



If You Could See Me Now - Implementation of the CVP WTMP

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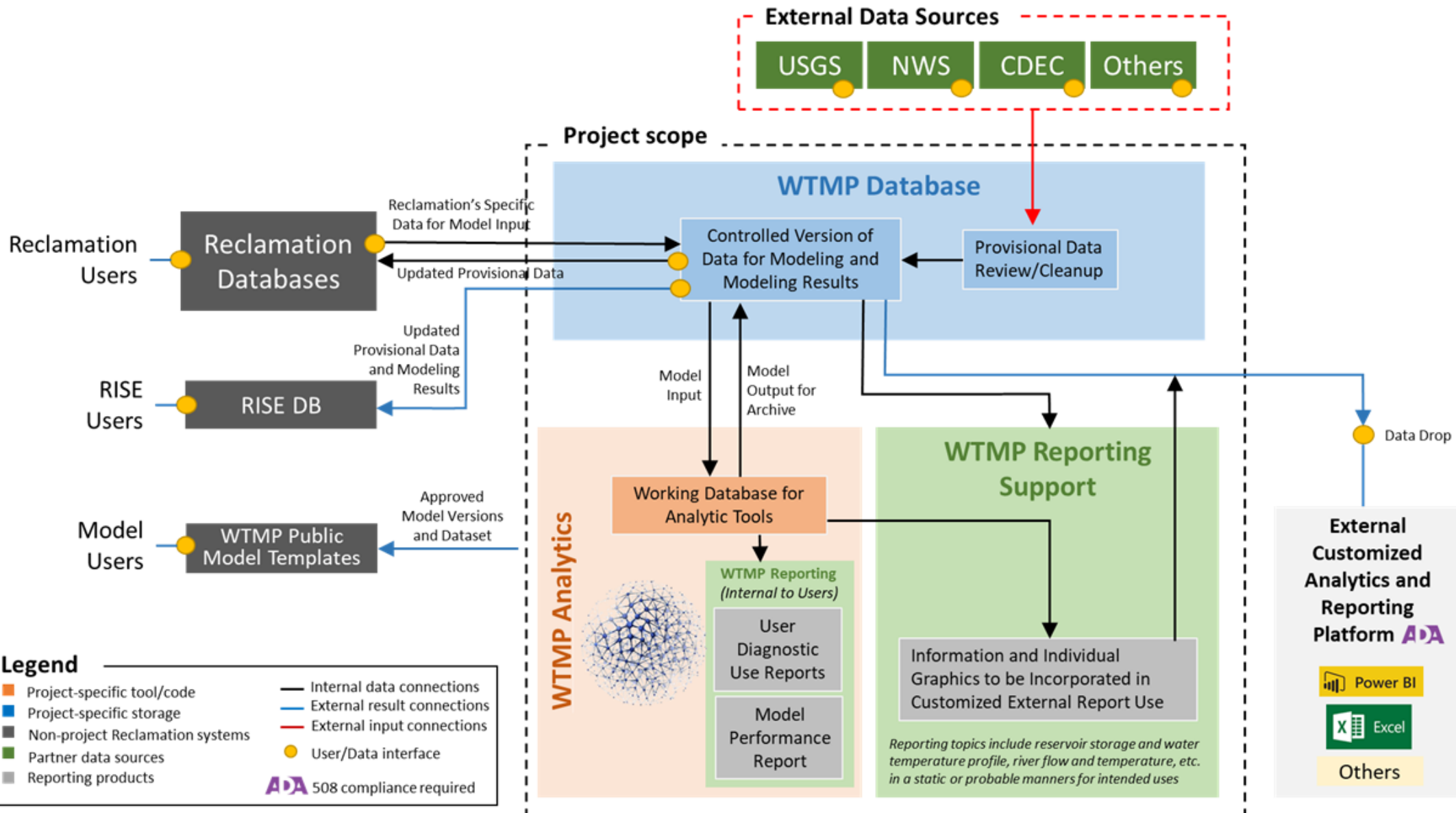
WTMP Objectives

Enhance Efficiency, Consistency, Adaptability and Transparency

- Ease model application and output interpretation
 - Reduce requirement for training on file editing and information flow
 - Reduce the time it takes to carry out modeling activities
 - Facilitate standard approaches for data management and reporting
 - Automate repetitive modeling tasks
- Facilitate the use of multiple models individually or in a sequence
- Managing updates and addition of new features
- Reducing input error and errors in general!



Water Temperature Modeling Platform

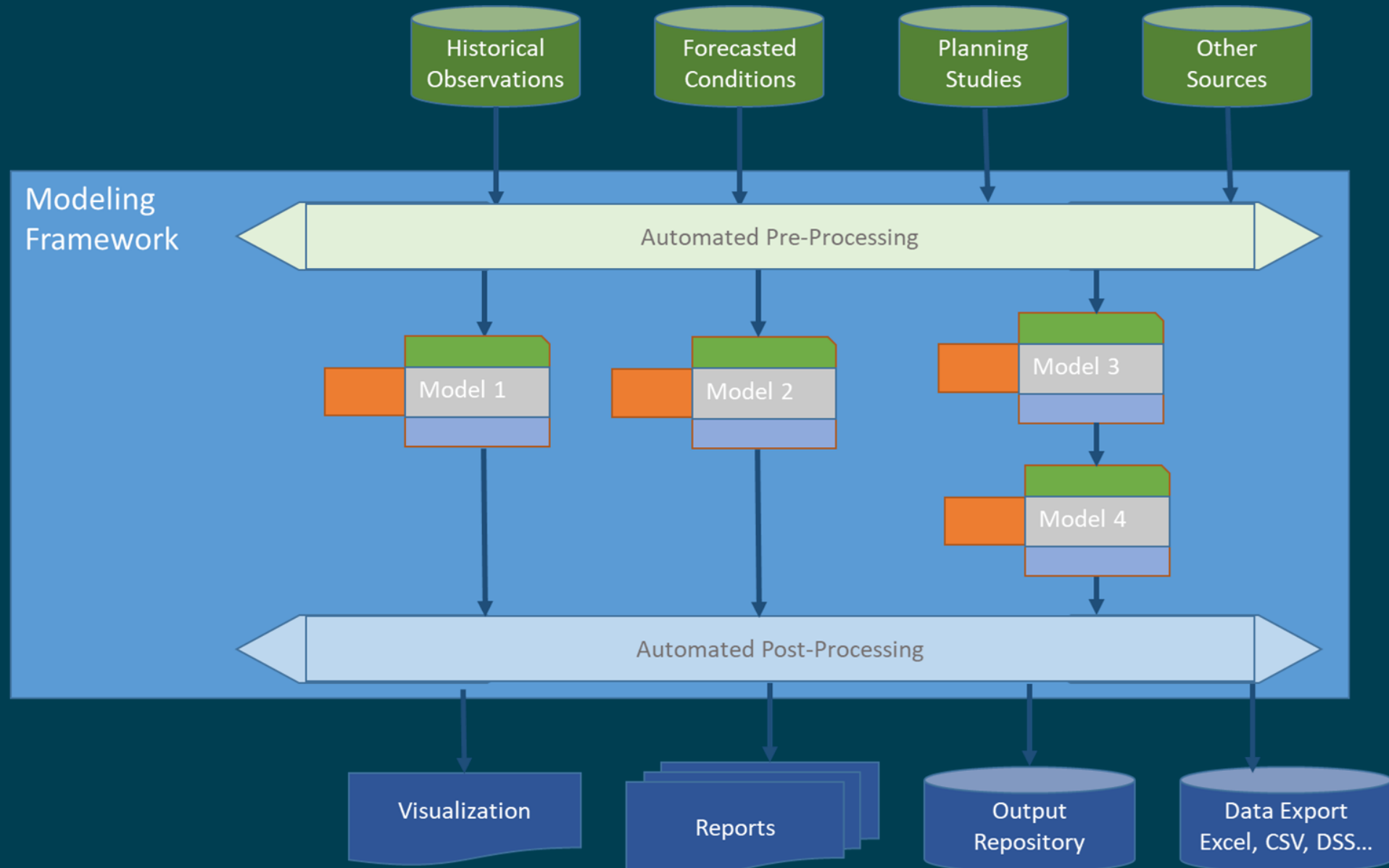


Framework Functions for Team Members with Different Roles

- **Model Operator:** Carries out modeling studies
- **Power User:** Configures automated processing for pre- and post- processing, designs reports, manages model linkages
- **Expert Modeler:** Responsible for configuration and calibration of a model for a particular system
- **Model Developer:** Responsible for the development and maintenance of a model's computational engine
- **IT Support:** Manages the IT infrastructure to facilitate team modeling and provide connectivity to web data sources



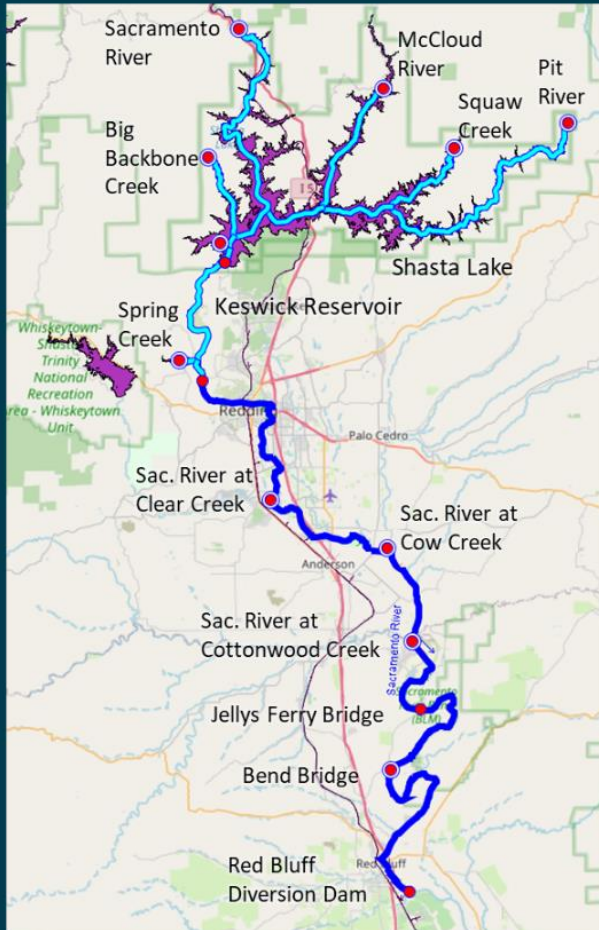
WTMP Analytics Framework



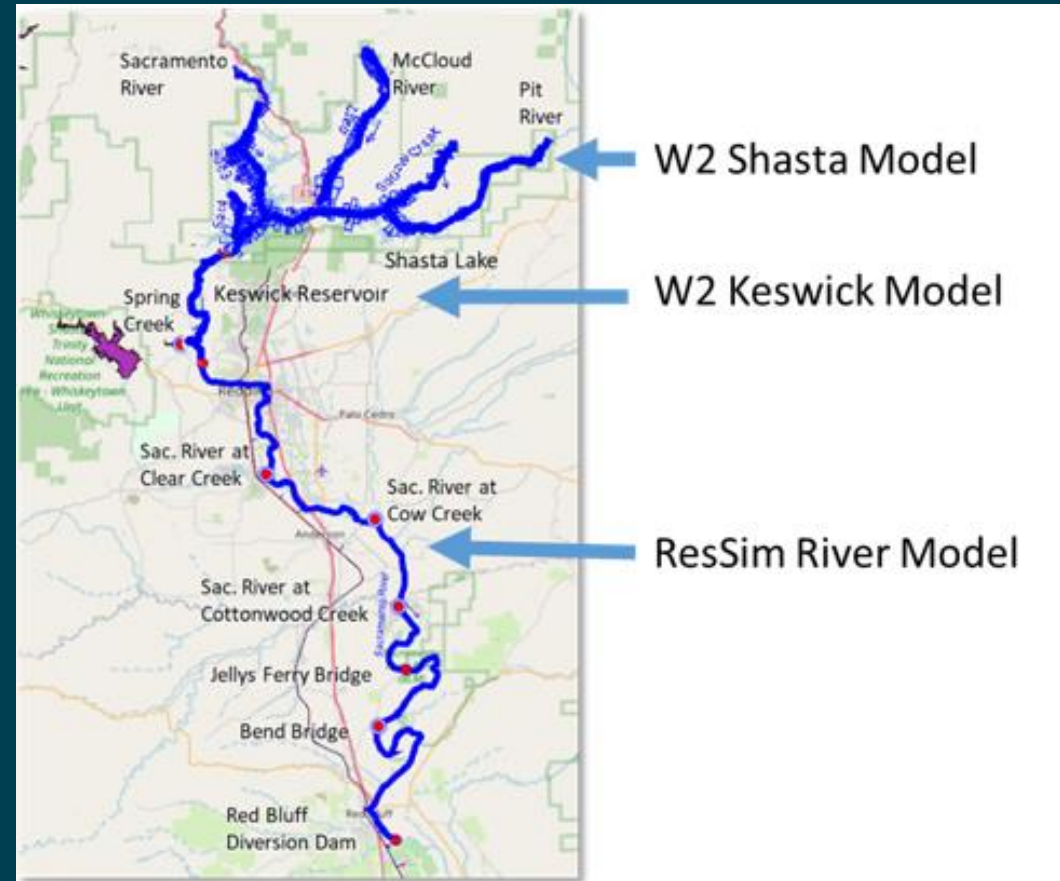
Running Different Models with Consistent Boundary Conditions

- Shasta-Keswick-Upper Sacramento River

- ResSim Only

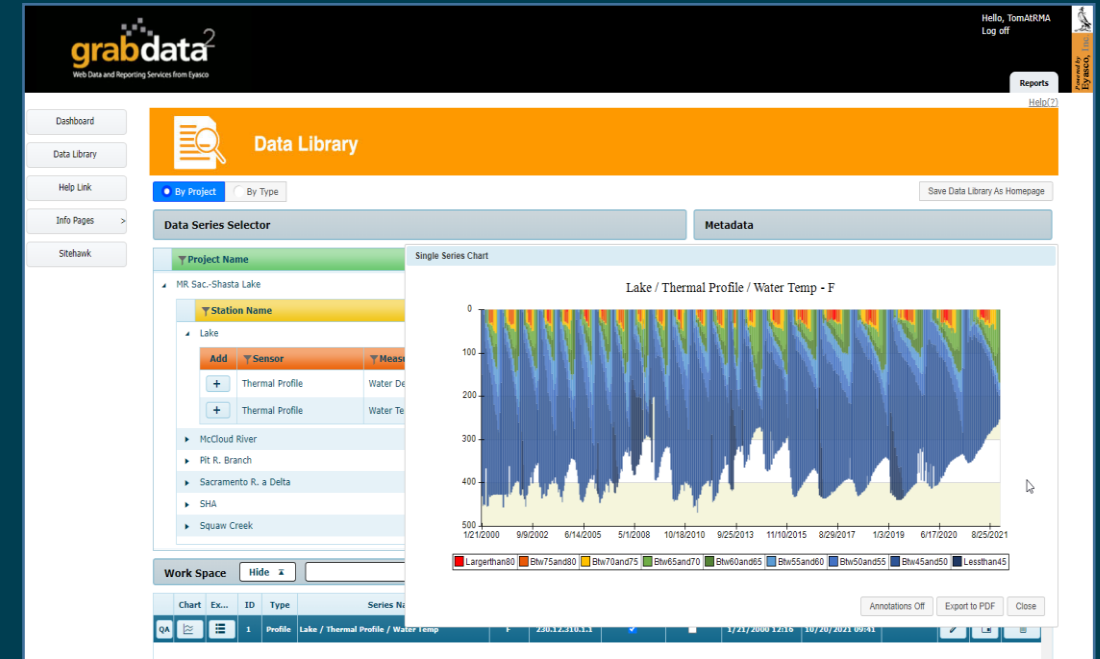


- Combined W2 and ResSim



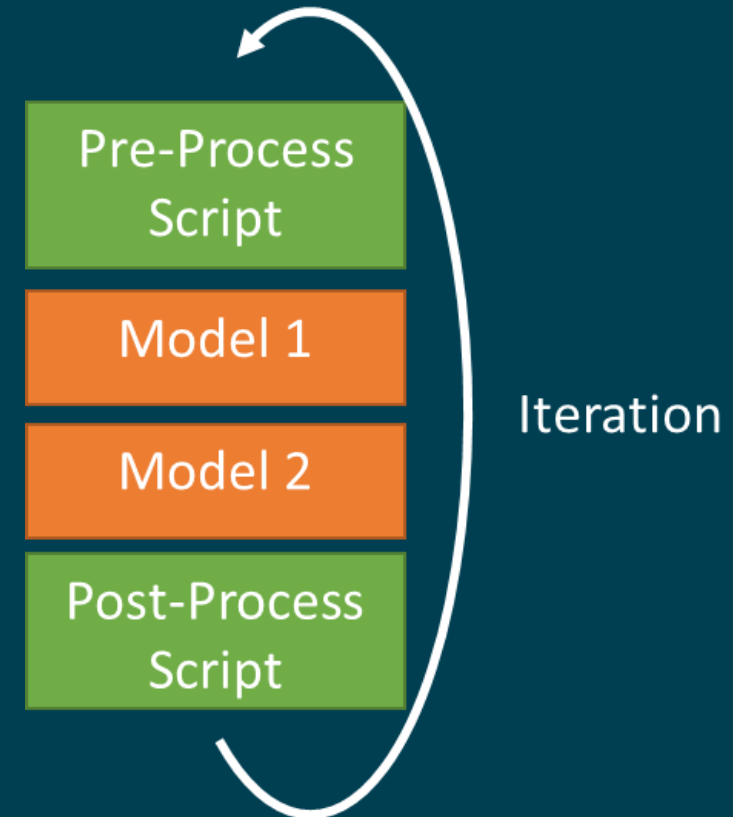
WTMP – Integration with Data Management System

- Web-service interface for WTMP data access
- Automated download of
 - “Model Ready” data for boundary conditions
 - Observed data for comparison to model results
- Time series data organized in “templates”
- Elements in models associated with templates



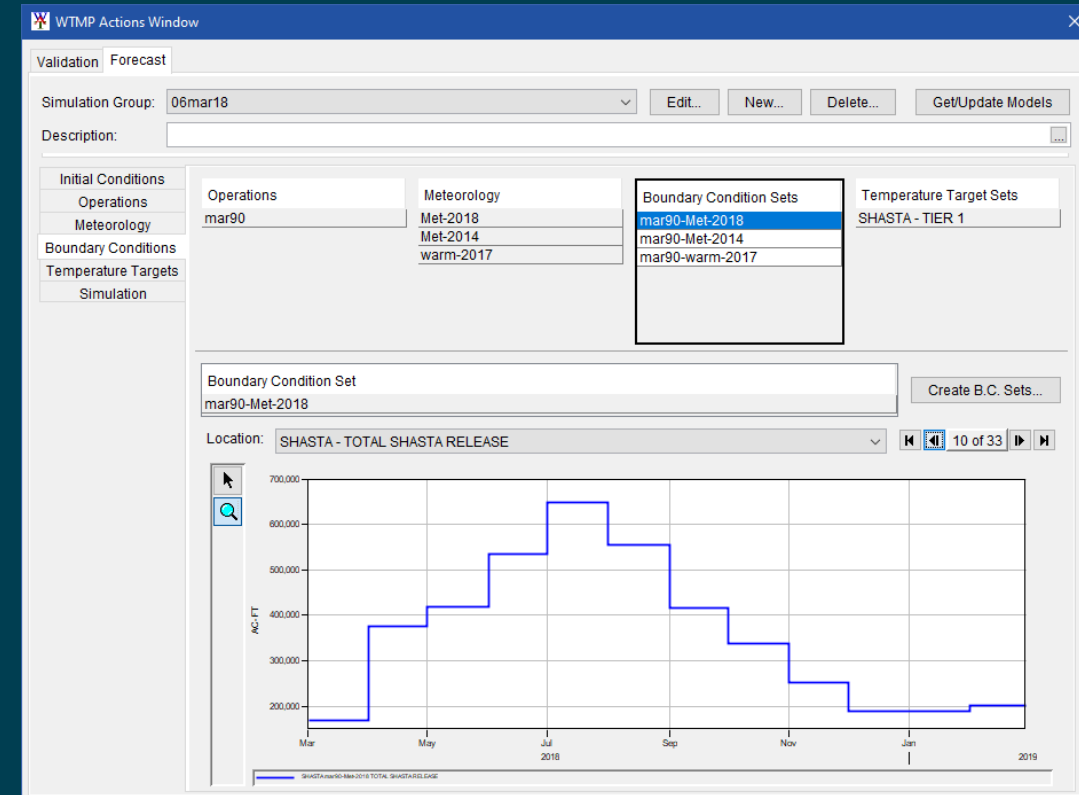
WTMP – Iterative Simulation

- Sensitivity testing
 - Varying one or more model parameters over a fixed range
- Ensemble simulation
 - Correlated sets of time series
 - Iteration over all or selected collection members
- Position analysis
 - Replacement of selected boundary conditions for the simulation period shifted from a longer time series
 - Iteration over all available years or selected years
- Use of DSS collections to manage time series sets



Seasonal Temperature Management Plan Simulation Workflow

- Forecast data preparation
 - Extract recent reservoir temperature profiles and river conditions from DMS
 - Gather CVP Operations Outlook Spreadsheets
 - Estimate future Meteorologic Conditions from Position Analysis, Local 3-Month Temperature Outlook, NCAR Ensemble Forecasts (planned)
 - Established and User Defined Temperature Target Sets
- Ensemble simulation exploring variability in operations, meteorology, and temperature target objectives
- Automated reporting from ensemble output



WTMP Modeling Framework User Interface

Menus and
Toolbar Buttons

Study Tree

Study Element
Details

WTMP Actions
Window

Georeferenced
Schematic

The screenshot displays the WTMP Modeling Framework User Interface. The main window shows a study tree on the left, a central workspace with a map and a schematic, and a bottom status bar. The study tree lists various simulation elements, including 'Shasta2RedBluff', 'Shasta-Keswick W2', 'ResSim', 'Keswick W2', and 'Simulation Groups'. The central workspace features a map of the Shasta-Keswick area with a blue schematic overlay. The 'WTMP Actions Window' is open, showing a 'Validation Forecast' tab with a 'Simulation Group' of 'sample' and a 'Description' field. Below this, there are sections for 'Initial Conditions', 'Operations', 'Meteorology', 'Boundary Condition Sets', and 'Temperature Target Sets'. A 'Create Boundary Conditions' dialog box is also open, showing a table with columns for 'Select', 'Operations', and 'Meteorology'. The table contains the following data:

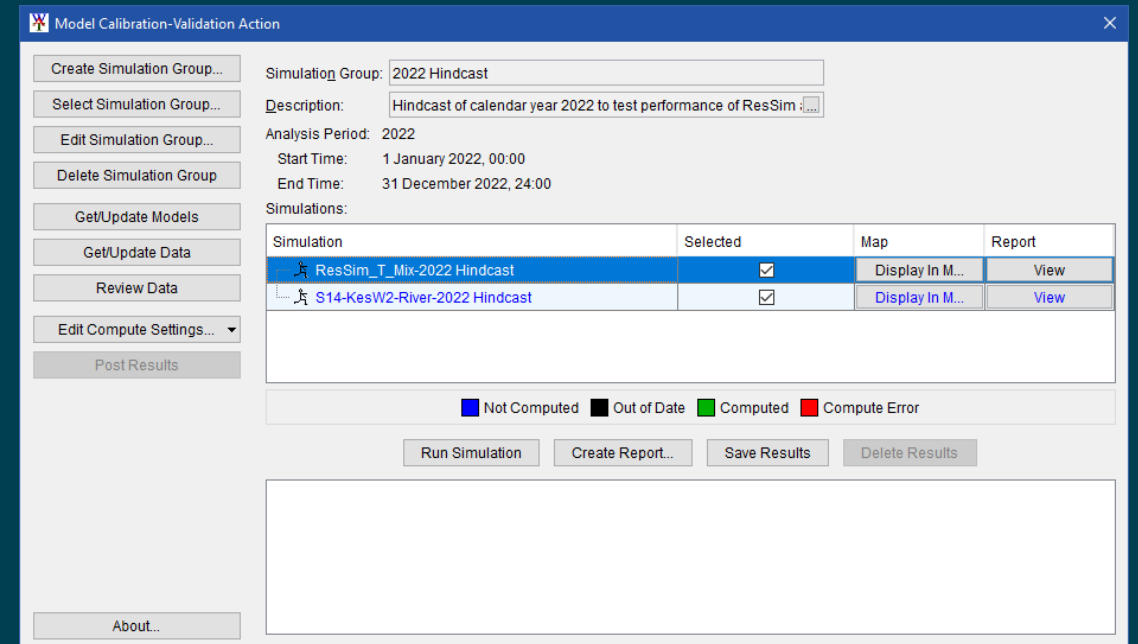
Select	Operations	Select	Meteorology
<input type="checkbox"/>	Mar90	<input type="checkbox"/>	position-2017
<input type="checkbox"/>	Mar50		

The status bar at the bottom shows coordinates: 315676 east, 14895709 north, and a scale of 675M of 2773M.

End-of-Year Hindcast/Validation Workflow

Easily perform simulations for the previous year checking performance of the models against field data

- Set up a simulation group for the recent period selecting the models to test
- Extract historical data from DMS
 - Model Ready Data for boundary conditions
 - QA-ed observed data for comparison to model results
- Perform simulations
- Create and review automated reports



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The screenshot displays the WTMP Modeling Framework User Interface. The main window shows a study tree on the left, a georeferenced schematic map on the right, and a WTMP Actions window in the center. The study tree lists various simulation groups and models. The georeferenced schematic map shows a network of rivers and streams with various simulation points marked. The WTMP Actions window provides a table of simulation groups and their status, along with buttons for running simulations and generating reports.

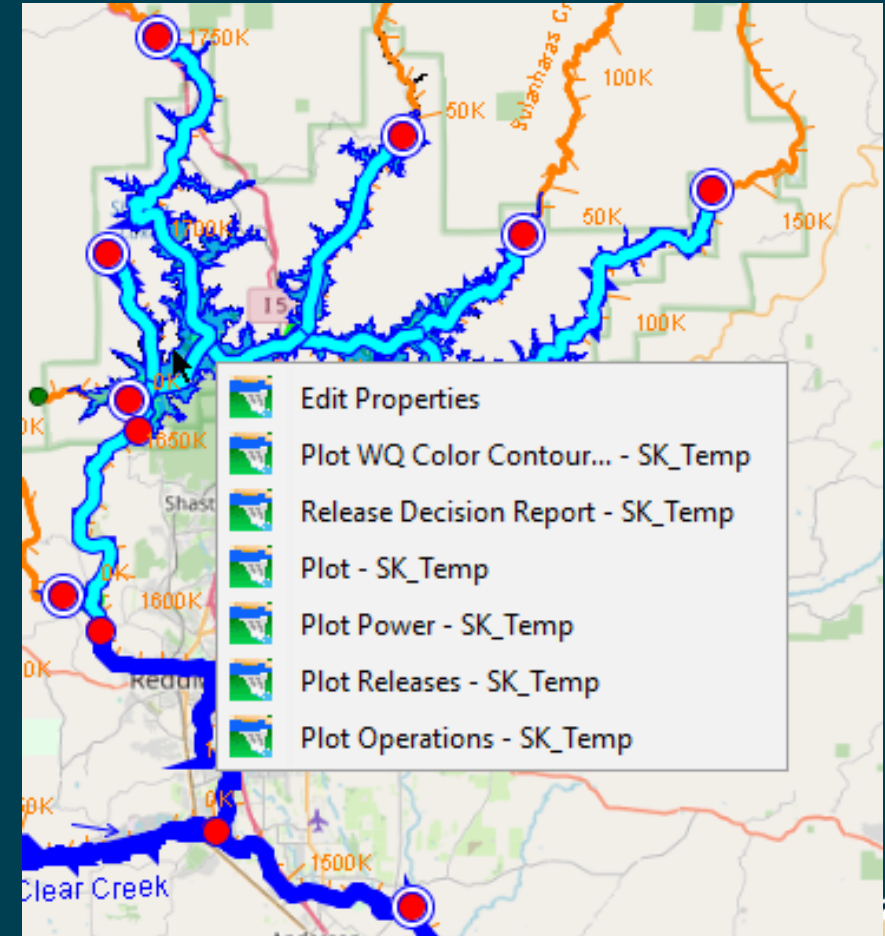
Simulation	Selected	Map	Report
ResSim_T_Mix-2014	<input checked="" type="checkbox"/>	Display In Map	View
Keswick 12-16-2014	<input type="checkbox"/>	Display In Map	View
S14-KesW2-River-2014	<input type="checkbox"/>	Display In Map	View

Legend:
■ Not Computed
■ Out of Date
■ Computed
■ Compute Error

Buttons: Run Simulation, Create Report..., Save Results, Delete Results

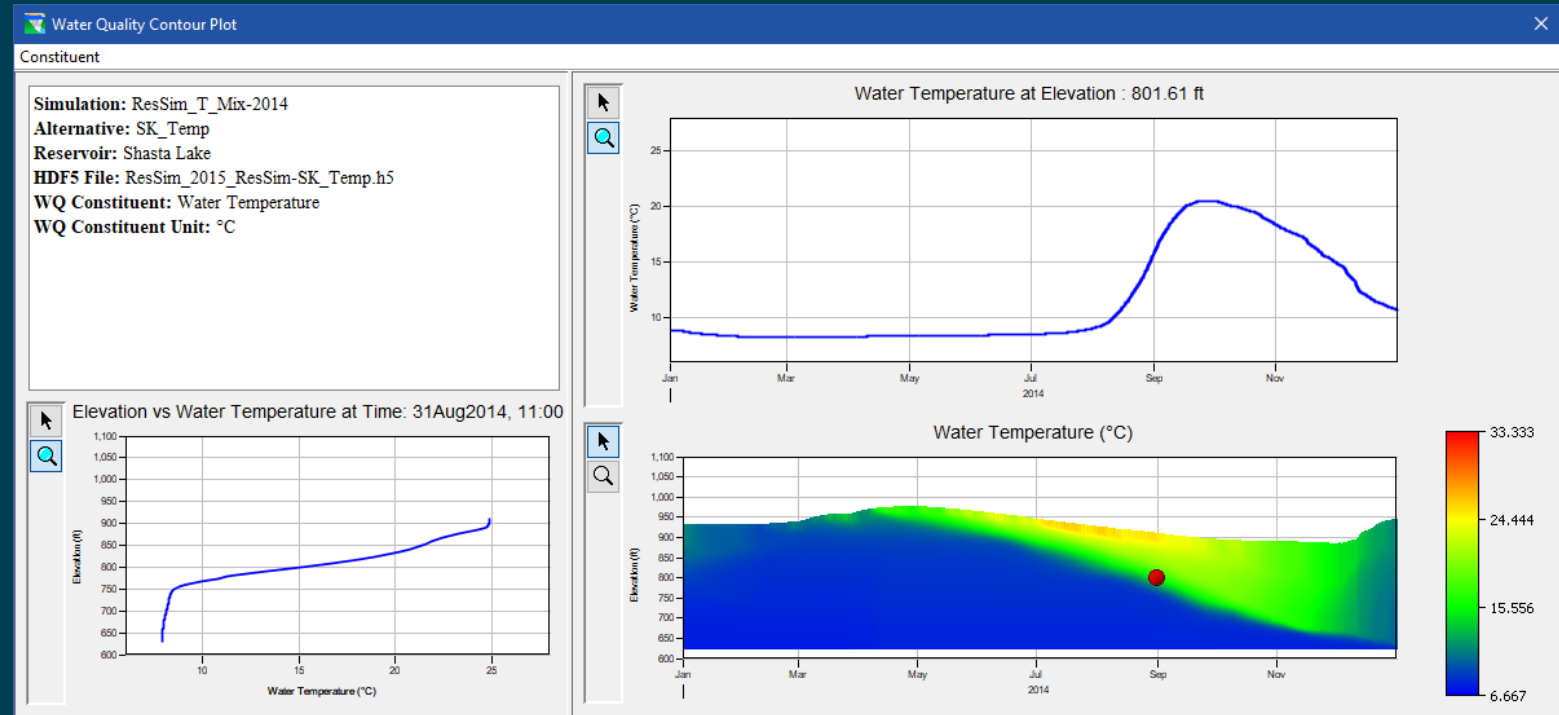
Display editors, plots, and tables from the HEC-WAT Schematic

- Display of schematic elements
- “Right Click” context menus
- Access to native editors (available for HEC-ResSim only at this time)
- Plots
- Tables

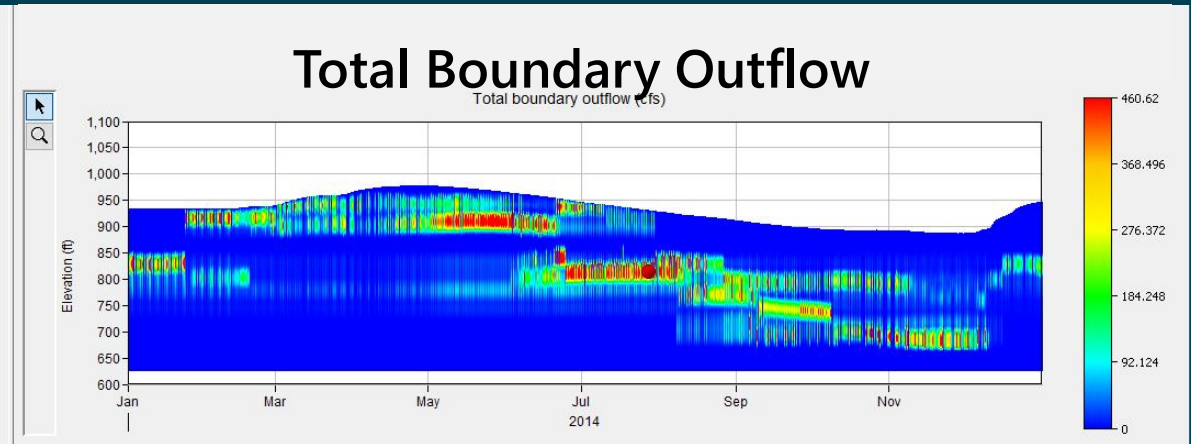
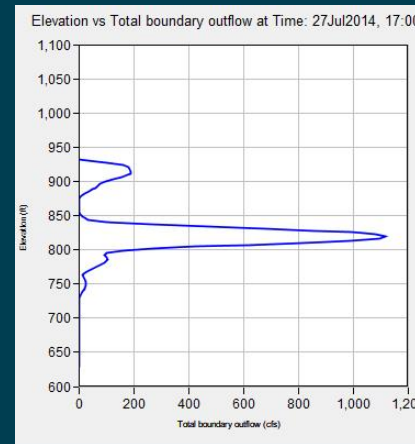
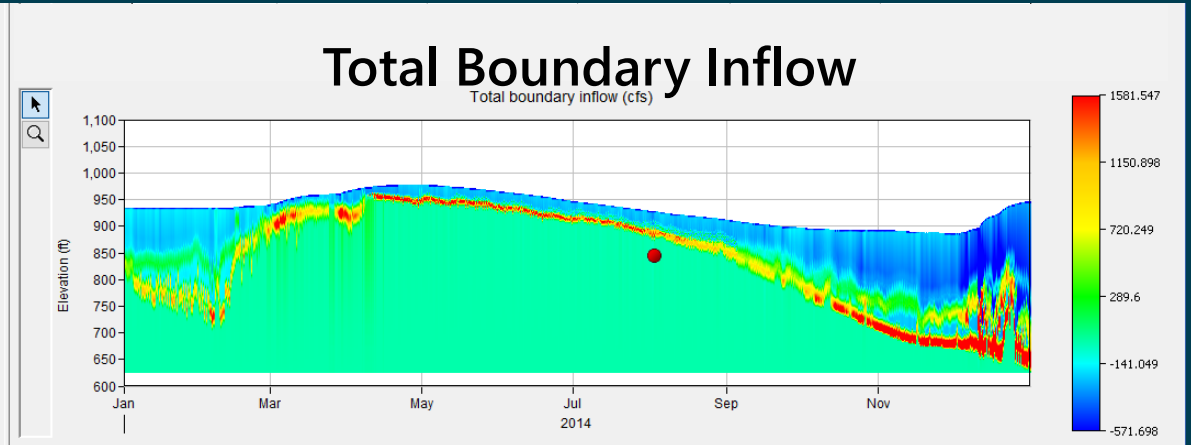
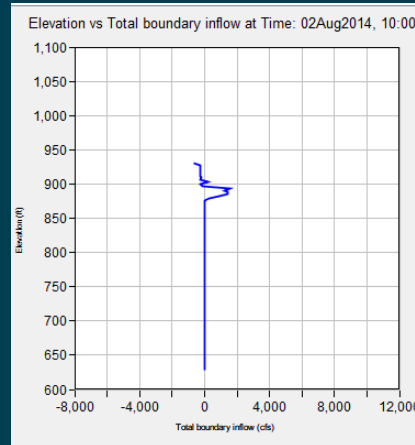
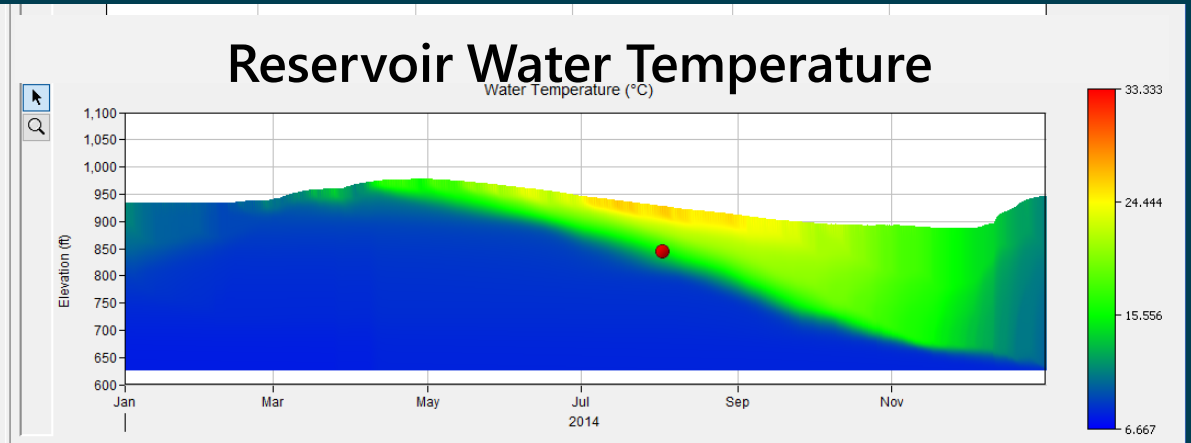
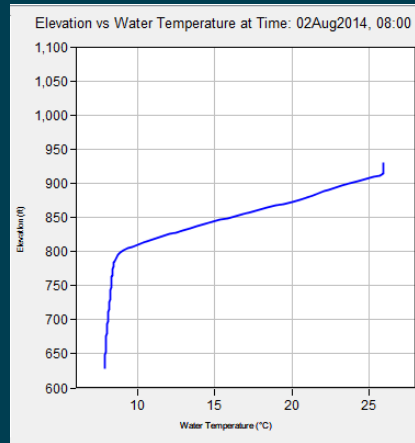


HEC-ResSim Interactive Reservoir Profile Plotting Tool

- Open from the schematic
- Components of the Plot
 - Depth-vs-time water quality contour plot
 - Profile plot
 - Water quality time series at a selected elevation
- Click or drag a marker point on the color contour to select the time and elevation for the profile plots
- Menu controls selection of constituent to display

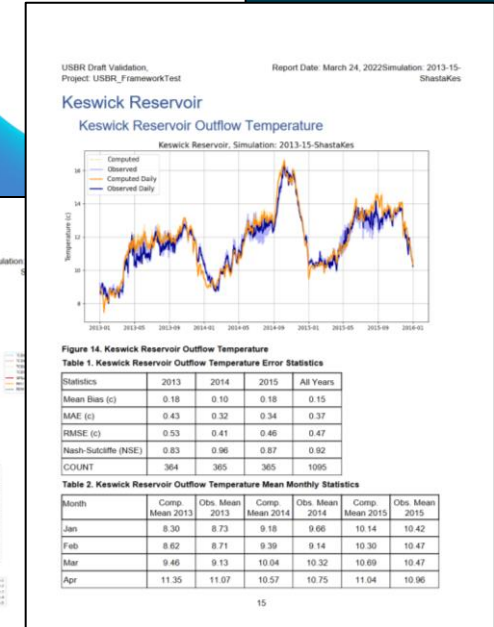
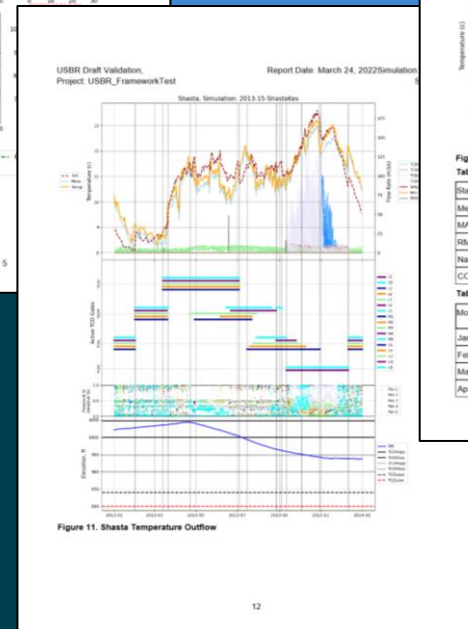
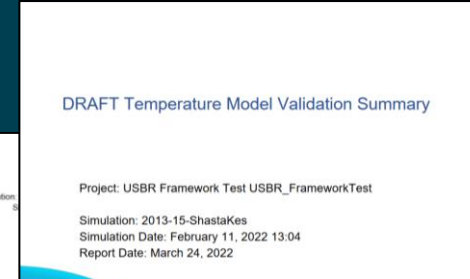
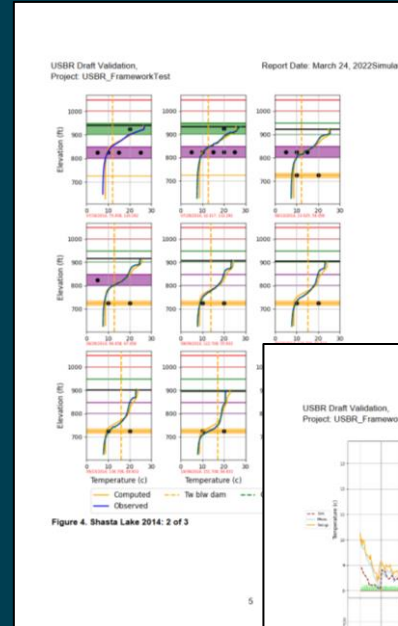


Example Contour Plots for Reservoir Conditions (HEC-ResSim)



Automated Plotting and Tabulation of Results

- Rapid creation of key output tables and graphics to facilitate results review by modelers
- Creation of tables and graphics that could be incorporated in other reporting and presentation products



W2-ResSim Comparison, Shasta Lake Temperature Profiles for 2014

