Report as of FY2010 for 2002NM1B: "Geographic Information System for Water Resources Research Planning"

Publications

- Articles in Refereed Scientific Journals:
  - Kambhammettu, B.V.N.P., J.P. King and A. Praveena. 2011. Evaluation of mountain-front recharge estimation techniques for Southern New Mexico basins. International Journal of Water Resources and Environmental Engineering. 3(3): 66-72.
  - Schmid, W., J.P. King, and T. Maddock III. 2010 Conjunctive Surface-Water / Groundwater Model in the Southern Rincon Valley Using Modflow-2005 with the Farm Process. NM Water Resources Research Institute, NM State University, Technical Completion Report No. 351. 65 pp.
- Other Publications:
  - Sandor, J., Minnis, P, and Hawley, J., 2010, On Mimbres farms and terraces: 16th Biennial Mogollon Archaeology Conference, October 14-16, 2010; Department of Anthropology, New Mexico State University-Las Cruces; Abstracts, p. 19-20.
  - Servicio Geologico Mexicano, Coordinacion General de Mineria, and International Boundary and Water Commission, 2011. Hydrogeological Activities in the Conejos-Medanos/Mesilla Basin Aquifer, Chihuaha, Phase 1. Prepared for the Transboundary Aquifer Assessment Act Project under contract with the New Mexico Water Resources Research Institute and Texas Water Research Institute. Two volumes.

Report Follows

Problem and Research Objectives

The New Mexico Water Resources Research Institute has become the focal point for geographic information system (GIS) data and information concerning water resources in New Mexico. It combines database management with digital mapping into spatial-tabular data models. These models are powerful tools for representing and manipulating earth-science information.

As use of geographic information systems has grown and presented new opportunities, it also has raised a number of new issues and problems. Of increasing concern is the management of a growing collection of spatial data sets and applications programs. These data sets and programs are very expensive to produce but relatively easy to share, so there is a great incentive to avoid duplicating production efforts. The trend clearly is toward managing these elements in distributed spatial libraries.

The primary objective of the project is to increase availability and accessibility of water resource information to support water resource planning and management in the state. The first task provides spatial data library accessibility. This task maintains arrangements and establishes those necessary to provide access to spatial data maintained by other agencies and organizations. The second task, spatial data development, evaluates needs, establishes priorities, and undertakes development of spatial data that is otherwise unavailable. These efforts will be coordinated with cooperating agencies and organizations to ensure no duplication of effort and to establish guidelines for coverages and priorities. The principal investigators maintain, update as necessary, and make the data available to cooperating agencies and organizations through both formal and informal arrangements to facilitate water resource planning activities.

Methodology

A number of cooperative data sharing agreements have been entered into with state, federal, and local agencies and organizations to facilitate access and to develop spatial data. Others will be pursued as necessary. Research funded by the NMWRRI in many cases results in the development of data that can be represented in a spatial form and thus can contribute to the state data pool. Projects that have such a potential are adjusted as necessary to meet this secondary purpose.

The NMWRRI maintains a GIS laboratory consisting of computer workstations; data storage devices; input/output devices; software for mapping and analysis (ARC/Info); database development and visualization; and network systems. The laboratory is connected via fiber to the New Mexico State University computer network and thereby to the Internet. The NMWRRI also maintains an Internet web server site through which both spatial and tabular water resource data can be provided.

Principal Findings

Various research activities are supported by the system for water resources planning in the state. The New Mexico Interstate Stream Commission provides grants to regional groups to support water resources planning. NMWRRI continues to be utilized by the NM Interstate Stream Commission to provide GIS mapping products for use in their plans and in public outreach. NMWRRI has helped many regional groups with GIS mapping products for use in their plans and in public outreach efforts.

Additionally, support has been given to the New Mexico/Texas Water Commission and various public entities of southern New Mexico for their planning activities. GIS mapping support is also provided to the Lower Rio Grande Water Users Organization.

This sophisticated mapping and geo-spatial database management system, originally designed to support WRRI-funded research activities, is now being used for external research grants (e.g., Creation of a Digital Hydrogeologic Framework Model of the Mesilla Basin and Southern Jornada del Muerto Basin; creation of maps for the purpose of water planning funded by the New Mexico Interstate Stream Commission; and pesticide management planning in the state funded by the New Mexico Department of Agriculture) by water resources management and planning agencies in the state. A research grant resulted in the creation of a regional geographic information system to support water planning in the Paso del Norte borderland area of the southwestern United States.

During the reporting period, projects funded through the GIS lab were sponsored by the New Mexico Department of Agriculture, the USGS, the Southwest Consortium for Environmental Research & Policy, and the National Park Service.

This is an ongoing project with new data continually being added to the database and assistance being given to produce specific GIS products upon request. Continued funding is anticipated from annual state appropriations as well as pending agency awards.