

Development of an Integrated Physical and Engineering Hydrologic Model of the Rio Grande

Douglas P. Boyle, Ramon Naranjo, Department of Hydrologic Sciences, Desert Research Institute, Reno, NV, dboyle@dri.edu; Steven L. Markstrom, and George Leavesley, U.S. Geological Survey, Lakewood, CO, george@usgs.gov, markstro@usgs.gov

Abstract: Researchers at the Desert Research Institute and the USGS are conducting SAHRA-related research aimed at developing an integrated physical and engineering hydrologic model for the purpose of investigating the feasibility of water banking and markets in the Rio Grande watershed. The main components of the integrated model will include a detailed representation of system behavior in (1) headwater areas (snow accumulation and melt); (2) surface reservoirs and conveyance systems (operational surface reservoirs, river routing, and diversions/returns); (3) regional and near river aquifers; (4) agricultural demand and uses; and (5) urban and industrial demand and uses. Existing models of several of these components have been identified and will be included, to some degree, in the final integrated model (e.g., URGWOM, MMS-PRMS, and various USGS groundwater models). Coupling of existing and new models of each component to create the final completely integrated model will require a detailed understanding of the problem requirements (what questions are being asked) and the data (what information is available in the hydrologic data). Once developed and tested, the integrated model will be used with the economic Market model and Behavior model to investigate several water market and banking scenarios.