

Memorandum

To: URGWOM Technical Team Members
Date: March 12, 2021
Subject: Notes of the March 9, 2021 URGWOM Technical Team Meeting

These notes summarize the items discussed during the March 9, 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 an update on the Five-year Plan, NCAR (National Center for Atmospheric Research) hydrologic modeling and snowmelt runoff forecasts and general updates on ongoing URGWOM related activities from the Corps of Engineers, the Bureau of Reclamation, the Interstate Stream Commission and the U.S. Geological Survey.

Lucas reported to the Team on discrepancies in simulated Caballo Reservoir flood control operations and in the Elephant Butte Dam hydroelectric turbine efficiency method, which is incorrectly prioritizing power generation in conflict with operations for irrigation demand and storage. Lucas has been working on correcting these issues.

Cindy reported that the NMISC is working with Hydros in applying a blended hydrograph for use in the model runs for optimization of Elephant Butte Reservoir storage. The blending hydrograph is not meshing with the Reservoir optimization rules and solutions are being explored.

Miller reported to the Team on the updates to the URGWOM Five Year Plan. The Plan consists of three components; the narrative description of tasks, a Gantt chart schedule of tasks and a spreadsheet budget of estimated task costs. Miller presented a series of PowerPoint slides showing the Gantt chart of tasks and schedule and solicited comments from the Team on the Task items and proposed schedule.

The URGWOM tasks are divided into three categories; ongoing regular activities, model enhancement and development and planning applications. Miller highlighted aspects of certain tasks including:

- Maintaining an URGWOM database meta data file that describes the source of data and any pre-processing of data necessary for preparing the data, and
- The role that the regular rules updates tracking spreadsheet prepared by Marc plays in the model documentation.

Miller also reported that in the past, the URGWOM Technical Team had conducted formal technical reviews of the model development and documentation. The last review was in 2010. In lieu of a technical review presentation, a new task is maintaining a record of the peer review of documentation prepared by members of the Technical Team. This would consist of posting Technical Team review of Technical documents, and the author's responses, on the URGWOM myUSGS web page.

Under the model enhancement and development section of the Plan, Miller pointed out three tasks identified for investigation that are included in the Plan that were identified by Hydros during the model calibration. These include reviewing the simulation of Riverside drains to address the apparent circular routing logic, reviewing the fixed MRGCD canal seepage rates to consider changing to variable seepage rates, if adequate data are available to support a change and an investigation of the simulation of drain returns in the Albuquerque to Isleta reach. The nature of these issues may be further clarified by Intera during their review of the model calibration.

Reclamation's Rio Grande Basin study is also included in the Plan, which will begin later this year. This task involves the use of URGWOM with input from informed stakeholders in a comprehensive and interactive planning effort for the upper Rio Grande basin in NM.

Nabil reported that Intera will be providing peer review of the calibration work prepared by Hydros and that review report will be available. Cindy reported that the NMISC report on recent aerial surveys of the middle Rio Grande irrigated land will be ready in about one year. Reclamation reported that the Basin Study stakeholder training schedule will be ready soon. The Report on review of the implementation of the aquifer objects will be ready in May, 2021.

There were no representatives from the USGS attending the meeting and no report from the USGS was submitted.

Phil introduced Andy Wood and Josh Sturtevant from NCAR who have been working with Reclamation in the research of streamflow forecast techniques.

Andy presented a background on water supply forecasting and distinguishing features of statistical regressions and the Ensemble Streamflow Prediction (ESP), which has been prepared for the Rio Grande basin since 2018. NCAR has been cooperating with Reclamation and the Corps to improve modeling and forecasting capabilities by improving weather and climate inputs, application of "hindcasting" to detect systematic errors and remove biases from modeling or forecasting errors. He further described the hydrologic model being used to assess whether the characteristics of the forecast hydrograph shape is being lost due to warming. This model is used to assess new strategies for input of hydrograph shapes.

Josh presented information on the development of ESP, its parameter estimation and model calibration. He presented the results of an April 1st ESP hindcast for the upper Rio

Grande based on a 49-year (1970-2019) period, at twenty locations, and described the methods applied in the ESP post-processing bias correction process. He compared the raw ESP forecast flow data with the bias corrected data and presented a series of hydrographs of bias corrected ESP data with the URGWOM AOP run results and the observed data for gages in the upper Rio Grande for various years (2012-2019). The comparative analysis of results shows that the ESP method is more skillful than the URGWOM forecasts and produces smoother, more realistic April 1 forecasts. This is because the ESP is not based on a single analog year and takes into account climate trends that may invalidate the reliability of historic hydrograph shapes.

The Team thanked Josh and Andy for their presentation. The Team then discussed the use of ESP for forecasting the time and magnitude of the runoff peak (or double peak). This is a limitation that ESP shares with the analog (URGWOM) forecast method. Nabil reported that the preferred method of snowmelt forecasting would be based on snowpack physics and temperatures to forecast peak flow magnitude and timing. Lucas reported that Reclamation has obtained NWS forecast traces and has placed them in the HDB database and computed the forecast probabilities. The new RiverWare extension allows for the direct download use of HDB data in URGWOM.

The next regular meeting of the Technical Team is scheduled for April 13, 2021 at 9:00 am, which will also be an on-line collaboration.

The meeting adjourned at approximately 10:30 am.

ATTENDANCE LIST
URGWOM TECHNICAL TEAM MEETING
March 9, 2021

<u>NAME</u>	<u>REPRESENTING</u>
Nabil Shafike	USACE
Marc Sidlow	USACE
Phillip Carrillo	USACE
William Miller	Southwest Water Design/USACE Contractor
Mike Brown	Tetra Tech/USACE Contractor
Carolyn Donnelly	Bureau of Reclamation
Lucas Barrett	Bureau of Reclamation
Michele Estrada Lopez	Bureau of Reclamation
Dagmar Lewellyn	Bureau of Reclamation
Andrew Gelderloos	Bureau of Reclamation
Jerry Melendez	Bureau of Reclamation
Cindy Stokes	NM Interstate Stream Commission
Shalamu Abudu	NM Interstate Stream Commission
David Neumann	CADSWES
Nick Mander	Hydros Consulting

Guillermo Martinez	Intera
David Jordan	Intera
Viola Sanchez	BIA - Designated Engineer
Andy Wood	NCAR
Josh Sturtevant	NCAR
Brian Westfall	Keller Bliesner / BIA Contractor
Delbert Humberson	International Boundary and Water Commission