



— BUREAU OF —
RECLAMATION

CVP Water Temperature Modeling Platform, Modeling Technical Committee – Meeting #5

Thursday, July 7, 2022; 1:00 p.m. – 4:00 p.m.

Meeting Objectives

Establish common understanding of project status and upcoming topics of Modeling Technical Committee (MTC). Review and provide comments on model selection and modeling framework selection and recommendations for implementation.

Agenda

See *20220707 WTMP_MTC05_Agenda_Accessibility.pdf*

Attendees

See *20220707 WTMP_MTC05_Attendees_Accessibility.pdf*

Interim Product Review (distributed via email only)

- *TM_Data Management (DRAFT)_052322(v1-clean)_POB(VI_508)_061022.docx*
- *Data Inventory: DRAFT_Stanislaus Data_Inventory_06-20-22(MTC5).xlsx*

Summary

The MTC met to establish common understanding of project status and upcoming topics of MTC discussions, provide opportunities for input on interim products and collaboration, and report the first subgroup activities and outcome. The fifth MTC meeting was conducted in a consistent format as the previous MTC meetings. The main topics included continued discussion of development of the Sacramento/Trinity River Water Temperature Model and the American River Water Temperature Model, introduction of Phase II activities, and the introduction of development of the Stanislaus River Water Temperature Model. Opportunities were afforded for follow-up questions and exchange of ideas. This 3-hour online meeting was attended by nearly 50 participants among 66 registered. The next MTC meeting is scheduled on 10/6/2022 from 1:00 p.m. – 4:00 p.m.

Meeting Logistics and Welcome Remark

Mr. Yung-Hsin Sun (Stantec) started the meeting with reviewing the agenda and logistics. Mr. Sun also provided a brief review of the future agenda topics for the MTC meetings and updates on the project website which includes meeting information, fact sheets, and deliverables. Mr. Sun proceeded to facilitate the MTC meeting.

Ms. Randi Field (Reclamation) provided welcoming remarks and recapped for the group the vision for the Water Temperature Modeling Platform (WTMP) project to modernize systemwide water temperature modeling and analytics; develop professional standards and foster transparency; consistent use for real-time, seasonal, and long-term planning; and accommodate continued technological advancement. Ms. Field thanked the MTC members for the community-based collaborative WTMP development and requested continued support and collaboration to leverage technical expertise.

Ms. Field provided an update on the independent scientific peer review process, with the goal to provide an external, independent review of the critical assumptions, technical approach and resulting products of the WTMP Project. Reclamation is partnering with Delta Stewardship Council who will be hosting public reviews. A mid-term review will occur on 7/19/2022 and 7/20/2022 and final review in Summer 2023 (tentatively scheduled). The mid-term review will evaluate the foundational development for the WTMP, including the design, and selections of models and platform. The ongoing development, methods, and performance of the Shasta-Keswick CE-QUAL-W2 water temperature models are also part of the review scope. The feedback from the mid-term review will guide the continued development of the WTMP. The anticipated outcome of this process is to improve robustness and transparency of the WTMP project development and outcome.

Featured Discussion: Sacramento/Trinity River Water Temperature Models – Calibration/Validation

The first discussion session by Mr. Mike Deas (Watercourse) and Mr. John DeGeorge (RMA) started with a review of the Shasta Lake and Keswick Reservoir CE-QUAL-W2 model results. As suggested by MTC members in the previous MTC meeting, a seasonal performance metrics (May through October) results were presented for the calibration and validation periods. The next steps for the Shasta Lake and Keswick Reservoir CE-QUAL-W2 modeling include continued sensitivity testing and refinements, model framework testing, and documentation. Next, the discussion focused on the Upper Sacramento ResSim Model, which covers Shasta, Keswick, and Sacramento River to Red Bluff. This discussion included a review of the reservoir geometry, outlet structures, and temperature control device specifications consistent with those of Shasta Lake CE-QUAL-W2 model, as well as the common inflow, meteorologic, and operational boundary conditions shared with CE-QUAL-W2 models. The discussion concluded with introduction on Whiskeytown (Clear Creek) and Trinity Basin model development. The discussion included overview of reservoir bathymetry, the availability of data and data gaps and filling procedures, and modeling approach for ongoing development of the CE-QUAL-W2 and ResSim models. The next steps include modeling

implementation, calibration, and validation. The highlighted challenges include data gaps and determining calibration/validation periods with known data gaps. The discussion concluded with asking for MTC feedback on the calibration outcomes for the models, use of multiple performance statistics, and any missing critical check/review on model calibration/validation.

Questions and Feedback:

- A member asked if the deviations from observed records in validation of Shasta Lake CE-QUAL-W2 model in 2021 were a result of certain conservative assumptions.
 - The team responded the calibrated parameters and model setup were consistent for the whole period; however, we have learned that for W2 model, the current TCD and model setup could result in warmer temperatures compared to the measured in years with lower storage and limited access to the TCD upper gates. We are still reviewing the results.
 - Another member commented that they recently set up a CE-QUAL-W2 model for the Mokelumne River system and their model was also producing warmer temperatures compared to measured temperatures in 2021. The team appreciated the additional data point.
- A member commented that the units for the summary tables showing the Shasta Lake outflow temperature calibration and validation results on slide 25 are incorrect. The units should be temperature (°C).
 - The team confirmed the error and will revise tables on several slides.
- A member asked what the “T” sensitivity represented in the table showing the Shasta Lake parameters tested for sensitivity.
 - The team responded that “T” represents insensitive, meaning that the parameter was relatively insensitive to overall water temperature profiles and did not impact release temperature.
- A member asked how the calibration is handling the effects of the thermal curtain in Whiskeytown considering the current disrepair and performance issues in recent years.
 - The team responded that they have reviewed historical aerial photos to see when the Oak Bottom curtain was deemed non-functional. Temperature data, provided by Reclamation, is available for a couple of years for locations immediately upstream and downstream of the curtain. This data is going to be used to help in calibration. While aware of the nonfunctionality of the thermal curtain, the team is still working on determining what year the curtain degraded to the point of no longer serving its purpose. The team asked data sharing if any MTC members had any direct information on this issue.

- Regarding the thermal curtain in Whiskeytown, another member commented that the Oak Bottom curtain was repaired and/or replaced about five years ago. They have asked for the status and condition of the Spring Creek curtain but have not heard back. The member did hear a couple of years ago from a RWQCB staff member, who recreates on the lake and sometimes dives in the lake, that the Spring Creek curtain is damaged and not in good shape.
- A member asked the team to consider, if possible, the inflow of sediment from the 2018 Carr Fire. USGS did conduct a study and generated a report on the extent and volume of material that entered Whiskeytown Lake. The member let the team know to reach out to them if they would like a copy of the USGS report.
 - The team responded that they have discussed with USGS on the sediment load after the Carr Fire and found that the impacts were not significant.
- Referring to the data gap for Whiskeytown Lake, a member commented that CDFW may have a temperature logger installed on Upper Clear Creek.
 - The team responded that we have confirmed that USFWS did not have an active temperature logger above Whiskeytown Lake, but one was installed by the team member last year but logger information has not been digitized.
- A member asked about the bathymetry data for Shasta Lake in the Sacramento River Water Temperature model. The member pointed out that the previous model development for Settlement contractors used the original USGS topo map for part of the Shasta Lake. The member asked if this bathymetry data could be updated, or if the area next to the TCD could be updated.
 - The team confirmed that the use of USGS topo map in the current work as well. The bathymetric data acquisition is expensive and time consuming; the activities would go beyond the current project schedule. However, more recent and improved bathymetry data within 1 to 2 miles upstream of the dam are used for the current work.

Featured Discussion: American River Water Temperature Models – Calibration/Validation

The next discussion by Mr. Craig Addley (Cardno, now part of Stantec) and Mr. DeGeorge focused on discussing modeling approach and results for the Folsom Lake and Lake Natoma Reservoir CE-QUAL-W2 calibration and validation. The next steps include continued calibration/validation, sensitivity testing, other refinements, model framework testing, and model documentation. The discussion concluded with asking for MTC feedback on the calibration outcomes for the models, use of multiple performance statistics, and any missing critical check/review on model calibration/validation.

Questions and Feedback:

- No questions or comments.

Featured Discussion: Phase II Activities

The next discussion by Mr. Sun and Mr. Deas focused on Phase II activities. Mr. Deas provided the objective and description of the following activities: project workplan, model implementation, estimation of uncertainty for sources and protocols, output communications, documentation and peer review. The discussion concluded with asking MTC members if they have any questions on Phase II activities and anticipated outcomes.

Questions and Feedback:

- No questions or comments.

Featured Discussion: Stanislaus River Water Temperature Models – Introduction

The next discussion by Mr. Deas introduced the Stanislaus River water temperature model development and initial model setup. The topics included review of the model domain; the modeling approach with CE-QUAL-W2 and ResSim; data inventory of geometry, hydrology, water temperature, and meteorology; the unique features of submerged dam and Goodwin Dam and diversions; and a review of data needs for New Melones Lake, Tulloch Lake, Goodwin Dam, and Stanislaus River. Future meetings will discuss the model calibration, model validation, model sensitivity, and documentation. The discussion concluded with asking MTC members for assistance in acquiring specific data sets, any critical data missing for model development, and any important elements that should be included.

Questions and Feedback:

- No questions or comments.

Wrap Up and Next Steps

The meeting was concluded with the following next steps.

- TM developed and distribution for review
 - Sacramento/Trinity River Model Calibration/Validation
 - American River Model Calibration/Validation
- Model development and framework implementation
- Initiation of Shasta TCD subgroup discussions
- The team to follow up with MTC members for additional references or data for the thermal curtain in Whiskeytown
- The team to follow up with MTC members for additional references or data for the temperature logger on Upper Clear Creek installed by CDFW

- Next MTC Meeting: Thursday, 10/6/2022; 1:00 p.m. – 4:00 p.m.
 - A separate email will be sent out with meeting registration information.
 - Scheduled topics:
 - Continued discussion of Sacramento/Trinity River Water Temperature Model
 - Continued discussion of American River Water Temperature model
 - Continued discussion for Stanislaus River Water Temperature Model