.

With the final TMP, Reclamation provided modeling for two temperature management scenarios (S13 and S14), using Reclamation's HEC5Q model and the SWFSC's provided updated RAFT model. The modeling results are shown in Table 1 below. Scenario S13 targets lower temperatures than S14, but results in earlier side gate use and lower cold water volumes at the end of the season, which is another indicator of the ability to maintain temperature control, than S14. Given the concerns with the early side gate use, the fisheries agencies have recommended that initial operations be targeted to be consistent with S14 so those operations are currently being targeted. The SWFSC modeling provided with the final TMP shows higher TDM levels and earlier side gate use than the May 19, 2021 SWFSC window shaping modeling, based in part on changes in input parameters like updated cold water pool volumes and other parameters. Reclamation's HEC5Q modeling shows higher TDM levels than SWFSC's modeling, likely due to different assumptions related to side gate performance that may be more realistic based on historical information.

[1] Reclamation did not provide TDM modeling for its draft TMP or other scenarios.

Table 1. TDM, Storage, and first side gate usage for different scenarios from final TMP.

Metric/Scenario	**S13**	**S14**
HEC-5Q TDM - Anderson (%)	78.2 – 78.4	94.4 – 96.6
HEC-5Q TDM - Martin (%)	66.6 – 77.3	80.1 – 87.6
RAFT TDM – Mean / Median Martin (%)*	64 / 71	73 / 81
End of Sept CWP Storage (TAF)	173	230
First Side Gate Use	7/13/21	8/8/21
Full Side Gate	8/29/21	9/19/21
End of September Storage (MAF)	1.25	1.25

State Water Board staff understand that hydrologic conditions this year are very challenging and that some actions have already been taken to make up for shortages in projected water supplies. Staff also understand that conditions are dynamic and that modeling is imperfect. However, the higher TDM levels identified in the final TMP, particularly for the planned operations under S14, raise significant concerns related to protection of winter-run Chinook salmon. Given very low survival levels of winter-run Chinook salmon for the past two years and the fact that winter-run Chinook salmon have a 3-year lifecycle, high TDM levels this year could increase the risk of extinction significantly. In addition, these results are concerning for fall-run Chinook salmon protection.

Despite these concerns, due to the extremely dry conditions and the significant reduction in expected Shasta inflows this year, the State Water Board is satisfied that the TMP reflects the currently known feasible and reasonable management actions Reclamation could take to control temperatures this year. However, the final TMP approval is subject to the following conditions:

1. Reclamation shall take all actions within its reasonable control to improve temperature conditions and ensure that TDM levels are minimized to the maximum extent feasible. Reclamation in coordination with the Department of Water Resources, State Water Board, and fisheries agencies shall evaluate additional options to improve temperature management. Reclamation shall submit a report of those evaluations, including evaluation of proposals that have been submitted by stakeholders, by June 21, 2021. I reserve continuing authority to modify my approval of the TMP based on this information and any changed circumstances, including changes to actual or projected releases, reservoir storage levels, TDM estimates, or other conditions.

2. Reclamation shall take actions within its reasonable control to achieve an EOS storage level of 1.25 MAF. I reserve authority to modify this requirement if there are actions within Reclamation's reasonable control that would allow Reclamation to improve temperature management by achieving a higher storage level, or if there are factors outside of Reclamation's control that prevent this storage level from being met.

3. Reclamation shall operate in accordance with the final TMP, and report to the Executive Director in writing within two business days in the event that Reclamation's operations deviate from, or are expected to deviate from, those outlined in the TMP and this approval. The report shall explain why actual operations deviated from the TMP or are projected to, address whether the carryover storage requirements and other TMP objectives will be achieved, and include a plan to address any deficiencies within Reclamation's reasonable control.

4. Reclamation shall consult at least weekly through October, and more often if warranted or requested, with representatives from the fisheries agencies and State Water Board to inform the agencies regarding real-time conditions related to temperature management and to receive input and advice from the agencies on this management.

5. Reclamation shall conduct monitoring, modeling, and other evaluations needed to ensure that temperature management actions are optimized and to inform future management actions as determined by the State Water Board in consultation with the fisheries agencies.

6. Reclamation shall provide a draft report to the State Water Board by October 4, 2021, on strategies that Reclamation will employ to rebuild storage and avoid temperature management concerns for winter-run, fall-run, and spring-run Chinook salmon next year in the event of dry conditions. That report will be subject to a two-week public comment period. Based on public comments, Reclamation shall update the report to address comments and provide a final report to the State Water Board by November 17, 2021.

Although this year remains very challenging for both water users and the environment, we appreciate the increased communication and coordination with Reclamation and the fishery agencies that has occurred this year. In order to build on this coordination and to ensure adequate consideration of temperature management needs next year, based on

the strategy identified in Condition 6, Reclamation is requested to: 1) develop and submit monthly temperature management plans for the February through May time period by the 20th day of the preceding month reflecting current hydrologic conditions that demonstrate actions that will be taken during that month to preserve storage for temperature management needs during the temperature management season (generally mid-May through mid-November); 2) submit a draft temperature management plan for the temperature management season in April based on April hydrologic conditions that most closely match current and projected future conditions; and 3) submit a final temperature management plan in May based on updated May hydrologic conditions that most closely match current and future projected conditions. In addition to the above, the State Water Board will also be considering other longer-term actions to address Sacramento River temperature management issues, including reevaluation of required actions by Reclamation and other water users.

Thank you for your continued cooperation and coordination on this matter. If you have any questions regarding this letter, please contact Diane Riddle at diane.riddle@waterboards.ca.gov. Please be aware that due to the public health concerns regarding the COVID-19 virus and the resulting pandemic, many State Water Board staff are telecommuting; therefore, the best avenue of communication at this time is via email.

Sincerely,

ORIGINAL SIGNED BY

Eileen Sobeck
Executive Director
State Water Resources Control Board