

Applying RiverSMART to Automate Model Development Testing for the Colorado River Basin Mid-term Operations Model

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The Bureau of Reclamation (Reclamation) performs routine development on their Mid-term Operations Model (MTOM), which simulates monthly operations at 12 reservoirs in the Colorado River Basin. The reservoir operating rules in MTOM can be complex with rule logic varying by both start time step and run cycle. Model and ruleset development has typically been tested using an “approved” model from the previous month. This method of testing relies on only one start time step and one set of initial conditions, which makes it difficult to identify errors in development caused by rules that did not account for certain operating scenarios.

To reduce these unforeseen errors, Reclamation is building a RiverSMART based, model development testing tool. The tool allows new development to be tested for all start time steps and a variety of operating conditions, regardless of the month the development occurs. Different hydrology scenarios, which include a variety of high and low flow traces, are combined with a range of initial conditions to evaluate the development over a range of operating conditions. RiverSMART’s R plugin is used to run post-processing scripts to perform automated checks of model output and assess differences between the operational and development MTOM versions. This combination of running MTOM over a variety of operating conditions and automatically checking the results helps ensure that current development will not result in future model errors.