**Sacramento River Temperature Task Group (SRTTG) Meeting**
**April 14, 2022, | 1:00 PM – 2:45 PM**
**Meeting Summary**

***Participants***

Bill Poytress, USFWS
Chris Laskodi, Yurok Tribe
Crystal Rigby, CDFW
Craig Williams, SWRCB
Doug Killam, CDFW
Donald Bader, Reclamation
Diane Riddle, SWRCB
Erica Meyers, CDFW
Eric Danner, SWFSC
Gabe Singer, CDFW
James Gilbert, SWFSC
James Earley, USFWS
Jeffrey Onsted, DWR
Jeff Laird, SWRCB
Jo Anna Beck, Reclamation
Jonathan Williams, CDFW
Kevin Reece, DWR
Kristin White, Reclamation
Kyle De Juilio, Yurok Tribe
Lauren McNabb, CDFW
Lenny Grimaldo, DWR
Mary Suppiger, Reclamation
Matt Brown, USFWS
Matt Holland, SWRCB
Miles Daniels, SWFSC
Michael Macon, SWRCB
Michael Wright, Reclamation
Michael Harris, CDFW
Mike Prowatzke, WAPA
Stephen Maurano, NMFS
Suzanne Manugian, Reclamation
Seth Naman, NMFS
Thad Bettner,
Taylor Lipscomb, SWRCB
Tom Patton, Reclamation
Vanessa Kollmar, CDFW

***Facilitation Team***

Mia Schiappi, Kearns & West
Terra Alpaugh, Kearns & West

**Key Discussion Topics with**
**Summary of Recommendations and Outcomes**

**Action Items:**

1. KW to circulate the populated modeling assumptions table to SRTTG. Reclamation and SWFSC should review and confirm information. SRSC should populate their column.
2. SWFSC to confirm where any of their current assumptions vary from those used in March modeling.
3. Reclamation to share full modeling runs with SRTTG. SWFSC to graph Reclamation results alongside their own in their regular format for easier comparison.
4. Reclamation and SWRCB create profile results in a graphical format.
5. Suzanne will relay back to Reclamations Bay-Delta Office (BDO) that the SRTTG supports using the 2021 redd distribution as the distribution input for the TDM modeling.

**Prior Action Items**

Terra Alpaugh, Kearns & West reviewed action items from the previous meeting on April 7, 2022:

1. **All SRTTG** to send Tom Patton comments on the TMP with focus on how to shape the available cold water, as well as any text that should be included in the plan for context (since the draft text was significantly pared down). Send comments by April 22nd, so that they can be considered and incorporated into the final draft (target submission date: May 2).
2. Reclamation requested comparative model runs from **SWFSC and SRSC**, so that the SRTTG can compare results across models.
3. **Chris Laskodi, Yurok and Tom Patton, Reclamation** - Consider requirements, need, and timing for emergency consultation required in the Trinity River ROD and NMFSs' 2000 BiOp. Please include NMFS Trinity representative Justin Ly (justin.ly@noaa.gov) in communications.
    a. The tribes have sent letters regarding Trinity operations. The tribes would like to be involved but it is not required under the ROD -**Addressed**

## 1. Model Assumptions

Reclamation provided a modeling assumptions table and the SRTTG live edited the document. Reclamation commented that it is important to document what different parameters people are using, even if each of the models may use different assumptions for at least some of the parameters.

- SWRCB asked the group to identify parameters that would have a higher impact on the TDM output; they want to better understand which assumptions play into the different temperature outputs. Policy makers who look at the modeling assumptions tables will want to know what assumptions matter most and which are driving the output.
    a. KW suggested that they highlight parameters that have high impact on TDM in red, with the understanding there is significant uncertainty around this.
    b. SWFSC commented that although they acknowledge the reasoning for identifying the different model assumptions impacting TDM, the exercise will not provide the necessary answers during the meeting because model comparison is a substantial task and there are too many interacting factors.
    c. SWRCB commented that there is a general concern that the modeling results are difficult for the public to understand. The model assumptions do not have to be identical but the greater the differences are, the harder it is for the public to understand. The point of the exercise is to recognize that the models are different, but there seem to be a few assumptions that drive the significant differences in TDM, such redd distribution.
- When going through the table, the group agreed to focus on establishing assumptions that will remain stable throughout the entire season, so when modeling is updated month to month, the updates are using the same core assumptions, such as the exceedance forecast. There are some assumption inputs that are updated on a monthly basis and those should be identified as well.
    a. Reclamation develops its operational forecast once a month, which includes a 90% and 50% exceedance and they do not typically change the forecast even if the inflow forecast changes throughout the month.
    b. SWRCB suggested using only one exceedance level when modeling.
    c. In the past, Reclamation finalizes their forecast with a temperature and will send the data package to the SWRCB, SWFSC and SRSC so that everyone has the same set of assumptions.
- SRSC commented that there are two different types of tools: physical tools, which are the reservoir models that provide temperature and biological tools, which provides the TDM estimate. Both physical models provide similar temperature outputs, within a degree or two. Deviation occurs more often with the biological tools.
    a. SWFSC commented that in their opinion a degree or two could make a huge difference in the TDM because the river temperatures are near the physiological thresholds of mortality and survival.

Reclamation and SWFSC staff provided input to fill out the assumptions chart. The SRSC commented that they will populate the table and will do a model run. See chart for all the inputs. Below is additional feedback that was provided, organized by parameter:

*Meteorology Source and Time Period*

- Reclamation commented that they used 25% historical meteorology for their early modeling because the monthly L3MTO forecasting process does not begin until April. The historical temperature data will be replaced with National Weather Service forecasts starting in April and updated monthly, using the 25% exceedance level. Reclamation commented that this is based on the past SRTTG recommendation that they use a temperature forecast based on real time conditions.
- The SWFSC uses gridded meteorology from the North American Regional Analysis for their historical meteorology. In general, they have been using 2015 as a representation for a warm year but will also use a combination of years.
- Reclamation asked if it is okay that they and SWFSC have two different approaches for meteorology sources or is there a desire to use the same data sets.
    a. SWRCB commented that ideally there should be one set of assumptions and data sets. The SWFSC has made a good case for their set of assumptions in the past, but because they are a part of NOAA the SWRCB defers to them for meteorology. But that is not necessarily a compelling argument that Reclamation should use the same assumptions.
    b. SWFSC commented that from a modeling perspective, it would be beneficial if all the models used the same inputs but that is not always possible because the HEC-5Q and CE-QUAL reservoir models require different types of meteorological input terms so it will require some work to get them aligned.
    c. Reclamation agreed it would take significant effort to align the inputs.

*Temperature Profiles*

- The new Shasta profile appears cooler on the surface than the last profile.
- The Whiskeytown profile appears warmer this year than last, which is important to take note of for modeling on Clear Creek.
- The Trinity profile will be complete next week.
- Although SRTTG mainly focuses on Shasta profiles, it is important for modeling purposes to look at other profiles (e.g., Whiskeytown, Trinity). The other profiles are not taken as regularly, but Reclamation may increase the frequency closer to the end of the summer for Whiskeytown, Lewiston, and Trinity Reservoirs.

*Temperature Targets*

- SWRCB commented that there is an important difference between SWFSC's previous modeling and Reclamation's TMP temperature targets throughout the season. This is a major driver and should be acknowledged as such.

*TDM Redd Distribution*

- SRSC asked Reclamation whether the TDM calculation is based on redds from 2016-2021 from SacPAS and whether they would be willing to update to the 2021 data.
- The 2021 redd distributions will result in a positive bias on TDM model results because they were highly contracted and compressed. If Reclamation was to use the same 2021 redd distribution as SWFSC, they can better assess whether the difference in TDM projections was the result of the difference in distribution, meteorology, or in temperature targets in each model.

- NMFS requested that Reclamation look closely at 2017, because hydrologically it is a poor analog for the current year. This could impact the accuracy of depths and velocities, behavior of spawning, and where redds are located. When looking at 2017 there are many downstream carcassesut with the absence of high flows in 2022 redds, and carcasses may not be distributed as far downstream
- Reclamation commented that they would relay these recommendations back to BDO.
- SWFSC commented that a decision on redd distribution choice is a parameter on which coordination is necessary and for which modeling assumptions should be the same across all models.
- CDFW recommends using the 2021 redd distribution because the aerial visibility for redd surveys was good last year and results were accurate. It is necessary to keep in mind that fish have been progressively steered into the upper river more frequently. Therefore, the only fish that come back are homing in on the upper river where they were born and where the cool water is.
- SWFSC commented that they are currently working on a way to predict redd distributions as a function of flows, temperatures, or other variables but it will not be ready for this water year.

*Critical Days*

- NMFS commented that the Reclamation listed assumption of stage-dependent mortality of three days is biologically may be premature to use for management. Although the model converges on this data, it is not reasonable to condense sensitivity to just three days. It is overly optimistic that it would be possible to manage cold water to such as specific point.
- Changing the number of critical days will change the interaction with the bT parameter. SWFSC noted that bT is higher for the stage dependent model of mortality, meaning that if you exceed that critical temperature for a very short period, there is going to a fast rate of mortality.

**2. Cold Water Shaping**

Reclamation discussed that last year a warm water bypass was possible early in the season; however, that is not possible this year because of reservoir levels. Reclamation asked SRTTG for input on what type of temperature targets would be acceptable early in the season to conserve cold water for later in the season when it is more valuable. These targets are used in the model assumptions.

**Current Conditions**

- The middle gates are currently open, and it will not be possible to operate the upper gates this year.
- The water coming out of the TCD is approximately 50° F, and downstream temperatures are remaining stable.
- Temperature is currently cool, but in May decisions will be made to manage the TCD to release cold water if necessary.
- Reclamation's temperature modeling targeted 57° to 58° at Highway 44 through May.
- Lower gates will be pulled in June due cooler target temperatures and reservoir levels.

**Discussion**

- There are not a lot of scenarios that can be run given the current flows, and there is not going to be a lot of shaping capability. The conditions of the reservoir are going to force the operations. There is not the same amount of variation as was seen last year.

- The modeling done in March, assumed a lower target temperature in mid-summer. Instead of making cold water last for the entire season, they targeted a narrow period that will be the most beneficial for the largest amount of redds.
- Reclamation will have to move to lower gates earlier in the season, because given where the cold levels are, operators will have to utilize cold water earlier than desired. It is possible that if the earlier temperature targets were adjusted higher, they might be able to delay using the lower gates. The latest profile shows a little bit cooler water at the surface, which is generally good, but it is necessary to release the water which means cold water is being released rather than preserved for later in the season. There is currently not a lot of flexibility with flow, because there is a schedule with the SRSC to share 1,250 cfs. It is necessary to maintain 3,250 cfs at Wilkins Slough. If flows go under that number, all diversions will need to be reduced. Flexibility may increase if there is any significant amount of precipitation.
- The month of May is not an ideal month for warm water for fish; there is concern that if the same route that was proposed for the warm water bypass is proposed this year, there will be similar levels of mortality.
- Since flows are currently low, temperature management will likely be focused on gate changes and which units are running.
- There is historical data of temperatures coming out of Keswick Dam and comparable flows that should be considered. Fall drought operations could be a good analog for how the river will respond to lower flows.

Next Meeting: Thursday, April 21, 2022.