

**Notes from URGWOM Technical Review Committee Meeting,
April 29, 1999, 9:30 AM, Room 119, Corps of Engineers Building**

In attendance:

Brian Ahrens, CO State Engineer Office
Lawrence Cata, San Juan Pueblo
Bobby Creel, Water Resources Research
Institute
John D'Antonio, NM Office of the State
Engineer
Ellen Dietrich, SAIC
Hiroshi Eto, Corps
April Fitzner, Corps, URGWOM
David Gensler, Middle Rio Grande
Conservancy District
Chris Gorbach, Bureau of Reclamation
Rhea Graham, Pueblo of Sandia
Javier Grajeda, Bureau of Reclamation
Gilbert Gutierrez, Santa Clara Pueblo
Steve Hansen, Bureau of Reclamation
Walter Hines, CH2M Hill
William J. Miller, WJM Engineering, Inc.
Conrad Keyes, Jr., Rio Grande Compact
Commission-TX

Dan Murray, NRCS
Ghassan Mushavrafieh, NM Office of the
State Engineer
Dennis Olson, BIA
Elmo Sandoval, Jicarilla Apache Tribe
Mark Schmidt, City of Albuquerque
Andy Seiger, Interstate Boundary and Water
Zhuping Sheng, El Paso Water Utilities
Marc Sidlow, Corps, URGWOM
Gail Stockton, Corps
Pat Turney, NM Office of the State Engineer
Steven Vandiver, CO Division of Water
Resources
Chris Velasquez, Corps
John Whipple, NM Office of the State
Engineer
Dave Wilkins, USGS, URGWOM
Mark Yuska, Bureau of Reclamation,
URGWOM

- ❖ The meeting was called to review the physical model and calibration of URGWOM, and to get comments on the methods, assumptions, considerations, and calculations. The Technical Team would like to have comments back from the Technical Review Committee (TRC) in 2 weeks. Copies of the slide presentations were distributed in a handout. The information is also included in the document for review, "Technical Review—Physical Calibration, Upper Rio Grande Water Operations Model," dated April 29, 1999. Only additional comments, questions, and answers are summarized in these notes.
- ❖ During the morning session, members of the Technical Team presented information on different aspects of work that they have accomplished since the TRC last met. Information was separated into two main topics, General Calibration Procedures and Specific Reaches.
 - Mark Yuska, the new Technical Team leader, summarized URGWOM capabilities and functions, including selecting and filtering the data sets, routing methods, loss calculations, and local inflows for the upper and lower reaches.

- Dave Wilkins discussed possible approaches to use in characterizing groundwater flow in the Middle Valley.
 - He has selected the model STWT1 that was developed for unconfined aquifer conditions.
 - Long-term model runs will be calibrated with daily data.
 - The Technical Team must determine how to supply the output from the groundwater model to RiverWare.
- Marc Sidlow presented preliminary results from RiverWare for specific reaches. He discussed time lags and loss coefficients in detail.
- April Fitzner discussed the preliminary results of calibrating the model for time lag and losses by developing seasonal loss relationships. In response to questions on how losses are calculated and used in the model, April pointed out that the important information for the model is the net effect of losses and local inflows combined.
- Dave Wilkins continued the discussion of flows, time lags, and losses in specific reaches from Embudo through the Middle Valley.
- Bill Miller discussed development of a relationship between the river water surface and wetted sands in the channel.
 - Assumptions:
 - At bank full, all sandbars are saturated. Sandbars become exposed as the water level lowers.
 - Bank full discharge equals peak discharge every other year.
 - Evaporation data come from nearby pan evaporation data collection sites and are correlated with the capillary action in wetted sands.
 - Data used to develop this relationship is from Bureau of Reclamation high flow and low flow aerial photography in 1994, the San Juan-Chama Incremental Loss Study in 1985, and Corps and Bureau of Reclamation water operations data.
 - Four equations were developed for each of four reaches.
 - Since the 1985 study, the river has become more entrenched, a fact that cannot be taken into account with current information.
 - Bill responded to a question asking why no equation was developed for the San Acacia to San Marcial reach by telling the group that Chris Gorbach of the Bureau of Reclamation is working on this.
- ❖ Steve Hansen discussed current work on measuring evapotranspiration (ET) in the Middle Valley. This technical support is documented in the Middle Rio Grande Water Assessment and the Seepage Study conducted on different soil types, both done by Bureau of Reclamation.
 - Historic water budgets are based on land use trends and helped identify the magnitude of riparian losses, estimated at 60%.
 - Monthly ET rates have been generated for crops and specific vegetative types back to 1935 from a previous study, which were then used to develop monthly water balances.

- The ET Toolbox project
 - Why study ET?
 - Evapotranspiration varies radically from day to day, especially during the growing season. Monthly variations can be as much as 200%.
 - One goal of the ET project is to establish better data on riparian ET.
 - The project is using lidar to provide an instantaneous picture of water vapor flux associated with different riparian vegetation. From this information, they build composite maps of ET variations using contour lines, or isolines. These data will be used in conjunction with remote sensing products and information to characterize ET throughout the river basin.
 - ET information can be accessed through the Internet at <http://www.usbr.gov/rsmg/nexrad/riogrande.html>.
 - The ET Toolbox data on the Internet is GIS-based. Data are provided in grid cells on color infrared aerial photography.
 - The National Weather Service will update data hourly once the real-time data are available.
 - Future plans include correlating 0.5 meter imagery to be flown this year, with 30 meter imagery that can be updated twice a month, and 1 kilometer imagery that can be updated twice a day, to facilitate frequent updates of the ET information on the Web site.
 - A dynamic weather-based daily model should be used to develop an algorithm for use in URGWOM so the daily ET data can be used to help calculate water losses.
- In the reaches below Elephant Butte, data are still being collected to enable flood control operations to be modeled in URGWOM. Javier Grajeda from the El Paso office of the Bureau of Reclamation presented the reaches and the types of data he is gathering.
- ❖ The TRC agreed that they appreciate the huge amount of work done by the Technical Team.
- ❖ The TRC members broke out into three groups, organized by river reaches, to discuss the information presented during the morning session and in the Physical Calibration document, to identify questions for the Technical Team, and to make recommendations. Following that session, the entire group reconvened and presentations were made by representatives of each breakout group. Items below marked with a Q? are either questions or comments to the Technical Team. Responses, marked with an A., were provided mostly by the Technical Team.
- Upper Mainstem, Steve Vandiver
 - Q? Why was no consideration given to diversions in the upper reaches?
 - A. No data is available on those diversions.
 - A. Dan Murray suggested that the NRCS field offices in each county would have capacity and other design information on diversions for which they provided construction assistance.
 - Q? A comment was made that although boundary conditions have never been forecast at Lobatos, Colorado can predict annual water quantities at the state line. The Rio Grande Decision Support System being developed will enable creation of average hydrographs at Lobatos for different types of snow years. Boundary outflows predictions from Colorado will improve as real-time data at Lobatos becomes available.

- Q? In the Lobatos to Cerro reach, there seem to be dramatic gaps in the flow data that was presented for the winter months. Why was the loss coefficient increased by over 2% without operations or weather changes and with similar flow conditions?
- A. Statistical data analysis just shows this result. It needs to be looked at more closely.
- Q? How are the high flows from springs in the Cerro to Taos reach handled in the model?
- A. They are handled as local inflows.
- Q? A concern was expressed that only one loss coefficient was used for the Red River area for all of January and February. A gaging error is probably causing major changes in loss coefficients, and data should be reviewed.
- Q? Where is the location of the Embudo Creek gage?
- A. Close to the confluence.
- Rio Chama reach, Bill Miller
- Most of their discussion related to the rules that have been developed for URGWOM.
- Q? How do the rules developed for the San Juan-Chama test case differ from the rules in RiverWare developed for the mainstem conceptual model?
- A. The rules will not change in function but they will be modified for the inclusion of individual San Juan-Chama contractors for the mainstem model.
- Middle Rio Grande and below, Walter Hines
- Q? How concerned is the Technical Team that they are not using drought years for the baseline conditions?
- A. They plan to model situations representing the drought years by generating them stochastically or by using the historical data with today's physical system.
- Q? Do they anticipate that the canal seepage data may change if there are drought years?
- A. The Technical Team was conservative in calculating seepage, but it may change once more data is available. This version of URGWOM will help identify areas for further study.
- Q? There is a problem applying the Penman equation without enough data.
- A. NMSU and the Bureau of Reclamation, Denver office, are working together to determine if it can be used. Evaporation tests done at Elephant Butte Reservoir between 1959 and 1963 may provide applicable data.
- Q? How is shallow percolation from canals handled?
- A. Losses from the river are estimated, so canal seepage is considered part of deep percolation and is not calculated as returning to the river.
- Q? What is being used to account for bank storage loss?
- A. Bank storage volumes will be determined from Dave Wilkins' groundwater calculations. These will be calibrated with shallow piezometer readings that will continue to be checked.

- Q? There is poor correlation between time lag and r^2 values. Does the low flow conveyance channel affect time lag between the Bernardo and San Acacia gages?
- A. No, not the best data measurements.
- Q? Will the format on the final report be similar to the Rio Chama test case format?
- A. Since they now have a technical editor, the Technical Team expects that the format will be different. The final document will not be done by January 2000.
- Q? Will URGWOM data be available on the Web site?
- A. All input data and some output data will be available initially.
- Q? Was the low flow conveyance channel operating during the years when the evaporation data Bill Miller referred to was collected, 1967-83?
- A. The Technical Team does not know the answer to this, but referred to Chris Gorbach who is leading a study on this channel below San Acacia.
- Q? Was canal seepage not credited in the model as being a gain to the river? Is the water eventually returning to the river?
- A. The Technical Team must characterize the overall return flow and is using one return flow to be representative of an entire reach.
- ❖ Plans for URGWOM, Gail Stockton
- The model from the Colorado-New Mexico line to Fort Quitman will be completed by January 2000, and will include multi-contractor accounting and forecasting.
 - Another TRC meeting will be held to review the rule sets.
- ❖ If TRC members have questions on the physical model, they should call any of the Technical Team members.
- ❖ **Comments on the Physical Calibration document should be e-mailed to Bill Miller within two weeks.**