

MEETING NOTES
UPPER RIO GRANDE WATER OPERATIONS MODEL
EXECUTIVE COMMITTEE MEETING

NM INTERSTATE STREAM COMMISSION
5550 SAN ANTONIO DR NE
ALBUQUERQUE, NM

December 5, 2013

An attendance list and meeting agenda are attached.

The attendants discussed Upper Rio Grande Impacts Assessment of the West Wide Climate Risk Assessment, Middle Valley Calibration, Lower Rio Grande Models, Watershed Modeling, and myUSGS website use.

URGIA of the WWCRA

Jesse Roach and Dagmar Llewellyn used a PowerPoint presentation to report on the modeling for the Upper Rio Grande Impacts Assessment (URGIA) of the West Wide Climate Risk Assessment (WWCRA) using the monthly timestep PowerSim model, or the Upper Rio Grande Simulation Model (URGSiM). The Impact Assessment is the foundation for basin studies. The report on transient simulations should be released next week.

Jesse initiated the discussion by first discussing trends in changes over time in historical temperature and precipitation data for 1971 through 2011 and then reviewed the modeling completed with URGSiM. The work was completed by Ariane Pinson, USACE. The different tables included rate of change in monthly maximum temperature, rate of change in minimum temperature, and net change in precipitation.

Transient Analysis

Output is available from 112 general circulation model (GCM) runs for the 1950 through 2099 period. The runs include different projections for climate conditions using several different models and simulations completed using three different greenhouse gas emission scenarios. The results were spatially downscaled to provide regional projections for changes in temperature and precipitation. The Variable Infiltration Capacity (VIC) model was then used to simulate 112 runoff projections. Post processing of the VIC model output entailed completing bias correction to historical hydrographs. Resulting hydrographs for all 112 projections were then run through the operations model, URGSiM, to provide output for evaluating a range of potential conditions that may be expected in the Rio Grande basin due to climate change.

The results indicated that temperature will rise and there will be more rain and less snow. The annual total precipitation will not change; however, timing will change. In the future, spring will occur earlier since the plants will be transpiring earlier. It was noted that the GCM is conservative so there may be more effects.

Resulting Flows

Jesse presented several charts of results from the completed 112 runs. The results showed a reduction in tributary inflows to the Rio Grande, and Rio Chama and Jemez River flows are also lower. Flows in the San Juan tributaries above the San Juan-Chama Project diversions are also projected to be lower with an approximate 15% reduction in flow that is not as severe on Chama side of divide. The URGSiM runs include adjusted values for projected riparian and crop ET rates that reflect the temperature changes for the 112 scenarios. Reference ET rates are computed with the Hargreaves method using the temperature data for the scenarios which are then referenced to compute crop ET and riparian ET rates. There is a clear increased demand combined with a reduced water supply for the model runs. The increased temperature leads to an increased demand. The total consumptive use summed across sectors does not rise due to reduced availability. The reduced supply and increased agricultural demand squeezes the system. Potential ET is rising since temperature is rising. Reservoirs are storing less water so there is no more ET loss. When there are storm events, spikes will occur at Abiquiu and Cochiti.

A period analysis was completed that entails completing runs for different developed scenarios with both URGSiM and URGWOM as discussed for the next agenda topic. However, URGWOM runs are not useable due to data input errors.

Middle Valley Calibration

New Mexico Interstate Stream Commission (NMISC) presented calibration efforts for Upper Rio Grande Water Operations Model (URGWOM). The calibration discussion included reviewing the slides presented at the last URGWOM Technical Team, November 12, 2013. The calibration period is from 1990 through 2010. Some of the work includes examination of the model layout, river seepage, gage flows and return flows.

Nabil reviewed the reasons for upgrading the middle valley portion of URGWOM, including low flows were not well simulated in the previous model version; much additional data on return flow are now available from gages installed on drains and wasteways; wetted sand loss demand will now be met from groundwater to eliminate potential for negative surface flow values; and the previous crop ET computations took too long because depletions were computed for each individual crop each day.

All of the middle valley reaches have been linked together and the initial calibration runs have been completed. Nabil presented histogram plots of actual less simulated flow for the URGWOM reach gages though the middle valley for all flow levels and for low flow (<200 cfs at San Marcial). Histograms of the actual versus simulated data were also displayed for each gage for individual reach simulation and for the linked reach simulation.

The model results are satisfactory, although the model is “gaining’ water as the simulation moves downstream. Nabil believes that to resolve this issue, the crop consumptive use values should be further reduced below the 80% of computed crop ET. In addition, the stream gage at Bernardo has experienced bed instability and the model reach calibration involving that gage data may not be reliable at high flows.

Nabil reported on the amount of depletion by type of use category as compared to the total depletion for M&I, evaporation, crop depletion and riparian ET depletion categories and that when the model seepage losses are compared to seepage run measurements conducted by NMISC and the USGS (in cfs per mile) the model seepage losses make sense.

The calibration work is completed and the middle valley portion of the model will be merged into URGWOM. The merging of the models will be completed soon, so the master model will be used for the AOP runs.

Lower Rio Grande Model

Amy and Nabil presented on the development of the daily timestep RiverWare model for the Lower Valley below Elephant Butte Dam by Hydros Consulting. The presentation covered the model overview, model representations, surface water and ground water interactions, summary of the latest work completed on Lower Rio Grande model and next steps.

The model simulates river and reservoir operations using historical data or historical inflows. The rules reflect the 2008 D3 Operating Agreement. The historical hydrology covers the period from 1975 through 2010. An overview was presented of each of the divisions of the Lower Rio Grande model. To represent the surface water and ground water interactions, a single ground water object is under an irrigated sub-area and an associated groundwater object is beneath the adjacent reach object.

Discrepancies in drain flows as compared to gage data were found especially in Rincon and El Paso valleys because of coarse scale of ground water objects, lack of reliable drain, wasteway and municipal flow data. Also, there is a timing issue of observed river headgate diversions with historical estimated consumptive irrigation requirement. Calibration of alluvial aquifer objects

in El Paso was inadequate because groundwater interaction between Mexico and El Paso is not modeled because no groundwater data for Mexico could be found.

Next steps for Lower Rio Grande model are enhancements, calibration and merging the Lower and Middle valley portions. Enhancements include adding integer-timestep lag times to the model, addressing issue of daily CIR values, refinement of D3 policy, addition of alluvial aquifer objects on Mexico side of Rio Grande, obtain additional data for EP#1 area of model below Courchesne Bridge, add local inflow points, and general improvements to ruleset efficiency and model usability.

Watershed Modeling

Marc presented on the Watershed Modeling that included discussion of the West Gulf River Forecast Center (WGRFC) model and the HMS models being developed by USACE.

Ongoing work for the WGRFC model includes testing of SNOTEL data uploads, software conversion, data export to URGWOM and database management. The first watershed model forecast results will be ready for the March 1st AOP, followed by an updated forecast every two weeks thereafter until May 1st, and monthly thereafter.

Watershed Modeling was initiated by previous USACE and New Mexico Interstate Stream Commission (NMISC) Technical Team members. This work will be completed by a contractor with funding from USACE in federal Fiscal Year 2014 or 2015 due to the workload of current Technical Team members.

The rainfall-runoff methods HMS model for warm season has recently been completed and the snowmelt-runoff methods in an HMS model for cold season will be completed in federal Fiscal Year 2014. USACE will advance Corps Water Management System (CWMS) in Upper Rio Grande Basin by developing and adding an HMS model and by integrating the URGWOM RiverWare model. In real-time, the HMS model will provide an alternative to flow forecasts provided by the WGRFC. Due to catastrophic fires, runoff issues are a big concern.

myUSGS

It was agreed upon that access to the myUSGS site will be for URGWOM Technical Team members only. If the public or students request information, the appropriate member will provide the needed information.

Water Quality Modeling

Due to time constraints, this topic was not discussed at this meeting; however, it will be discussed at the next meeting.

The meeting notes and slides for Upper Rio Grande Impacts Assessment (URGIA) of the West Wide Climate Risk Assessment (WWCRA), Middle Valley Calibration, Lower Rio Grande, and Watershed Modeling will be posted on the website, <http://www.spa.usace.army.mil/Missions/CivilWorks/URGWOM/CommitteeNotes/ExecutiveCommitteeNotes.aspx>

The next Executive Committee meeting will be held May 15, 2014 at 9:00 am. The next meeting topics will include water quality modeling, accounting model with merged Lower Rio Grande and Colorado portions and others.

The next Advisory Committee meeting will be held January 28, 2014.

The meeting adjourned at 11:30 am.

URGWOM Executive Committee Meeting
December 5, 2013

Attendance List

NAME	ORGANIZATION
Carolyn Donnelly	U.S. Bureau of Reclamation
Dagmar Llewellyn	U.S. Bureau of Reclamation
Amy Louise	U.S. Army Corps of Engineers, Albuquerque District
Jesse Roach	Sandia National Labs
Nabil Shafike	NM Interstate Stream Commission
Marc Sidlow	U.S. Army Corps of Engineers, Albuquerque District
Mark Yuska	U.S. Army Corps of Engineers, Albuquerque District



Executive Committee Meeting

December 5, 2013 – 9:00 am

Conference Room – New Mexico Interstate Stream Commission,
5550 San Antonio Drive NE, Albuquerque, NM 87109

Agenda

1. Climate Change Modeling – URGSiM
2. Middle Valley Calibration
3. Lower Rio Grande Models update
4. Watershed Modeling – NWS model & HMS models
5. Water Quality
6. myUSGS
7. Other Business
8. Next Meeting Date