

Development of a Groundwater Availability Model for the Central Gulf Coast Region of Texas

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Abstract

A three-dimensional groundwater model is being developed as part of the Groundwater Availability Modeling (GAM) program of the Texas Water Development Board. MODFLOW is used for these groundwater models. The key hydrostratigraphic units include the Chicot Aquifer, Evangeline Aquifer, the Burkeville Confining Unit, and the Jasper Aquifer. The Central Gulf Coast GAM is one of three Gulf Coast GAMs and extends from the basin divide between the Colorado and Brazos Rivers and the Colorado-Brazos and Brazos River basins in the northeast and an approximate flow line coincident with the middle of JimHogg/Brooks/Kenedy counties in the south. The conceptual model was developed based on a detailed review of data sources for aquifer system geometry (geology, hydrostratigraphy, outcrops, river basins, and GAM boundaries), hydraulic properties, water levels, recharge, and discharge (pumping and groundwater/surface water interaction). Water-level observations were used from wells that were screened in a single structure, and had observed water levels similar to neighboring wells. A technique was applied that allowed recharge to vary spatially and temporally across the model domain. The model is being calibrated to predevelopment water-level conditions and to transient water-level conditions from 1980–1990. An overview of the model conceptualization, predevelopment calibration, and transient model calibration is presented. The completed GAM is intended for use as a basis for performing basin specific studies to assess groundwater availability under various water management strategies and potential well-field designs.