CVP Water Temperature Modeling Platform, Modeling Technical Committee Output Subgroup Meeting

Thursday, June 1, 2023; 2:00 p.m. – 4:00 p.m.

Meeting Objectives

- Build common understanding and receive feedback on WTMP planned features for output and visualization.

- Explore options for future enhancement.

Agenda

See 20230601 WTMP MTC Output Subgroup_Agenda_Accessibility.pdf

Attendees

See 20230601 WTMP_MTC Output Subgroup_Participants_Accessibility.pdf

Summary

The first meeting for the Output Subgroup was to provide a venue for MTC members who would like additional detail of planned features for WTMP output visualization beyond what are discussed in the regular MTC meetings. This subgroup was established based on MTC08 discussion. Opportunities were afforded for follow-up questions and exchange of ideas. This 2-hour online meeting was attended by 22 participants among 30 registered. The next MTC meeting is scheduled for 7/6/2023 from 1:00 p.m. – 4:00 p.m.

Meeting Logistics and Welcome Remark

Mr. Yung-Hsin Sun (Sunzi Consulting) went through the logistic and expectations of the meeting. The main focus of this meeting is to build common understanding and receive feedback on WTMP planned features for output and visualization. The request is for the subgroup members to provide feedback on the planned features and explore options for future enhancements.

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Recap: Output Mechanism in WTMP and Options

The first discussion by Mr. John DeGeorge (RMA) started with a review of the output mechanism in WTMP and options of generating information in reports. WTMP reporting includes user diagnostic reports and model performance reports. For reporting of simulation or forecasting results, information and individual graphics can be incorporated in a customized format for internal and external report use. The reporting topics include reservoir storage and water temperature profile, river flow and temperature.

The purpose of automatic reporting is for rapid creation of key output tables and graphics to facilitate results reviewed by modelers. The creation of tables and graphics could be incorporated in other reporting and presentation products. The design requirements for the automatic reporting include a simple report creation action for users within the WTMP. The report configuration files should be editable by advanced users and configuration files should be modular and reusable. The visual presentation of tables and plots should be easily controlled and support similar result presentation from different models. Every user defined report is scripted and accessible through the WTMP user interface. The automatic reporting will also include the configuration files (XML format) which will have the contents of the tables and objects used in the report. Some currently available report objects include profile plots, statistic tables, time series plots, buzz plots (American River Basin only), and Shasta Outlet operations plot. Mr. DeGeorge showed example of figures and tables generated from a report.

Questions and Feedback

- A member asked about including a narrative description about the sources of the model input data and the assumptions around the input data. This would be helpful to have when reviewing the figures and tables of the model input conditions.

  The team responded that a report of the input data displayed in timeseries figures and tables along with a discussion of the source and assumptions of the input data could be developed.

- A member asked if reports of modeled temperature data versus recorded actual temperature data could be generated. It would be helpful to see outputs of inflow temperatures and meteorology between modeled and actual input data.

  The team responded that a report of modeled versus actual data could be added as a report generation option in the WTMP.

- A member asked the geographical scope of the WTMP.

  The team responded that the WTMP covers three watershed systems: the American watershed, the Sacramento/Trinity watershed, and the Stanislaus watershed.

- A member asked how far out can forecasting simulations be used.

  The team responded that the seasonal forecasting has multiple options the user can select from, and that seasonal forecasting could be projected out to October.

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Introduction: Applications in WTMP that Generate Output (as planned)

The next discussion by Mr. Yung-Hsin Sun focused on the report generation for seasonal water temperature planning and long-term planning studies. A significant number of output figures and tables were incorporated in appendices for the draft Model Development TM. The report design focused on the modeler's needs for review and documentation.

The report template for seasonal water temperature planning focuses on relevant information that can be used throughout the season showing records in the past and forecast in the futures. The condition of the past current season provides useful context for future actions, including decisions and events of significant effects on water temperature management in the remaining season. Seasonal water temperature planning is a progressive process with forecast and correction where the future decisions are subject to the constraints of previous ones. Incorporation of quantifying forecast uncertainty is a work in progress. The forecasting reports will also include tables as necessary. Mr. Sun showed example of report figures for seasonal water temperature on the Sacramento River and a buzz plot for the American River. An example of visually showing forecast uncertainty is to show a temperature time series plot with error bands. The end-of-season hindcast exercise is to inspire lessons learned for improved management.

A long-term planning study is different than a seasonal planning study in that it uses CalSim simulated data but not forecast data. It also conducts a seasonal planning study for each simulated year (i.e., 100 years in the latest CalSim 3 model). Seasonal planning output can be leveraged for yearly information from a long-term planning study. However, the aggregated information and statistics of the entire simulation period may be more important. The report outputs of the long-term planning study are a work in progress and proposed outputs could be produced similar to outputs generated from CalSim model runs. Mr. Sun showed example of typical CalSim study review figures used by modelers.

Questions and Feedback

- No questions or comments.

Discussion

The final discussion by Mr. Yung-Hsin Sun focused on two discussion topics. The first prompt to the subgroup was "What does useful output of the WTMP application look like?". The second prompt was "What are output concepts for future expanded use of WTMP?".

Questions and Feedback

- A member asked if there was a way to generate an output to spatially represent temperature in a figure or a table of temperatures by river mile.

  The team responded that an output similar to a heat map showing the temperature over the watershed could potentially be developed. The user would have to select what type of temperature to display, for example maximum, minimum, or average daily temperature to develop the heat map.

- A member asked if the data used to develop the report tables and figures would be available in another format for model users to perform their own summary analysis.

  The team responded that all the model outputs used to generate the report tables and figures will be available per model study in CSV and/or XML format files.

- A member asked what platform Reclamation will use for information sharing.

  The team responded that this is a future MTC meeting topic that will be discussed in further detail. The process generally would be Reclamation would run a model and post the model run to the platform and be made available for anyone to download and access.

- A member suggested an output that would allow for the ability to track temperatures downstream and a contour plot of temperatures as a function of river segments of a watershed.

- A member commented that there are new biological thresholds for the Trinity River for seasonal forecasting developed by the Trinity River Restoration Program.

  The team thanked the member and asked for the information to be sent over.

- A member commented that the more data that can be generated as outputs the more useful it will be when evaluating a range of simulations.

- A member commented that buzz plots developed for the American River system could be useful for the Trinity River system.

- A member commented that for long-term planning studies, for a selected year a table of temperatures by month color-coded by temperature could be helpful. This could be developed per scenario and then an option to display the differences between scenarios in a separate table color-coded by the extent of the differences. Generating outputs showing the frequency distribution of water temperatures by scenario and by water year type would also help to give a good results overview.

Wrap Up and Next Steps

The meeting was concluded with the following next steps.

- Complete the planned implementation for the current project.

- Separately, future development considerations and plan formulation.

- Next MTC Meeting: Thursday, 7/6/2023; 1:00 p.m. – 4:00 p.m.

  - A separate email will be sent out with meeting registration information.

  - Scheduled topics:

    - Model uncertainty

    - WTMP output and visualization

- Other topics, as needed.