

## Notes from the URGWOM Technical Review Committee Meeting; April 26, 2001, 1:00 PM; Corps of Engineers, Albuquerque

*In attendance:*

Cyndie Abeyta, USFWS

Cecilia Abeyta, Lt. Governor Bradley

Brian Ahrens, SEO, CO

Naomi Archuleta, Pueblo of San Ildefonso

Richard Becker, NMRC

Steven Bowser, USBR

John Carangelo, Socorro SWCD/LSA

John Cawley, BIA

Bobby Creel, WRR/NMSU

Gina DelloRusso, USFWS/Bosque del Apache

Ellen Dietrich, SAIC/Corps

Donald Gallegos, Corps

Albert D. Gonzales, BIA/SPA

Jaci Gould, USBR

Rhea Graham, NMISC

Javier Grajeda, USBR-El Paso

Laura Hagan, JSAI

Ed Hamlyn, UTEP/CERM

Mike Hamman, Jicarilla Apache Tribe

Debbie Hathaway, SSPA/NMISC

Ed Kandl, USBR

Conrad Keyes, Jr., EWRI/ASCE

Dick Kreiner, Corps

Walt Kuhn, Tetra Tech

Bill Leibfried, SWCA/NMISC

Dagmar Llewellyn, SSPA/NMISC

Charles Lujan, Pueblo of San Juan

Fred R. Lujan, Ysleta del Sur Pueblo

Natalie M. Maldonado, Weston, Inc.

Mike Marcus, SWCA/NMISC

Bob Marley, DBS&A

Art Martinez, BIA/AAO

Clay Mathers, Corps

Regan Murray, Los Alamos Lab

Timothy Overdier, BIA

Christine Pacheco, NMED/SWQB

Ed Payne

Scott Reinert, EPWU

Joe Ruiz, Senator Bingaman

Willem Schreüder, RCAA

Nabil Shafike, NMISC/URGWOM

Zhuping Sheng, Texas A&M

Marc Sidlow, Corps/URGWOM

John D. Sorrell, Pueblo of Isleta

Gail Stockton, Corps

Doug Strech, MRGCD

Mark Sundin, BLM

Carole Thomas, USGS/URGWOM

Vince Tidwell, Sandia National Labs

Leann Towne, USBR

Julie Tsatsaros, NMED/SWQB

Bill Turner, Waterbank

Rae Van Hoven, NMSHTD

Steve Vandiver, CDWR

Dave Wilkins, USGS/URGWOM

Woody Woodward, USGS

Mark Yuska, USBR/URGWOM

- ❖ The main purpose of this meeting was to review the second draft of the URGWOM Physical Model documentation and provide an opportunity for discussion and questions. The presenters were members of the URGWOM Technical Team, who gave slide presentations and distributed copies of the slides and the documents. The main topics on the agenda included a general overview, significant changes made since the first draft, a description of calibration and validation methods, physical reservoir accounting, description of the forecast model, and a summary of future model enhancements and uses.
- ❖ The notes below summarize the questions and comments during the presentations, in the order that they were made. The meeting was videotaped, and in reviewing the videotape, it was felt that some of the answers could have been more responsive. More responsive, after-the-fact answers have been added to these meeting notes and are shown in brackets [ ].
- ❖ Question: What is the status of negotiations with Mexico to participate in the modeling effort? Is there any way that Mexico can delay URGWOM modeling if they do not agree to become involved?
  - Answer: Without Mexican participation, it is likely the model will stop at American Dam. The U.S. Section of the International Boundary and Water Commission is working on this.
  - URGWOM only addresses flood control operations of U.S. facilities below Elephant Butte Reservoir to American Dam. The model would be improved if Mexican and U.S. diversion and return flow data were included.
- ❖ Comment: Mexico has recently indicated an interest in opening discussions of water flows and water systems, which may tie in with the URGWOM effort.
- ❖ Question: Does URGWOM take into account the effect of the surface water depletions caused by groundwater pumping and augmentation of stream flow due to return flows from sewage treatment plants?
  - Answer: There are no separate, specific calculations, yet, in URGWOM, of surface water depletions caused by groundwater pumping. URGWOM does take wastewater return flows into account, as documented. The surface water effects of groundwater pumping are considered as far as these effects are reflected in the gradient from the river to the riverside drains. URGWOM will be improved in the future by using MRGCD measured return flows.
- ❖ Question: Does URGWOM distinguish a difference between seepage from the river to the deep aquifer and seepage from the canals and drains?
  - Answer: No, canal seepage rates are derived from the USBR Water Assessment study [1997, U.S. Bureau of Reclamation, Middle Rio Grande Water Assessment, Middle Rio Grande Basin Surface Water Budget for Calendar Years 1935, 1955, 1975, and 1993, Supporting Document Number 15.], which provided a basis to develop seepage rates per reach. URGWOM calculates seepage losses from the river but these losses go to bosque ET, riverside drain interception, and percolation to the deep aquifer. Bosque ET and riverside drain interception are estimated. URGWOM only uses the loss from the canals. It is assumed that all canal losses do not return to the surface water system. URGWOM does not calculate open water evaporation from the drains and canals. It does address evaporation from irrigation, called consumptive use or evapotranspiration .
  - Open water evaporation from the canals and seepage from the canals are relatively small factors in the larger system [compared to other physical system unknowns, at this time.]

- ❖ Question: How is the percentage of deep percolation from farms derived?
  - Answer: Deep percolation is calculated using a rate of 1 acre-foot per year, based on information from Steve Hansen, USBR, [from the 1997 Middle Rio Grande Water Assessment; Supporting Document No. 7.]
- ❖ Question: How do you define the percentage of water intercepted by the Low Flow Conveyance Channel?
  - Answer: The percentage of river leakage intercepted by the Low Flow Conveyance Channel from Bernardo to Elephant Butte is based on USBR water budget studies in the San Acacia to San Marcial reach. [written communication, Chris Gorbach, USBR].
- ❖ Question: Is most of the local inflow in the upper reaches due to groundwater discharges in the spring?
  - Answer: [No, not from groundwater, but from snowmelt runoff in tributaries to the Rio Chama and Rio Grande.]
- ❖ Question: What about non-crop evapotranspiration in the middle valley?
  - Answer: A future enhancement to URGWOM will include the addition of data for bosque evapotranspiration. For now, bosque ET is lumped in with river leakage.
- ❖ Question: The relationship between groundwater and surface water is sensitive to seasonal and recent antecedent moisture conditions. This seems not to be included in URGWOM. Could you use a detailed groundwater model to feed into the local inflow component?
  - Answer: [Data are probably not available to build or calibrate a shallow ground water/surface water model that would simulate antecedent moisture conditions. Such a model might be built to simulate seasonal groundwater/surface water interaction, but such a model would not produce local inflow data.]
- ❖ Comment: URGWOM should also capture depletion of the shallow groundwater system.
- ❖ Question: How would setting forecasts affect diversions?
  - Answer: For now, URGWOM uses historical river flows from a year similar in volume to the year in question to forecast daily river flows and diversions. This procedure may be enhanced in future model versions.
- ❖ Question: Is there a way to account for a wet summer through an application in the model?
  - Answer: In the post-forecast season, URGWOM provides the ability to select a different representative period, if that would be more appropriate to reflect wet summer conditions.
- ❖ Question: How do you explain the low point in the flow graph for April forecasts in May? Is it due to irrigation diversions?
  - Answer: This is in reference to the Embudo gage, so there is little irrigation above the gage in New Mexico. The low flows are due to cold temperatures in Colorado that reduced flows in early May of the chosen historic year.
  - The model does not calculate flows above the New Mexico-Colorado state line. URGWOM modelers are relying on the Colorado Department of Water Resources to provide the general shape of the hydrograph and the volume of water for use in the model. Only flood control operations at Platoro Dam are slated for modeling in Colorado.

- ❖ Comment: The groundwater system below Cochiti is complex, so users must be careful when using URGWOM for planning purposes, especially for low flow conditions.
  - Response: URGWOM must be used within its limitations and assumptions. Enhancement with a groundwater model will help overcome some of these limitations.
- ❖ Question: When will the NRCS/NWS coordinated forecast 30-year baseline period change to 1971-2000 from 1961-1990?
  - Answer: We understand that this will be soon. Our current model calibration period is 1985-2000 and is to become 1975 – 2000 when we have the complete data set.
- ❖ Question: How will this change model results since this new NRCS/NWS baseline period has climatic differences?
  - Answer: This new period is closer to our model calibration period, so the model forecasts should be improved.
- ❖ Question: RiverWare is proprietary software. Is it possible to make the source code public?
  - Answer: [No, but there is much information about the code that is public.]
  - The University of Colorado (CU) is a non-profit, educational institution that holds the intellectual rights to the source code of RiverWare. Universities may, and usually do, maintain intellectual property rights to the results of federally funded research, as allowed by the Bayh-Dole Act, Public Law 98-620, November 8, 1984. As such, the source code is not in the public domain. CU, TVA and USBR are partners in the commercialization of RiverWare and have a formal agreement that specifies the amount of license fees and the use of the license fees.
  - CU charges a license fee for RiverWare so that everyone using the software contributes to the annual maintenance costs of the software. The maintenance includes upgrades to the newest versions of software and operating systems, semi-annual new releases of the software, creation and upkeep of bug-tracking and reporting tools and other web features, upkeep of installation procedures and guidelines, etc. These activities are necessary for RiverWare to remain a viable software. USBR and TVA, the sponsors of the research and development, fund most of the annual maintenance costs, which total about \$200,000 annually.
  - One of the attributes of the RiverWare software is that none of the rules or data are buried in the source code; instead they are user-defined and visible. The algorithms on which standard engineering calculations or methods are based are written into the source code. Detailed documentation for these algorithms are available on the CADSWES RiverWare website <http://cadswes.colorado.edu/riverware/> as PDF files that can be downloaded. If the documentation is not detailed enough to address specific questions, CADSWES is willing to make the source code for these algorithms available and/or to answer questions.
  - The URGWOM technical team uses the RiverWare modeling environment to develop a detailed, site-specific model of the Rio Grande Basin. The URGWOM model is tailored to the Rio Grande by the data, selection of physical process algorithms and parameters for those algorithms, and by the operational rules that drive the solution. These are all available as data files or rules documented in the various URGWOM model documents. All of this information will be available to the public on the URGWOM website when the URGWOM model is substantially complete and tested. However, to run simulations with the URGWOM model in RiverWare, a user must purchase a RiverWare license.]

- ❖ Question: Are the data only accessible through RiverWare?
  - Answer: No, [the URGWOM technical team uses the RiverWare modeling environment to develop a detailed, site-specific model of the Rio Grande Basin. The URGWOM model is tailored to the Rio Grande by the data, selection of physical process algorithms and parameters for those algorithms, and by the operational rules that drive the solution. These are all available (or will be) as data files or rules documented in the various URGWOM model documents. All of this information will be available to the public on the URGWOM website as data storage system (HEC-DSS) files or as documentation when the URGWOM model is substantially complete and tested. However, to run simulations with the URGWOM model in RiverWare, a user must purchase a RiverWare license.]
  - The Technical Team is not an original source of data. All data used in URGWOM is publicly available elsewhere. The Technical Team is compiling data in HEC-DSS so that all of the data are available in digital format for the model to run. [The Technical Team would like to make data available later as a by-product of URGWOM development, but it may not be appropriate to be a clearing house for others data. We will be seeking approval from the originating agencies to provide data to the public that was modified for URGWOM use. Unmodified source data should be obtained from the source agency; e.g., USGS stream gage records from USGS.]
  - Anyone can have HEC-DSS and data when the data are ready to be distributed. There is some concern that if the Technical Team distributes data early without it being thoroughly checked, or qualified, the team would incur some liability.
- ❖ Question: On reaches below Caballo, Percha Dam controls much of the water. Why is there no separate reach from Caballo to Percha, then from Percha to Leasburg?
  - Answer: URGWOM is not modeling diversions below Elephant Butte because of the ongoing litigation, only flood control operations, so the model in the lower part of the basin is simplified and the reach length is very short.
  - Once the litigation is settled, the Technical Team expects to enhance the model below Caballo.
- ❖ Comment: Add Percha diversion in a future enhancement.
- ❖ Question: Has there been documentation of personal communication that supplied information to the URGWOM Technical Team?
  - Answer: [Any information that has been used in the development of URGWOM should be referenced and included in the documentation. If we have omitted something you are aware of, please bring it to our attention. We will be further correcting and adding references to pages 35 and 37 of the February 2001 URGWOM document that were incomplete with respect to specific reports from the USBR Middle Rio Grande Water Assessment Study].