



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2004TX150B

Title: Estimating Water Availability and Sustainable Yield in a Coastal Semi-Arid Region of South Texas

Project Type: Research

Focus Categories: Groundwater, Models, Water Supply

Keywords: Groundwater availability, groundwater modeling, sustainability, water use

Start Date: 03/01/2004

End Date: 02/28/2005

Federal Funds: \$5,000

Non-Federal Matching Funds: \$31,658

Congressional District: 15th

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Abstract

The objective of this project is to develop a practical and easy to use methodology to assess water availability in South Texas groundwater systems near Refugio County. The project will use the fundamental concepts of water balances as the theoretical framework to model groundwater supplies in the region. This study seeks to develop a simulation of a multiple layer aquifer system that represents real world conditions. In basic terms, the model will determine groundwater availability or accumulation as a result of the amount of water flowing into and out of the system.

To gather needed data, a field sampling and testing program will collect information about infiltration rates. Spatial data will be used to identify sampling locations. Evapotranspiration will be measured using micro-lysimeters on at least a quarterly basis to characterize changes over time. Average fluctuations in groundwater levels will be obtained from a network of monitoring wells managed by the Texas Water Development Board as well as field sampling now being carried out by Texas A&M University-Kingsville (TAMUK). Baseflows to streams and rivers will be calculated with the

HYSEP computer model developed by the U.S. Geological Survey, and will be augmented with data from field studies at TAMUK. Climate data from the National Weather Service will be used to obtain rainfall trends. Geographic Information System (GIS) tools will be used to manage and analyze this data and present results spatially using computer-generated maps. A computational method called “fuzzy regression” will be utilized to analyze and refine statistical outliers.

This project is supported with cooperation from the Refugio Groundwater Conservation District and other partners. District personnel and other stakeholders in the region will work with the research team to identify missing data needed to appropriately model the region’s aquifers. Stakeholder will be incorporated into ongoing data gathering, modeling, and analyses activities throughout this project. It is anticipated that this project will provide new information about infiltration and evapotranspiration processes that affect groundwater availability in this region. Research results will be presented in easy to use spreadsheets for use by stakeholders, water resources managers, and decision makers.