

Memorandum – DRAFT

To: URGWOM Technical Team Members
Date: March 30, 2017
Subject: Notes of March 9, 2017 URGWOM Technical Team Meeting

These notes summarize the salient matters discussed at the March 9, 2017 Upper Rio Grande Water Operations Model (URGWOM) Technical Team meeting. The meeting began at 9:00 am in the conference room at the NM Interstate Stream Commission office in Albuquerque, NM. An attendance list is included on page five.

The principal Agenda topics include Lower Rio Grande diversion / release patterns, changes required to run models on a monthly time step, Colorado Rio Grande Compact deliveries, one or two rulesets for models, March 1st snowmelt runoff forecast and AOP model runs and the Middle Rio Grande potential ET and CIR coefficients.

Lower Rio Grande diversion and release pattern development

The Hydros crew led the Technical Team on a discussion about the change in the Caballo Dam release and irrigation diversion rules from demand based releases to the pattern based releases. They described the criteria (Caballo Dam release volume) for determining wet, average and dry water supply conditions. Hydrographs of headgate diversions and Caballo Dam releases were presented and the rules changes required to implement these pattern changes were described. Nick stated that the rules are able to shift the release pattern from a dry condition to an average condition or average to wet condition in the event of forecast changes. When the pattern changes to a wetter condition, the release pattern will change so that it will include the entire release volume for the wetter condition. The volume of the release is ultimately controlled by the allocations made to each irrigation district.

Hydrographs of Caballo Dam releases based on the simulated pattern releases, demand based releases and the historic record were presented for the 1975-2012 period for both the daily and monthly time step models and the pattern based releases look more realistic when compared to hydrographs of actual releases. It was noted that the monthly pattern based release hydrographs do not show flood control releases from Caballo Dam, Hydros will check on this

issue. Jesse suggested that a review of the historic record be undertaken to determine if an increase in runoff forecast during some year in the past would have triggered the switch from dry pattern release condition to the wet pattern condition.

Model changes to run monthly time step model

Nick (Hydros Consulting) led a discussion about the changes made to the model to provide for a change in the time step from daily to a monthly. This work included changing the conductivity values and travel time lags. Hydros presented hydrographs of historic and simulated flow to demonstrate the effect of the modifications to the model. Some problems were encountered in the revisions to the initialization rules in the AOP runs, and Hydros will resolve this problem with the cooperation of Tetra Tech. Nabil stated that the Team will review and test the proposed changes made by Hydros.

Discussion of maintenance of a single or two model rulesets

The Team discussed the need for maintaining two separate rule sets, one for the daily time step model and another for the monthly time step model. Hydros (Steve) indicated that his preference is to maintain a single ruleset that could be applied to multiple time steps, and he explained his reason for this preference although he had earlier favored separate rulesets. Jesse stated that there is less overhead in maintenance of a single ruleset and that a single ruleset could also be applied for use in an hourly time step model. After further discussion, the Team decided to maintain a single ruleset for all model time steps, for the Colorado, Middle Rio Grande and Lower Rio Grande models. Tetra Tech and Hydros will test, implement and document changes to the models and steps to make the time step conversions. Jesse stated that at this time there is a single set of rules that can work at a daily or monthly timestep for the Colorado and LRG portions of the model, but re-generalizing the MRG rules since the last time that was done will take some time. Nick suggested that the RiverWare compare tool could be used to identify and verify the rules changes, which may help identify and resolve all outstanding issues associated with the transition.

Colorado Rio Grande Compact delivery accounting

Jesse summarized for the Team the methods that the model uses to allocate water and compute Colorado Rio Grande Compact deliveries and he identified the index inflow and outflow stations. The objective of the model is to meet the Compact deliveries by splitting the inflow between allocatable flow and Compact delivery flow and to curtail allocatable flow diversions as necessary to meet Compact deliveries. Jesse reported that with the recent updates to the curtailment calculation methodology the model is able to meet target Compact deliveries within a few thousand AF except in dry years when over-delivery can occur even when there is no curtailment of diversions. This is particularly true in the Conejos River system. Thus, in terms of controlling Compact deliveries by curtailing diversions, the model is now doing as well as it can. Jesse reported that his next steps on this work would be preparing documentation, evaluating information received from Craig Cotten regarding historical curtailment operations, and the update the model.

Jesse discussed the problems with the workspace layout of the Colorado portion of the model. Due to the large number (177 total) of diversion points and water users groups on the Rio Grande and tributaries in Colorado, the work space layout is large, cumbersome and difficult to use. Even when the water users are collapsed into a cluster, the workspace layout is not made smaller. Jesse suggested that a smaller workspace layout should be built based on compressed clusters laid out in a smaller workspace which would then be decompressed one at a time to show the individual water users. Jesse indicated that he thought that this would be a relatively straightforward task that should be done on the official model, and that he could make this change at the next conveniently available opportunity to work on the official model.

Middle Rio Grande CIR coefficient

Brian reported to the Team that Keller-Bliesner Engineering has been asked by Tetra Tech to review the determination of the consumptive use of crops in the Middle Rio Grande. Currently, the model applies an 80% factor to the crop potential ET values computed using the Hargreaves Samani method to arrive at the actual consumptive use. Brian proposes to utilize 2002 Metric estimates of actual ET developed by Rick Allen for the middle valley. Nabil indicated that while 2002 was hydrologically dry year, there was sufficient stored water to provide for full irrigation water supply. Actual ET estimates using Metric analysis would then be compared to the ET values computed using the Hargreaves Samani method after applying the

ET factor (80 percent). The Team also discussed other methods for developing estimates of ET from satellite imagery, including new methods by the USGS and Hydros.

Brian will also correlate crop ET values based on Hargreaves Samani with ET values computed using the Penman-Montieth method. The Penman-Montieth method requires the full suite of climate data, which is available from the Alcalde and Los Lunas weather stations.

March 1st preliminary AOP model results

Marc presented to the Team the results of the preliminary AOP model runs based on the March 1st forecast. He presented the assumptions incorporated into the model about storage operations and stated that the model has not incorporated the 2017 Rio Grande Project operating schedules from Reclamation. The forecast volume at Otowi decreased from 1.08 MAF on February 1st to 960 KAF, the Jemez River forecasted inflow decreased and otherwise the forecast was similar to the February 1st forecast. The model runs show that the storage restrictions under Article VII of the Compact would be lifted sometime in late May when usable Project Storage increases above 400 KAF.

The next meeting of the Team has been scheduled for April 4, 2017 at the NMISC office in Albuquerque beginning at 9:00 am.

The meeting adjourned at about 11:50 am.

ATTENDANCE LIST
URGWOM TECHNICAL TEAM MEETING
March 9, 2017

<u>NAME</u>	<u>REPRESENTING</u>
Marc Sidlow	USACE
Jesse Roach	Tetra Tech / USACE Contractor
Kyle Douglas-Mankin	USGS
William Miller	WJM Engineers/USACE Contractor
Nabil Shafike	USACE
Lucas Barrett	USBR
Ken Richards	USBR
Cindy Stokes	NM Interstate Stream Commission

Those participating via telephone conference:

Nick Mander	Hydros Consulting
John Craven	Hydros Consulting
Steve Setzer	Hydros Consulting
Conrad Keyes Jr.	USACE Contractor
Jerry Melendez	USBR
Brian Westfall	Keller-Bliesner Engineers / BIA Contractors
Mary Halstead	Colorado Department of Water Resources
Ashenafi Hydebo	Colorado Department of Water Resources