

## Notes from the URGWOM Technical Review Committee Meeting; November 13, 2003; 8:30 AM; Corps of Engineers, Albuquerque

### *In attendance:*

Cynthia G. Abeyta, USFWS	Ed Polasko, NWS
Roberta Ball, Corps	Jesse Roach, Sandia National Laboratories
Marti Blad, Ph.D., Pueblo of Jemez	Michael Roark, USGS, URGWOM Technical Team
Claudia Borchert, City of Santa Fe	Garret Ross, USBR
Steve Bowser, USBR	Rolf Schmidt-Petersen, NMISC
Douglas P. Boyle, Desert Research Institute	Nabil Shafike, NMISC
Deb Callahan, USBR	Zhuping Sheng, Texas A&M University
John Carangelo, Socorro Soil and Water Conservation District	Marc Sidlow, Corps, URGWOM Technical Team
John Carson, Hydrosphere/NMISC	Andy Smith, Water Assembly
Cliff Crawford	Gail Stockton, Corps Project Manager
Gina DelloRusso, USFWS	Valda Terauds, USBR Project Manager
Ellen Dietrich, SAIC/Corps	Vince Tidwell, Sandia National Laboratories
Don Gallegos, Corps, URGWOM Technical Team	Steve Vandiver, Colorado Division of Water Resources
Mark Horner, Corps	Jack E. Veenhuis, USGS
Dick Kreiner, Corps	Tim J. Ward, UNM
Leslie Kryder	Dave Wilkins, USGS, URGWOM Technical Team
Clay Mathers, Corps	Mark Yuska, Corps
William J. Miller, WJM Engineers, Inc./Corps	Edith Zagona, University of Colorado

**Note:** *These meeting notes briefly summarize the information presented and document the questions, answers, and discussion that arose during the meeting. For a more complete discussion of the material presented at the meeting, please refer to the model documentation (Item 6. The Planning Model-Base Run Start-up and Initial Conditions Assumptions), available from the URGWOM web site (<http://www.spa.usace.army.mil/urgwom/>).*

- ❖ Bill Miller welcomed everyone to the meeting, after self-introductions, used a slide presentation to explain that the main purpose of this meeting was to present the documentation and results of the most recent efforts to develop the URGWOM Planning Model. The Technical Review Committee meetings provide opportunities for the URGWOM Technical Team to communicate modeling objectives and recent activities while gaining insight from independent reviewers, with the ultimate goal of making better models.
  - Documentation and the meeting agenda were e-mailed to Technical Review Committee members, and are also available on the URGWOM web site. Bill asked that those who

wish to comment on the model or the documentation provide comments to him by December 15, 2003.

- Bill briefly reviewed the mission of URGWOM and the history of URGWOM documentation, as well as past Technical Review Committee meetings from December 11, 1997 to August 22, 2002. Notes from past meetings and the documentation reviewed are available on the web site.
- Bill emphasized that URGWOM includes four models: the Water Operations Model, Accounting Model, Forecast Model, and now the Planning Model. The models run on RiverWare, developed by CADSWES. Bill also listed the types of models that URGWOM is not.
- ❖ Gail Stockton gave an overview of the goals and purpose of the URGWOM Planning Model.
  - The Planning Model is a tool that enables comparisons of the operational alternatives for the Upper Rio Grande Basin Water Operations Review and EIS, while reflecting system complexity and operational reality.
  - The Planning Model is intended to be used by all water management agencies, providing a common base for discussion. It will eventually reside at the USGS, who will archive model versions and distribute to the public. Next year, CADSWES will release a RiverWare version as freeware that can be used for accessing and reviewing URGWOM data.
- ❖ Slide presentations from different members of the URGWOM Technical Team described the development of the Planning Model from the Water Operations Model.
  - Don Gallegos reviewed the diversions and operations planned for the City of Albuquerque Drinking Water Project and how they are modeled in URGWOM.
    - Diversions are planned to begin in 2006. URGWOM uses the planned diversion amounts provided by the City, which total 130 cfs (½ San Juan-Chama, ½ native Rio Grande water). The native water is returned to the river as wastewater.
    - **Question:** What loss rates does URGWOM use for the delivery of Albuquerque San Juan-Chama water to the diversions?
      - **Answer:** URGWOM applies the same San Juan-Chama loss rates that are used for delivery of all contractors' water to Cochiti Dam (2.33% from Heron Dam to Cochiti Dam). No losses are charged against this water between Cochiti Dam and the proposed point of diversion.
    - Don also discussed the Middle Rio Grande Conservancy District (MRGCD) irrigation demand schedule and the reservoir and streamflow minimum target levels.
    - He showed hydrographs of the storage amounts and releases from the primary reservoirs to be evaluated, including El Vado, Abiquiu, Cochiti, Elephant Butte, and Caballo. He also reviewed the potential for conservation storage at Abiquiu and the minimum by-pass flows at the Low Flow Conveyance Channel.
  - Dave Wilkins explained how river leakage is estimated in the URGWOM Planning Model.
    - Leakage is calculated as gross leakage only (the total amount of water leaving the river) because that is the primary aspect of interest for the model.
    - It is computed daily and based on the gradient of the groundwater flow line between the river and the riverside drains.

- The key to calculating leakage between Cochiti and Bernardo is the horizontal hydraulic conductivity.
- Dave calibrated the leakage equation against real data for all but the southern part of the middle valley, below Bernardo where river leakage was calibrated using limited water budget data. The equations for each reach were provided from the information in the draft Planning Model documentation.
- **Question:** Is the entire reach (Cochiti to Bernardo) a losing reach?
  - **Answer:** Most of the time this is true, but not always. It varies by reach and seasonally.
- Mike Roark described some of the problems that arose in developing the Planning Model from the Water Operations Model.
  - In the middle valley, the model uses one set of MRGCD diversion values from 2001 and a wide range of historical river flows over the 40-year planning period. As a result, the Technical Team needed a way to correct irrigation return flows in the model. Canal and drain gage data below bifurcations are adjusted during shortages using relationships between historic diversions and canal and drain gage data where return flows occur.
  - **Question:** Would the 1985-1996 data be adequate to represent drought years? Would using the 1975-1979 years better represent the drought periods?
    - **Answer:** Mike said that he would look into this but he is unsure at this time.
  - **Question:** When the relationship between diversion and river return flows is calculated, are the tributary flows or the river flows adjusted?
    - **Answer:** The model corrects the inflow to the river, but does not specifically adjust any tributary flows.
  - **Question:** The scatter of data showing the variability of flows in the reach between San Acacia and San Marcial is a few hundred cfs but the target flow to be reached to comply with the Biological Opinion (BO) is 50 cfs. Can the Planning Model be used with confidence to plan for meeting the requirements of the BO?
    - **Answer:** The 50 cfs target flow established by the BO will not be used in the evaluation of the alternatives in the EIS, which is the primary use for the Planning Model. The target river flows in the BO are not specifically part of any alternative because no one knows where the water would come from or how long it would be in effect. The flows predicted in the Planning Model over the 40-year period will be used to compare the impacts of the alternatives. However, the EIS resource teams could determine the number of years in which the requirements of the BO would be met under each alternative, using Planning Model output.
    - It may be possible to solve for a target flow of 50 cfs during a single year using the Water Operations Model.
  - **Question:** When developing relationships between San Acacia and San Marcial, does the model take into account diversions from the Low Flow Conveyance Channel, such as by the Bureau of Reclamation (pumps) the MRGCD or the Bosque del Apache?
    - **Answer:** No, because little or no diversion data are available for these diversions.
- Marc Sidlow summarized the changes to the ruleset made for the Planning Model and San Juan-Chama contractor accounting.

- As the URGWOM Technical Team tested the Planning Model, they identified some changes to the ruleset developed for the Water Operations Model that were needed to improve both models. Recent changes made by CADSWES to RiverWare made it easier to interchange rulesets between models.
  - **Question:** What happens in the model if a reservoir overflows?
    - **Answer:** The rules preclude that from happening by limiting releases based on outlet and spillway capacities. Floods that would overtop a dam are not included in the hydrologic sequence.
  - **Question:** There seems to be many things that cannot be characterized in a rule because the demands for water are not predictable. How are they handled in URGWOM?
    - **Answer:** Due to the very long time period used in the Planning Model, it is necessary to limit the number of variables by defining a set schedule for water demands and to document the assumptions made. The Planning Model output will be used to compare alternatives to each other, not to predict water supply and demands.
    - In the Water Operations Model, flows are predicted for one year based on runoff forecasts and information from water managers, so annual variations in water demands can be taken into account.
  - **Question:** Is the Planning Model used for accounting?
    - **Answer:** The Planning Model is not used for accounting. The URGWOM Accounting Model tracks all water contracts based on historic water accounting from the Bureau of Reclamation up to the present. The Water Operations Model forecasts flows up to a one-year time period, using the Accounting Model output for the current year up to the time that the model is run. The Planning Model uses the 40-year hydrologic sequence and historic patterns of climate and accounting.
  - **Question:** If one applies the baseline ruleset to historic data, would it accurately represent historic flows?
    - **Answer:** It depends on which years were used for comparison. URGWOM does well in calculating Rio Grande water. The Planning Model uses 2001 MRGCD demands for all years because it reflects the future better than the demands from 2002.
  - **Comment:** The URGWOM Technical Team may want to work with the City of Santa Fe to develop potential exchanges of water that could be used in future Planning Models. The problem in doing this would be predicting the retention or relinquishment of water.
- ❖ Debbie Hathaway summarized the development of the 40-year streamflow hydrologic sequence used in the Planning Model.
- The purpose of the sequence is not to predict the future, but to develop a representative sequence to enable the comparison of alternatives for the Water Operations Review EIS.
  - A paper explaining the methodology used to develop the sequence will be available to the public for review after the Draft EIS is distributed.
  - **Question:** If the sequence used in the Planning Model is synthetic, why does it matter what real data were used to create the sequence? Why select real data only between 1975 and 1999?

- **Answer:** Daily data are required and the only daily data available for use is post-Cochiti (1975-1999). The 1975-1999 recorded data were normalized to account for dry years, while recognizing that this is a wet period overall. The sequence is probably not typical for any real 40-year period because it includes extremes.
- ❖ Nabil Shafike described Rio Grande Compact accounting in the Planning Model and the effect of Article VII.
  - **Question:** Are there rules in the model on the kind of debit during a year and the length of time over which the debit is calculated?
    - **Answer:** No. Accounting for Compact debits and credits is done only on an annual basis in the model, as it is done now under the Compact.
- ❖ Don Gallegos projected selected Planning Model results using hydrographs generated from the base run and one EIS alternative. He showed hydrographs from several locations requested by the group.
- ❖ Gail Stockton invited those in attendance to further review the operating Planning Model, as well as the displays on tools developed for the EIS over the lunch hour. Displays provided information on the document management system and vegetation mapping developed for the Water Operations Review.
- ❖ Bill Miller wrapped up the meeting and encouraged people to send him comments on the Planning Model documentation.