BUREAU OF RECLAMATION

Sacramento River Temperature Task Group Notes

April 11, 2024

Members Attending

- USBR: Alexander Vaisvil, Elissa Buttermore, John Hannon
- USFWS: Craig Fleming, Erica Meyers, Matt Brown, Sommer Tanya, Travis Apgar
- CDFW: Crystal Rigby, Doug Killam
- NMFS: Sam Pyros, Stephen Maurano
- SWFSC: Cyril Michel, Evan Sawyer, Miles Daniels
- DWR: Kevin Reece, Mike Ford, Ryon Kurth
- SWRCB: Claudia Bucheli, Craig Williams, Jeff Laird
- SRSC: Mike Deas, Lee Bergfeld(MBK Engineers), Lewis Blair
- WAPA:
- Yurok Tribe:
- Hoopa Tribe:

Actions Items

- Reclamation will share the draft TMP when it is ready.
- Kearns & West will notify the SPG of SRTTG's support of the spring pulse recommendation and feedback about the temperature dependent mortality analysis.
- The SPG will have a meeting soon to coordinate further.

Topics

Welcome, Agenda Review, and Purpose

Terra Alpaugh, Kearns and West, welcomed all participants. The purpose of the ad hoc meeting was to share the USST spring pulse flow recommendation and solicit any input/considerations from the Sacramento River Temperature Task Group (SRTTG).

Pulse Flow Development Process Recap

Terra Alpaugh, Kearns and West, gave an overview of the Spring Pulse Flow Planning Process:

- The Upper Sacramento Scheduling Team (USST) recommendation and analysis is documented in a Pulse Flow Operation Plan.
- The USST is directed to regularly update SRTTG on the development and recommendation of pulse flow scenarios. An update was recently given at the SRTTG's March meeting.
- The SRTTG is to reserve time for discussion of the recommendation at its March and April meetings. This ad hoc SRTTG meeting was scheduled for the SRTTG to discuss and provide recommendation since the next SRTTG meeting is scheduled in late April.
- The Upper Sacramento River Spring Pulse Flow & Upper Sacramento Scheduling Team LTO Implementation Guidance Document states that after SRTTG has had time to review and discuss, the recommendation may be elevated for the Water Operations Management Team (WOMT) to consider how the selected scenario is forecasted to affect juvenile Chinook migration success and Shasta summer temperature performance (i.e., winter-run Chinook salmon temperature dependent mortality).
- Last year USST/SRTTG was advised that the Shasta Planning Group (SPG), rather than WOMT, is the appropriate venue for sub-director discussion of the recommendation.
- Finally, Reclamation will make a final determination as to whether to implement the proposed Pulse Flow Operation Plan.

Operations Update

Tom Patton, Reclamation, provided an update on system conditions and operational plans that may impact pulse flow planning:

- Reclamation is currently releasing 6,000 cfs at Keswick and plans to increase to 8,000 cfs tomorrow.
- Storage at Shasta is about 4.3 MAF.
- There is a small storm forecasted to arrive this weekend with forecasted peak daily inflow of 15,000 cfs.
- Warmer and drier conditions are forecasted afterwards.
- Reclamation would hold 8,000 cfs as a base flow until late in April when the pulse flow period begins.
- Flows are currently on the higher side in the Shasta system but will recede with drier conditions.
- Irrigation demand are forecasted to increase significantly at the end of April.
- Flows are currently high in the lower river: at Wilkins, they are forecasted to reach 17,000

to 18,000 cfs by the California/Nevada River Forecast Center (CNRFC).

Spring Pulse Flow Recommendation

Cyril Michel, SWFSC; Tom Patton, Reclamation provided a briefing on the USST Spring Pulse Flow recommendation and rationale.

Reclamation provided data on the hydrologic conditions anticipated across the study period and outlined multiple potential pulse scenarios with favorable timing and magnitudes. Reclamation provided the flow data to Cyril Michel at Southwest Fisheries Science Center (SWFSC) who has expanded these scenarios to explore a broader range of different pulse possibilities. Pulses would occur in eight specific weeks and pulses last for two, three, or four days and start on Tuesdays. There could be one, two, or three pulses for the season. Pulse flows should be no more than 15,000 cfs at Keswick and 18,000 at Wilkins Slough. SWFSC generated approximately 150 scenarios based on these constraints for four-day pulses, as four-day pulses tend to have better survival benefits for spring-run Chinook salmon smolt.

Cyril gave background on pulse scenario evaluation. SWFSC conducted the evaluation by comparing outmigration survival of spring-run Chinook salmon smolts in pulse flow scenarios to survival under baseline conditions without the pulse flow. Spring Pulse Flows are meant to benefit spring-run Chinook salmon smolts. Many smolts come from the upper Sacramento River tributaries of Mill Creek, Deer Creek, Battle Creek, and Clear Creek, so it is important to consider the timing of the smolts leaving the tributaries and entering the main stem of the Sacramento River when evaluating pulse flow scenarios.

SWFSC examined the scenarios using historic daily smolt passage and catch data from Red Bluff Diversion Dam, Mill Creek, and Deer Creek. The ten best-performing scenarios when using Red Bluff Diversion Dam daily movement data are scenarios with three pulses over four days in weeks four, five, six, seven and/or eight. Using Mill Creek screw trap data, the best scenario had pulses in weeks six, seven, and eight since fish tend to migrate later than those fish in Red Bluff and Deer Creek. Using Deer Creek, passage data shows fish moving out earlier so the best flow scenarios have mid-range pulse flow weeks.

USST favors the pulse flow scenario occurring in weeks four, six, and eight since those weeks consistently rank in the top ten when using all the different data sets. There is also a gap week between each pulse, which is advantageous because back-to-back pulses might be less effective. This is because the first pulse moves the fish that are ready out and there may not be more fish ready to move if a pulse arrives the next day. A gap between pulses might find more fish ready for migration.

Elissa Buttermore, Reclamation, gave an overview of the documentation in Pulse Flow Operations Plan. It contains a summary of action and background; an overview of the forecast and current conditions, descriptions of the Chinook salmon benefits and how actions will improve outmigration survival; and a description of the pulse flow scenarios.

Questions and Comments

- Sacramento River Settlement Contractors (SRSC) asked if the analysis considers conditions all the way to the ocean so that mortality risks in the Delta are considered, especially in warmer temperatures in late May.

    - SWFSC responded that it is true that at some point in the season the Delta becomes inhospitable for smolts. The intent of the pulse flows is to move smolts out before that. Historically, week eight (beginning on May 20) is hospitable to salmon throughout the system, especially in wet years like this one. There will be several pulse flows coming out of the San Joaquin River at the same time, so water conditions in the Delta should still be good in late May, especially compared to drought years. There is also flexibility in the proposal: the recommendation is to implement a pulse flow in weeks four and six for sure, but to reassess conditions prior to implementation of a week eight pulse. USST will revisit as week eight nears.

- SRSC asked if there would be coordination on the timing for the pulse flows on the San Joaquin. They noted that the system is warmer and lower flows, so aligning the flows in both systems might have benefits in the delta.

    - Reclamation noted that USST has considered Delta conditions mostly from a flow standpoint. There is typically reduced pumping from April through May. Conditions are generally better in the wetter years.

- USFWS noted that the proposal with pulses occurring on weeks four, six, and eight initiates pulses within the earliest timeframe possible is and will help move smolt to the ocean. Having a gap between pulse flows will allow more smolts to accumulate in the river between pulses and also allow for a better evaluation of effectiveness. Fish can be acoustically tagged before and after pulse to learn about their survival. Starting as early as possible in week four supports the outmigration of any Coleman National Fish Hatchery fall run salmon that may remain in the upper river. Coleman is releasing 3 million fish this Friday and more at the Butte City location next week. Those fish could benefit from a week four pulse.

- USFWS asked whether, beyond the Sacrament River, there is a benefit for downstream or in the Delta from the pulse flows.

    - Reclamation said that the D1641 standards for April will be met without a pulse flow. The pulse could support meeting targets for May, but April needs to be over before Reclamation can evaluate the Delta requirements for May. The plan is to be at minimum exports from April to May, so pulse flows will not change exports.

- Reclamation also noted that they will do temperature management model run with and without the pulse flows. They do not anticipate any significant difference in temperature dependent mortality between those model runs. There will be reduction of storage in Shasta. The model outputs will be built into the documentation.

- USFWS added that the first pulse flow will occur when there are high baseline flows. The proposal is to maximize releases but keep them below 15,000 cfs at Keswick and below 18,000 cfs at Wilkins Slough so that they do not interfere with diversions for ACID or cause additional seepage issues at downstream locations. Implementation at those flows could provide data that could help clarify survival in higher flows.

Input from SRTTG on Spring Pulse Flow Recommendation

Kearns & West stated that this recommendation is being put forward by the USST and asked for the group members for input and an indication that they are comfortable elevating this recommendation to Shasta Planning Group.

Questions and Comments

- SRSC indicated support for the pulse flow recommendation but noted that having a temperature dependent mortality analysis would be useful in providing a fully informed perspective.
- SWFSC said that Miles Daniels did an analysis using historic data to assess how a theoretical pulse flow in past years would have impacted temperature management and temperature-dependent mortality. It showed in wetter years like this year that the effect is negligible. Last year when the pulse flow was approved, that document was attached to the operations plan. That could be done this year. It is a historic analysis and not an analysis using current conditions. Reclamation is doing its own analysis and that will be available soon.
- NMFS noted that the 2019 biological opinion provides an earlier analysis of this action. Even with the possibility of a 150 TAF use, the temperature dependent mortality difference in wet years is less than 2%. Also in that document, it suggests that if Shasta has 4 MAF at the end of April then that provides enough water for river temperatures at the CCR gage to be held at 53.5°F.
- Historically, using both of those relationship is useful.
- USFWS asked if the data needed for modeling temperature dependent mortality was currently available.
    - Reclamation stated that it sent the March forecast data to SWFSC which will not be the best reflection of current lake conditions. Reclamation will have the April forecast early as next week and will use it for modeling in draft Temperature Management Plan. The Temperature Management Plan would be sent to the SRTTG in two weeks. If the first pulse starts on April 23, it will need to be scheduled on next Friday 19th, so the group will not have up-to-date temperature modeling prior to making a recommendation.

The attending representatives of the SRTTG member organizations present (Reclamation, NMFS, NMFS SWFSC, DWR, CDFW, USFWS, SRSC, Water Board) recommended advancing the pulse flow recommendation to the Shasta Planning Group with the caveat that the SRTTG would like to see the temperature dependent mortality analysis as soon as possible, but with the understanding that the pulse flow may be scheduled before receiving that information.

Next Steps

- Kearns & West will notify the SPG of SRTTG's support of the recommendation and feedback.
- The SPG will have a meeting soon to coordinate further.

Adjourn

Post-Meeting Documentation

Thursday 4/11, 2:33pm, Email from Kearns & West to the Shasta Planning Group

Subject: SRTTG/USST Spring Pulse Recommendation to SPG [Input Needed EOD Friday]

Dear Shasta Planning Group,

Your input is needed on the SRTTG/USST Spring Pulse Flow Recommendation by EOD, Friday, April 12. I am available to calendar a call for you all to confer if you share your availability for tomorrow ASAP.

A subgroup of SRTTG members has met over the past month to assess the viability of a spring pulse flow based on the criteria described in the Proposed Action and to determine what a preferred scenario would look like in terms of number of pulses, duration, and timing. The subgroup has had regular participation from Reclamation, NMFS, SWFSC, USFWS, CDFW, DWR, SWRCB, and SRSC. This afternoon, Tom Patton and Elissa Buttermore of Reclamation and Cyril Michel of the NMFS Southwest Fisheries Science Center presented to SRTTG **the subgroup's recommendation, which is as follows:**

- Implement 3, 4-day pulses in Weeks 4 (April 22), Week 6 (May 6), and Week 8 (May 20) (also referred to as Scenario M6).
- In the event of base flows at Wilkins Slough above 11,000 cfs, which is usually the target peak for the pulse flows, implement a larger pulse flow (i.e., max flows that still keep Keswick below 15k cfs and Wilkins Slough below 18k cfs). This is most likely to occur for the Week 4 pulse.
- Continue discussion at the USST around the timing and benefits of the third pulse in Week 8. Depending on conditions, the group might make a subsequent recommendation to move that flow to Week 7 or to skip it altogether.
- Coordinate acoustic tagging efforts with CDFW (Ryan Resnick), whose crew is also tagging fall run at RBDD during the same period.

For your reference:

- All agencies present at SRTTG voiced support for advancing the recommendation to the Shasta Planning Group; participating agencies were Reclamation, NMFS, NMFS SWFSC, DWR, CDFW, USFWS, SRSC, Water Board.
- The pulse flow considerations and 2024 recommendation are outlined in the attached Spring Pulse Operations Plan.
- Also attached are the Spring Pulse Study Plan, which includes the Monitoring Plan, and the Spring Pulse Flow Guidance Document, which outlines the direction provided by the Proposed Action and BiOp.
- The survival estimates considered by the USST and the most recent updated runs are attached as the "survival per scenario" file.

Additional feedback included:

- Comparative TDM runs (i.e., with and without a pulse) will be completed to be shared at the April 25th SRTTG Meeting. Based on historical analysis of wetter years, the group does not anticipate seeing a meaningful change in TDM as a result of the pulse flows' water cost. However, this analysis will be an important part of documentation, and it remains a priority to determine how to complete it earlier in the season in future years so that it can be used in decision making (especially in drier years).

I would also like to note the time sensitivity of this request: if the M6 Scenario is approved, Reclamation will need to make their decision about implementation on Monday, April 15, so that Cyril Michel of SWFSC and his team can begin tagging fish for the "pre-pulse" comparison immediately and CVO can schedule the flows on Friday, April 19.

I expect that your individual SRTTG representatives will be briefing you further on the details and rationale supporting the recommendation, but please feel free to reach out to K&W if you need any of the materials the subgroup considered during their discussions. For transparency, the full SRTTG is copied on this email.

Best,
Terra and the KW Facilitation Team

Friday 4/12, 3:27 pm, Email from Kearns & West to the SRTTG

Subject: SPG Response to SRTTG/USST Pulse Flow Recommendation

Dear SRTTG and USST,

The SPG conferred via email today on your pulse flow recommendation. Five agencies – Reclamation, USFWS, NMFS, CDFW, and the State Board—expressed support for implementation of the M6 pulse flow recommendation (described at yesterday's meeting and below in writing). DWR abstained.

USFWS requested one minor edit to the Pulse Flow Operations Plan on page 2 which states "The timing of these pulses may also support Coleman National Fish Hatchery (CNFH) fall Chinook, which have been released over the last several weeks." Please rephrase to "The timing of these pulses may also benefit the approximately 3 million Coleman National Fish Hatchery (CNFH) fall Chinook which will be released in the next week."