

TR-297

The Development of a Coordinated Database for Water Resources and Flow Model in the Paso Del Norte Watershed

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This report fulfills the deliverables required by the cooperative agreement between the U.S. Army Corps of Engineers and Texas Agricultural Experiment Station (TAES/03-PL-02: Modification No. 2) on behalf of the Paso del Norte Watershed Council. Tasks accomplished in this phase include (a) review of hydrological models in the region; (b) conceptual model of the Rio Grande flow; and (c) linkage protocol of the coordinated database and hydrological models. In addition, a training workshop on the RiverWare model was offered to regional water stakeholders. Twenty-four trainees attended the workshop at New Mexico State University on December 15-17, 2004. The Project Team also provided review on the FLO-2D model simulation of the Rio Grande flood control scenarios at the U.S. IBWC on August 3, 2005, review of QA/QC procedures of the real-time data collection, and assessment of regional orthophotographic images in 2005.

This Project was conducted by researchers at Texas A&M University (TAMU) and New Mexico State University (NMSU) under the direction of Zhuping Sheng of TAMU. It was developed to enhance the coordinated database, which was originally developed by the Paso del Norte Watershed Council with support of El Paso Water Utilities to fulfill needs for better management of regional water resources and to expand the Upper Rio Grande Water Operations Model (URGWOM) to cover the river reaches between Elephant Butte Dam, New Mexico and Fort Quitman, Texas. In Phase I of this Project (TAES/03-PL-02), hydrological data needed for flow model development were compiled and data gaps were identified. The objectives of this phase were to develop a conceptual model of the Rio Grande flow between Elephant Butte Dam and American Dam by using data collected in the first development phase of the PdNWC/Corps Coordinated Water Resources Database and to enhance the data portal capabilities of the PdNWC Coordinated Database Project.

The first part of this report (corresponding to Task Five of the contract for the Development of a Coordinated Database and GIS for Water Related Resources in the Rio Grande Watershed, written by Sue Tillery, Phillip King and Zhuping Sheng), summarizes the hydrological models developed for surface water and groundwater flows and management of regional water resources in terms of model configuration, advantages, and limitations of each modeling approach. This part of the report also identifies and verifies the availability of relevant hydrological data needed for development of the RiverWare model, especially hydrology of drain return flows. Based on previous modeling studies, the authors evaluated reasonable simplifications (through the use of look-up tables or similar tools) of interaction of surface and groundwater within the Mesilla Basin and Rincon Valley and developed the RiverWare conceptual model for the Rio Grande flow for the selected reaches and within the limits of available data.

The second part of this report was written by C. Brown and B. Creel and summarizes the data portal enhancements to the PdNWC Coordinated Database for its linkage to the URGWOM development. This part of the report describes enhancements to the data portal capabilities of the Project through the development of a low-end user interface that would serve GIS-based graphics of each data set and enhanced metadata of relevant data sets. A literature search of bibliographic resources detailing GIS-based hydrologic modeling in the Paso del Norte region and linkages to these resources are provided via portions of the Project website.

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