GAM run 05-28

by Shirley Wade

Texas Water Development Board
Groundwater Availability Modeling Section
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REQUESTOR:

Ed Walker, General Manager for Wintergarden Groundwater Conservation District

DESCRIPTION OF REQUEST:

Mr. Walker requested the following information for his district from the southern part of the Groundwater Availability Model (GAM) for the Queen City and Sparta aquifers (which includes the Carrizo-Wilcox aquifers):

- recharge.

METHODS:

To address the request, we:

- ran the steady-state model for the southern part of the Queen City and Sparta aquifers GAM and extracted groundwater budget information including long-term average recharge for Dimmit, La Salle, and Zavala counties.

PARAMETERS AND ASSUMPTIONS:

We used the following assumptions in this analysis:

- see Deeds and others (2003) and Kelley and others (2004) for assumptions and limitations of the GAM, and
- recharge represents long-term average climatic conditions.

RESULTS:

Recharge and Water budget

A groundwater budget summarizes how the model estimates water entering and leaving the aquifer. The groundwater budget for the steady-state model is shown in Table 1. The total recharge for Dimmit, La Salle, and Zavala counties from the GAM is 48,452 acre-feet per year. Total recharge in Table 1 represents contributions to the aquifer from precipitation entering the system where the geologic unit containing the aquifer is exposed at the surface. Some groundwater conservation districts consider recharge for their management plans to equal total recharge. Other groundwater conservation districts consider a net value, such as total recharge minus evapotranspiration which is 45,050 acre-feet per year.

Table 1. Groundwater flow budget for Dimmit, La Salle, and Zavala counties in the steady-state GAM of the southern part of the Queen City and Sparta aquifers.

Flow Term	*Flow (acre-ft/year)*
Lateral flow in	28,213
Lateral flow out	-20,682
Upward Leakage to younger layers	-14,568
Recharge	48,452
Evapotranspiration	-3,402
Net Stream Leakage	-37,834

In Table 1 a negative sign refers to flow out of the aquifer in Dimmit, La Salle, and Zavala counties. A positive sign refers to flow into the aquifer in Dimmit, La Salle, and Zavala counties. All numbers are rounded to the nearest 1 acre-foot. Values are probably only accurate to two significant figures.

REFERENCES:

Deeds, N., Kelley, V., Fryar, D., and Jones, T., 2003, Groundwater availability model for the southern Carrizo-Wilcox aquifer: final report prepared for the Texas Water Development Board by INTERA Inc.

Kelley, V. A., Deeds, N. E., Fryar, D. G., Nicot, J. P., Jones, T. L., Dutton, A. R., Bruehl, G., Unger-Holtz, T., and Machin J. L., 2004, Groundwater availability model for the Queen City and Sparta aquifers: final report prepared for the Texas Water Development Board by INTERA Inc.