3D Hydrostratigraphic Model of the Tertiary Aquifers, Fayette County, Texas

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ABSTRACT

Texas SB 1763 requires each regional water planning group to declare a Desired Future Condition (DFC) for 2060 for its surface and groundwater resources by September 2010. Counties and/or groundwater districts are scrambling to better understand the impact of groundwater level fluctuations on stream and spring flows caused by future demands. Daniel B. Stephens & Associates Inc. completed a 3D hydrostratigraphic analysis for the Fayette County Groundwater Conservation District (FCGCD). The county presently depends on groundwater from the Gulf Coast, the Yegua-Jackson, and the Sparta aquifers. This study also delineated deeper (to 7,000 feet) and potentially future brackish aquifers, including the Queen City, Carrizo, and Wilcox (Simsboro). Well data was obtained from the FCGCD, the Texas Water Development Board (TWDB) Water Information Integration and Dissemination (WIID) database and the Texas Commission on Environmental Quality (TCEQ) state well reports database. A total of 413 driller's reports and geophysical logs were used to build the 3D hydrostratigraphic framework using ArcGIS and C-Tech's Mining Visualization Software (MVS). Driller's reports were screened for location accuracy, well depth, lithologic description, and screen interval, with approximately 35% passing screening criteria. Recent water levels were used to create a piezometric surface in the 3D hydrostratigraphic model and saturate the delineated lithology. Net saturated sands were delineated and volumetric calculations were completed for each Tertiary aquifer. The modeling effort assisted the FCGCD in making a decision on their DFC.

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