# Linking Hydrological Models for Watershed Mangement

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BACKGROUND

A better understanding of the temporal and spatial variability of flow and salinity of surface water and the underlying alluvial aquifer is essential to develop management strategies for river operation and salinity control in the Rio Grande Basin. The high concentrations of dissolved solids in lower reaches of Rio Grande are a major concern for water resource managers and water users. To address this issue, the TAMU, teaming with UTEP, NMSU and the UACJ team are developing the SWAT model for the hydrology within the selected watershed, RiverWare models to simulate the river flow for the reaches between the Elephant Butte reservoir and Fort Quitman with the addition of salinity component to the current RiverWare model that was developed by TAMU. Modeling both flow and salinity in the lower Rio Grande is very useful for making management decisions to maintain optimal river ecosystem health while meeting downstream water delivery requirements.

Rio Grande Project Study Area
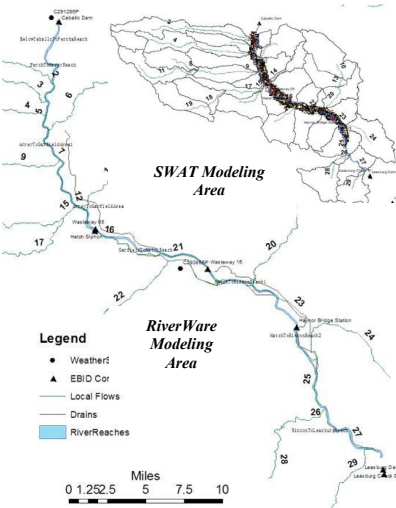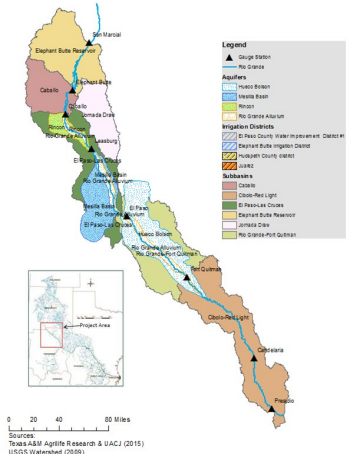
Linked Models for Rincon Valley

METHODS

- Collect and compile necessary data and analyses to expand the RiverWare® model for water operations and salinity modeling in the Rincon Valley, Mesilla Basin, El Paso lower valley and District 009 in Mexico.
- Integrate the RiverWare model to simulate river flow and water operations scenarios for the entire study area (from Caballo Dam in New Mexico to Fort Quitman in TX) with enhancement in crop water consumption.
- Augment salinity modeling to the current the RiverWare water quantity model using RiverWare's water quality modeling approach.
- Link the SWAT and RiverWare models in Rincon Valley to experiment the inclusion of runoffs from local ungauged arroyos in improving the accuracy of RiverWare operation model.
- Flow and salt exchange between the surface water and adjacent aquifer (groundwater objects) is computed, and the transport of salt through the system is tracked using discretized salt and post-process approaches in RiverWare.

PROGRAM RESULTS AND BENEFITS

- Workshops and training for water resources stakeholders are being held to demonstrate SWAT & RiverWare modeling and their linkage.
- Linked models deliver the better quantification of temporal and spatial flow and salt exchange patterns between the river and the underlying aquifer and provide better guidelines for water resources planning and decision-making in river operations and salinity control in the arid environment.
- Hydrologic simulations in this project will benefit regional stakeholders in numerous ways: Better controlling flood surges with more responsive water quantity and quality management strategies; assisting irrigation districts, water utilities, and federal water operators to more effectively and efficiently manage water deliveries and salinity.