



# Sacramento River Temperature Task Group Notes

April 25, 2024

## Members Attending

- Bureau of Reclamation (Reclamation): Alexander Vaisvil, Christopher Laskodi, Derek Rupert, Elissa Buttermore, Elizabeth Kiteck, Karissa Bridges, Lisa Elliot, Tom Patton
- U.S. Fish and Wildlife Service (USFWS): Charles Chamberlain, Craig Fleming
- California Department of Fish and Wildlife (CDFW): Crystal Rigby, Doug Killam, Erica Meyers, Gang (Gary) Zhao, Kimberley Holley, Tracy Grimes, Travis Apgar, Vanessa Guzman Costa
- National Marine Fisheries Service (NMFS): Sam Pyros
- Southwest Fisheries Science Center (SWFSC): Miles Daniels
- California Department of Water Resources (DWR): Kevin Reece, Mike Ford, Ryon Kurth
- California State Water Resources Control Board (SWRCB): Craig Williams, Jeff Laird
- Sacramento River Settlement Contractors (SRSC): Mike Deas, Lee Bergfeld
- The following SRTTG members did not have a representative present: Western Area Power Administration (WAPA), Yurok Tribe, and Hoopa Tribe.
- Facilitation Team: Victoria Pebbles and Jack Hughes, Kearns & West.

## Topics

### Welcome, Agenda Review, and Purpose

Victoria Pebbles, Kearns & West, welcomed all participants and reviewed the purpose of the SRTTG as follows:

- Sacramento River Temperature Task Group (SRTTG) consists of agency representatives having direct interest in cold water pool management on the Sacramento River and meets at least monthly February through October. The purpose of the SRTTG is to “share operational information monthly and improve technical dialogue to inform the development and the implementation of an annual Temperature Management Plan (TMP) for the Sacramento River.” The TMP is developed by the U.S. Bureau of Reclamation

- (Reclamation) in accordance with California State Water Resources Control Board Water Rights Order 90-5 to assist with improving and stabilizing Chinook salmon populations in the Sacramento River.

## Hydrology and Pulse Flow Implementation Update

Tom Patton, Reclamation, provided a brief update on current operations before presenting the latest forecast and implications for the Sacramento System, as well as on current hydrologic conditions and flows.

### Current Operations:

- Currently, midway through the first pulse flow, releasing 11,000 cfs at Keswick. Reclamation is scheduled to hold 11,000 cfs pulse until Saturday, before decreasing down to 6,000 cfs until the start of the second pulse on May 7th. The forecast for Wilkins Slough is 16,000 cfs and peaking at just under 17,000 cfs.
- The elevation of Shasta Lake is decreasing with inflows slightly lower than releases.
- Whiskeytown Reservoir is filling with natural flows. Reclamation might have to divert a bit through Carr later in May.
- Trinity Lake is currently at the peak of the Record of Decision (ROD) flows at 8,500 cfs. Reclamation will hold for one more day before initiating a slow ramp down through May and the early summer months. This is lowering Trinity Lake's elevation, but snowmelt entering the lake may slow this and potentially increase elevations as ROD flows continue to decrease.

Reclamation presented the information contained in the meeting packet shared with the SRTTG. Sections below correspond to groups of graphs, images and tables in the meeting packet provided by Reclamation.

### Northen Sierra Precipitation:

- Precipitation is close to average for this time of year at 93% of the average.
- Showers are forecasted in the far northern part of the state.

### California Snow Water Content:

- The snow is starting to melt, and the runoff is going to the reservoir.
- In the north, snowpack is at 92% of the April 1st average.

Daily Central Valley Project (CVP) Water Supply from 4/24/2024 showing Current Storage, Releases, and Mean Water Temperatures

- Releases are high for this time of year with pulse flows on almost every river.
- Storage in the reservoirs is looking good.
  - Storage at Trinity Lake is at 123% for this time of year.
  - Shasta Lake is at 4.377 MAF.

- Inflow is also looking good.
  - 149% of the 15-year average at Trinity Lake.
  - 121% for Shasta Lake.
- Water Temperatures
  - Were close to 53.5°F for a few days last week at the CCR Station.
  - The temperature at TCD is warming gradually and was near 52°F for a while before cooling. Reclamation anticipates the surface of Shasta Reservoir to start warming more significantly in May.

#### Reservoir Profiles and Cold-Water Pool: Graphs on Isothermobaths-2024, Graphs on Cold Water Pool Volume, Percent Exceedances (1998-2023)

- Shasta Lake:
  - The surface of the lake is warmer now, but there is still a good cold-water pool forming.
  - Shasta Lake has a cold-water volume of 52°F and colder and 48°F and colder water similar to 2016.
  - The 52°F cold water pool volume is near the 50% exceedance.
  - The 50°F cold water pool volume is near the 25% exceedance.
  - The 48°F cold water pool volume is near the 75% exceedance.
- Trinity Lake:
  - High storage with a good cold-water pool, and slightly warming at the surface.
  - Trinity Lake has a has a cold-water volume of 52°F and colder and 48°F and colder water similar to 2019.
  - The 52°F cold water pool volume is near the 50% exceedance.
  - The 48°F cold water pool volume is near the 25% exceedance.
- Whiskeytown Reservoir:
  - The temperature is cool, but there is slight warming on the surface.

#### Seasonal Temperature and Precipitation Outlook

- The National Weather Service 30-day forecast shows an equal chance of precipitation in May, and the far north of California has a slightly greater chance of above normal temperatures.
- The seasonal temperature outlook shows a good probability for above normal temperatures.

## Estimated Central Valley Project Operations 50% Exceedance

- Assumes all three pulse flows will happen: one in April and two in May.
- Forecasted storage volume at Shasta is 4.4 MAF at the end of April but actual storage is currently lower at around 4.3 MAF. Storage at the end of September is forecasted at just over 3 MAF.
- Trinity Lake storage volume is forecasted to be just under 1.7 MAF at the end of September going into the next water year.
- All reservoirs look good going into next year.
- The Sacramento River is forecasted to peak at 12,000 cfs in July before dropping through the fall and winter.

## Estimated Central Valley Project Operations 90% Exceedance

- Actual conditions were tracking close to this estimate for the month of April.
- Forecasted elevation at Shasta Lake is 2.5 MAF end of September.
- The Sacramento River is forecasted to peak at 13,250 cfs in July before dropping to 4,000 cfs for the winter.

## Questions and Comments

- Reclamation asked if temperatures at the Temperature Control Device (TCD) rise enough that 53.5°F at CCR cannot be maintained this early in the season, should Reclamation release colder water sooner or let temperatures climb now to preserve the cold water for release later in the year?
  - SWRCB said the situation might have occurred in the past and that some temperature dependent mortality (TDM) modeling that would inform an answer to that question.
  - CDFW reminded the group that CDFW provides the first notice of winter-run spawning and that in dry years that first notice of spawning gives the signal to be protective of water temperature. Conserving cold water early in the season for winter run spawning and runs later in the season is important.
  - Reclamation invited SRTTG members to provide thoughts via email if they wished.
- CDFW asked why there was a steep drop in the cold-water volume in Shasta Lake from March to April?
  - Reclamation responded that the measurements are taken once a month, so it is sometimes hard to tell what happened in between measurements. Soon Reclamation will start to make these measurements every two weeks. This drop probably has something to do with flood releases pulling water through the TCD upper gates. The current intent is to skim off the warmest water, but at that time, the reservoir was not as stratified. This type of drop can be seen in other years and is common.

## Temperature Management Plan and TDM Modeling

Tom Patton and Elissa Buttermore, Reclamation provided an overview of the sections of the draft 2024 TMP and noted the following:

- Reclamation is using the State Water Resources Control Board (SWRCB) Order 90-5 and the IOP, just like last year.
- It will be a Tier 1 year, so Reclamation will operate to 53.5°F at CCR.
- The draft TMP describes modeling limitations, uncertainties, and assumptions, including using the April 25% exceedance L3MTO forecast.
- The Shasta Lake release strategy is based on the 90% exceedance forecast of operations.
- Hypothetical operations without pulses and the impacts on TDM are included in the draft TMP as well.
  - There are four different graphs showing results with and without pulses in Attachment 5.
  - The TDM median values are similar to what the NMFS Science Center found in their TDM modeling.
- There are many uncertainties outlined in the plan, including if the Upper Sacramento Scheduling Team ultimately recommends any changes to the spring pulse timing and magnitude.
- SWRCB was interested in what it would look like if Reclamation operated to 56°F at Balls Ferry, so Reclamation will include this analysis in the final report.

Miles Daniels from the SWFSC presented the Summary Document for Shasta/Keswick Operational Scenarios (dated April 25, 2024) prepared by the SWFSC, which was shared with SRTTG members as part of the meeting materials.

- The RAFT model was used to run two scenarios, one with and without spring pulse flows, with outputs showing average Sacramento River daily temperatures and associated temperature-dependent egg mortality.
- There is a small effect/difference between the two model runs. The mean percent results indicate an eight percent TDM without pulse flows and thirteen percent TDM with pulse flows. The median percent results indicated five percent TDM without pulse flows and ten percent TDM with pulse flows.
- Redds later in the season account for most of the TDM. Warming accounts for the difference in mortality between the two scenarios.
- The 5% difference in the median values between the two scenarios may not be as significant since TDM levels are low.

## Questions and Comments

- CDFW noted that one of the inputs to the HEC-5Q model is the equilibrium temperature and asked if there is a tool to adjust the equilibrium temperature based on the forecast.

- Reclamation responded that it uses the three-month forecast from Climate Prediction Center as a guide for looking at historical temperatures and then lines them up. It uses pattern years to make a temperature forecast that includes equilibrium temperature and a few other meteorology metrics and inputs into the HEC-5Q model. Reclamation can find the methodology write up and send to the CDFW.
- CDFW noted that the target for end-of-September storage at Shasta seems low for the IOP in above-normal water year.
- CDFW asked if extending the availability of cold-water habitat for salmon downstream of Clear Creek in a year with decent cold-water pool is possible.
  - Reclamation responded that maintaining 53.5°F at CCR is considered a Tier 1 operation. In the current proposed action, there are no conditions identified that extend that temperature further downstream. The SRTTG could recommend operating further downstream. Reclamation is analyzing operating to 56°F at Balls Ferry (BSF). There is still a large cold-water pool in Shasta but not as big as last year when it was decided not to move compliance point down to BSF. Projections show using side gates this year, unlike last year. There is more of a pull on the reservoir with a pulse flow. Reclamation might consider doing an analysis of what would happen without the third pulse flow, but it may not show a significant difference in timing of gate use.
- Reclamation invited the SRTTG to send in comments on the draft TMP via email and suggested that an ad hoc meeting be scheduled in early May to discuss the draft TMP more as a group.

### River Fish Monitoring: 1) carcass surveys 2) Redd counts 3) stranding and dewatering surveys

Doug Killam, CDFW, provided river fish monitoring updates.

- Adult winter carcass runs surveys start next week on Wednesday.
- Spawning starts on May 1, but not many fish are seen in May and June.
- Redd surveys will start in late May.

### Questions and Comments

- SWRCB asked what returns are expected this year?
  - CDFW: Outmigration conditions for juveniles three years ago in fall 2021 were terrible at Bend Bridge and Keswick, because of low flows. Since survival was low, a big return run is not expected this year.
- CDFW noted that late fall run fish are hatched and in the middle of emergence. CDFW will continue carcass survey into the second week of May. There are few adult salmon spawning in late April and early May. The surveys now are focused on pre-spawn mortality or other problems.

## **Fish Distribution/Forecasts**

Charlie Chamberlain, USFWS, presented the estimated percentage of the population upstream of Red Bluff Diversion Dam for steelhead, winter-run, and spring-run Chinook salmon.

- Mainstem juvenile monitoring program sampling through the pulse flows and capturing spring and fall-run smolts.
- The biweekly reporting process is down for revamping and software updates. The reports might be made on the SacPas website soon.

No representatives were present to provide the Steelhead or Livingstone Stone Hatchery updates. Kearns & West offered to follow up with appropriate SRTTG members to request that an update be shared with the group via email.

## **Additional Announcements**

Elissa Buttermore, Reclamation, presented the Delta Temperature Outlook (dated 4/25/24), which was included in the meeting materials, noting that the temperature graphic can be generated for multiple Sacramento River and Delta locations by adjusting the query options on the SacPAS website.

## **Action Items**

- Kearns & West will follow up with Kaitlin at USFWS for Steelhead and Livingstone Stone updates to share with SRTTG.
- Kearns & West will follow up with Coleman Hatchery to get updates on fall-run releases.
- SRTTG members can email their comments on the draft TMP to the group.
- SWRCB will report back to the SRTTG as to whether they have previous TDM modeling that would inform a decision on timing the release of cold water for fish benefit.
- Kearns & West will work with the SRTTG to schedule an ad hoc meeting in early May.
- Reclamation will send the methodology for equilibrium temperature to the CDFW.

## **Adjourn**