

GAM run 03-10

by Shirley Wade

Texas Water Development Board
Groundwater Availability Modeling Section
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REQUESTOR:

Mr. Harvey Everheart, Mesa Underground Water Conservation District

DESCRIPTION OF REQUEST:

Mr. Everheart requested the following information from the Southern Ogallala aquifer Groundwater Availability Model (GAM) for the Mesa Underground Water Conservation District (UWCD):

- Water budget and
- Total available storage.

METHODS:

To address the request, we:

- Ran the transient (1939-2000) model for the Southern Ogallala aquifer Groundwater Availability Model (Blandford and others, 2003) and queried the budget files in Dawson County for 1990, 1996, 1999, and 2000; and
- Estimated total aquifer storage in 1996.

PARAMETERS AND ASSUMPTIONS:

None: Data request.

RESULTS:

Recharge and Water budget

Table 1 shows the water budget for the Southern Ogallala GAM model in Dawson County for the years 1990, 1996, 1999, and 2000. Recharge values from the model are listed in the table.

Aquifer Storage

The total volume of water stored in the aquifer in 1996 from the Southern Ogallala GAM was 7.4 million acre-ft. This number was calculated by:

- subtracting the base elevation of the aquifer from the modeled 1996 water levels for each model cell,
- multiplying by the specific yield for the cell (ranging from 0.15 to 0.22), and the area of the cell (1 mi²), and
- summing over all of the cells in Dawson County.

Note: in some areas of Dawson County modeled water levels for 1996 were greater than observed water levels and in some other areas modeled water levels were less than observed water levels.

REFERENCES:

Blandford, T. N., Blazer, D. J., Calhoun, K. C., Dutton, A. R., Naing, T., Reedy, R. C., and Scanlon, B. R., 2003, Groundwater Availability of the Southern Ogallala Aquifer in Texas and New Mexico; Numerical Simulations Through 2050: Final Report prepared for the Texas Water Development Board.

Table 1. Dawson County flow budget for the Southern Ogallala aquifer GAM in acre-feet per year.

Year	Out-of-Storage	In-to-Storage	X-flow in	X-flow out	Wells	Springs and Seeps	Recharge	Total		% diff
								In	Out	
1990	549	-35,560	5,413	-6,824	-22,938	-3,465	62,802	68,764	-68,787	-0.03
1996	38,139	-23,919	5,761	-6,980	-72,022	-3,701	62,704	106,604	-106,623	-0.02
1999	16,760	-24,749	5,951	-7,070	-49,727	-3,794	62,604	85,315	-85,341	-0.03
2000	6,292	-30,995	5,846	-7,192	-32,634	-3,830	62,504	74,641	-74,652	-0.01

Notes:

1. **In-to-storage** refers to water put into storage
2. **Out-of-storage** refers to water withdrawn from storage
3. **X-flow in** refers to lateral flow into the county.
4. **X-flow out** refers to lateral flow out of the county.
5. **Wells** is for pumping input.
6. A negative sign refers to flow out of the aquifer in the county.
7. A positive sign refers to flow into the aquifer in the county.
8. The numbers are rounded to the nearest 1 acre-ft.