

To: URGWOM Technical Team Members  
Date: August 31, 2021  
Subject: Notes of the August 10, 2021 URGWOM Technical Team Meeting

---

These notes summarize the items discussed during the August 10, 2021 Upper Rio Grande Water Operations Model (URGWOM) Technical Team meeting. The meeting began at 9:00 am and was conducted as an on-line collaboration hosted by the Corps of Engineers using the Corps' WebEx account. All those participating in the meeting introduced themselves and their names and affiliation are listed on the last page of these meeting notes.

This month's meeting agenda topics include reports on the development and calibration of the deep aquifer objects, the July, 2021 Tech Team field site visits, the update of the URGWOM database, simplification of the Colorado portion of URGWOM, model modifications to separate the Lower Rio Grande portion of the model when not needed, simplified Lower Rio Grande demand, adding the Santa Fe River (City and County) system to the model and RiverWare updates and enhancements.

Phil reported that the solicitation for candidates to fill Marc Sidlow's position has closed and it is anticipated that the position will be filled by the start of the Fiscal Year (October 1<sup>st</sup>).

Nick provided background information on the development and calibration of Deep Aquifer Objects (DAO) in URGWOM where deep aquifer heads from MODFLOW models are replaced with 100 DAOs in the Middle Rio Grande and 88 in the Lower Rio Grande. Data (aquifer parameters, average heads, recharge and pumping data) from four MODFLOW models (Albuquerque Basin, Socorro Basin, Mesilla Basin and Hueco Bolson) were extracted into the URGWOM DAOs. The Middle Rio Grande was calibrated using PEST (Parameter Estimation and Uncertainty Analysis), and the Lower Rio Grande was calibrated by hand over a 20-year period. The calibration targeted deep and shallow aquifer heads and river channel and riverside drain conductivity. The parameter data statistics were collected and evaluated. Surface flow calibration was satisfactory however Nick suggested that the calibration of groundwater parameters could be improved by evaluation of a mass balance of cells between models. Nick also recommended that additional work to organize GIS data sets be undertaken, that the Lower Rio Grande should be calibrated using PEST and additional head data should be extracted from the Mesilla Valley model. The final step would be to incorporate the DAOs into the official model.

In follow-up to Nick's presentation, the Tech Team discussed the change in run time due to implementation of the DAOs (not yet evaluated), the requirements for additional DSS file inputs (e.g., aquifer pumping and recharge) and the simulation of pumping from irrigation wells (already incorporated in the simulation of shallow groundwater-surface water interaction). The implementation of the DAOs into the official model is scheduled to be completed by the end of 2022.

Katie Markovich (Intera) reported on the QA/QC review of the DAO calibration. Overall, the calibration method is based on a defensible approach, with the URGWOM and MODFLOW models matching trends and flow directions; there are no major concerns (refer to May, 2021 Intera Report). The QA/QC review recommendations include performing a mass balance flux comparison between URGWOM and MODFLOW. Katie presented a plan for the mass balance study approach which is currently underway. The study is intended to answer the following questions: do the URGWOM and MODFLOW mass balances compare and are there calibration parameters that unreasonably affect the mass balance?

Other recommendations from Intera include fixing the DAO and shallow groundwater naming conventions to make them consistent, change the DAO areas and inflows (if the large DAO areas are boundary conditions, then these should be documented). The assumptions used in extracting the aquifer properties into URGWOM should be described. The groundwater heads in the DAOs should match the MODFLOW model heads and Hydros is updating the calibration to ensure that there is a reasonable match. The calibration statistics should be reviewed to address errors in contradictory slope in the aquifer head v. time curves. The lateral / longitudinal flows between objects / cells match well between the models (URGWOM and MODFLOW). In response to a question, Katie reported that the shallow aquifers are being simulated as unconfined aquifer and the DAOs are simulated as a confined aquifer, or more like a leaky confined aquifer. Phil stated that the Hydros DAO implementation report and the Intera QA/QC report will be posted on the URGWOM myUSGS web page.

Miller reported on the July 13-14, 2021 URGWOM Technical Team field inspection trip of MRGCD irrigation facilities. Thirteen individuals participated on the trip, including Anne Marken and Matt Martinez of the MRGCD. A total of nine locations in the Corrales to Isleta reach were inspected on day one and nine locations in the Belen to Bernardo reach were inspected on the second day. All participants were provided a trip itinerary of sites inspected and a .kmz file of the location of each site. With the exception of the Isleta Diversion Dam, all sites visited are locations where water is returned to the Rio Grande (drain outfalls or wasteways). The purpose of the trip was to gather information and to become familiar with the MRGCD facilities and to obtain an understanding about how each facility operates and its function within URGWOM. During the visit to the Upper Corrales Riverside Drain outfall at the Alameda Bridge, trip participants noted that the Albuquerque Bernalillo County Water Utility diversion, which is located about ½ mile below the Alameda Bridge, is simulated in URGWOM at a location downstream of the Paseo del Norte Bridge. Mike Brown reported that he has reviewed the URGWOM documentation and he was unable to uncover a reason for this discrepancy; perhaps Nabil could provide some assistance on this matter. There were other takeaways from the field inspections concerning the reliability of records from individual gaging locations, which are summarized in the Inspection Trip Report which has been uploaded to the myUSGS web page.

Mike reported on the update to the URGWOM database, in which 1,000 of the total 1,300 data elements were updated through 2019. This update supersedes the May, 2020 database update, however the files that will become obsolete with the implementation of the DAOs were not updated. Some data on Colorado diversions were not updated as these data have not yet been posted on the Colorado State Engineer web page. The database catalog (.xls spreadsheet) of metadata was also updated to assist in the future database updates. Mike suggested that the periodic or constant coefficients that do not change do not need to be stored as daily data. This would not result in a significant reduction in file size but would reduce the database complexity. The coefficients could be imported to the model using methods. Mike projected the database to grow about 5-10 MB per year into the future. Mike's recommendations include the regular (annual) update of the database including data QA/QC and to update the MRGCD irrigated acreage based on an inventory or survey of these lands.

Lucas reported to the Team on the work Reclamation has performed on the incorporation of the Santa Fe River system into the URGWOM model. This build out has been completed and has been documented, which will be shared with Tech Team members. The Santa Fe River system add-on was developed to help Santa Fe with their study of the Buckman Diversion return flow alternatives and will also be included in Reclamation's Rio Grande Basin Study. The additions to the model are intended to simulate the Buckman Direct Diversion return flow (pipeline or Cochiti Lake exchange), the operation of the two city Reservoirs, diversions by Acequias from the Santa Fe River, the City's "Living River" releases from the Reservoirs and the Buckman Diversion demand from the Rio Grande. New objects added to the model include: the Buckman Direct Diversion return flow (Cochiti exchange is to the Cochiti Recreation Pool account), a return flow object (effluent pipeline to Rio Grande at Buckman Diversion), a constant diversion object (Buckman) and the Santa Fe River (reservoirs, Compact Accounting and Acequia operations (with a "master switch" to turn this object on or off). There are no reservoir methods or accounts and both reservoirs are combined into a single facility to simplify the system. Lucas presented a series of hydrographs displaying initial model run results for each alternative. The model documentation will be release in the next few weeks. Cindy requested that Lucas ensure that the pre-compact storage in McClure Reservoir is considered in the model simulation.

Lucas reported on recommendations to simplify the Colorado portion of the model. He suggested that the purpose of the simulation of the Colorado portion of the model is to compute Compact delivery obligations, but since the state of Colorado is not using the model, the number of water right diversions simulated in the model could be reduced. He further added that in some years, manual adjustments to the model are required to ensure that the Colorado delivery obligations are properly simulated. Nick suggested that the Compact delivery obligations are based on upstream forecasts and that a script could be added that would turn off the water right solver if it is not required.

Lucas reported to the Team on his proposal to modify the script that would disable the Lower Rio Grande portion of the model when it is not in use in order to reduce run time. He will also add a simplified release demand schedule for Caballo Reservoir. This matter was discussed during a previous Technical Team meeting. The demand would be based on the December 31<sup>st</sup> storage in Elephant Butte and Caballo Reservoirs and the January to June inflow forecast. The new method does not account for Elephant Butte or El Paso Water Improvement District #1 supply allocations. This simplified release pattern will be implemented into the Rio Grande Basin Study and Lucas will send documentation on these changes to the Team for their review. Lucas recommended that everybody update the RiverWare model to version 8.3 and he offered to assist with using and updating OpenSSL to those who may require assistance.

David reported on RiverWare enhancements to be found in the version 8.3 update. These updates include development of a scalar data viewer, the ability to undo or re-do SCTs, improvements to the model comparison tool, a new ensemble data tool and script analysis, more compact display of scripts (displays only groups shown in work space) and DMIs for USGS site maps (requires installation of OpenSSL version 1.1.1). Future enhancements to RiverWare include improved “windowing” to preserve and restore model window layouts, which will be released in version 8.4 as a Beta version.

The next meeting of the Technical Team is scheduled for September 14, 2021.

There being no additional matters to be brought before the Team, the meeting was adjourned at about 11:30 am.

ATTENDANCE LIST

URGWOM TECHNICAL TEAM MEETING  
August 10, 2021

<u>NAME</u>	<u>REPRESENTING</u>
Phillip Carrillo	USACE
William Miller	Southwest Water Design/USACE Contractor
Mike Brown	Tetra Tech/USACE Contractor
Dave Moeser	US Geological Survey
Lucas Barrett	Bureau of Reclamation
Michele Estrada Lopez	Bureau of Reclamation
Andrew Gelderloos	Bureau of Reclamation
Jerry Melendez	Bureau of Reclamation
Andrew Gelderloos	Bureau of Reclamation
Carolyn Donnelly	Bureau of Reclamation
David Neumann	CADSWES
Nick Mander	Hydros Consulting
John Craven	Hydros Consulting
Zhuping Sheng	Paso del Norte Watershed Council
Katie Markovich	Intera
Guillermo Martinez	Intera
Brian Westfall	Keller-Bliesner Engineering
Cindy Stokes	NM Interstate Stream Commission
Emma Kelly	Bureau of Reclamation
Steve Shultz	
Bill Schneider	City of Santa Fe