

GAM Run 08-79 Addendum

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Groundwater Availability Modeling Section
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EXECUTIVE SUMMARY:

We extracted aquifer and potentiometric thickness information from each of the aquifer units in the northern portion of the Gulf Coast Aquifer in Southeast Texas Groundwater Conservation District.

REQUESTOR:

The Board of Directors for Southeast Texas Groundwater Conservation District

DESCRIPTION OF REQUEST:

The Board of Directors for Southeast Texas Groundwater Conservation District requested aquifer thickness information for the aquifer units that make up the northern portion of the Gulf Coast Aquifer within the district on April 9, 2009 during a presentation and discussion of the draft results of groundwater availability model runs 08-79 and 08-80 (Oliver, 2009a; Oliver 2009b). The purpose of the aquifer thickness and potentiometric thickness maps is to provide a context for the water level change figures presented in groundwater availability model run reports 08-79 and 08-80.

METHODS:

The top and bottom of each aquifer unit, as well as the water levels in each aquifer unit at the end of 2005, was extracted from the groundwater availability model for the northern portion of the Gulf Coast Aquifer. Water levels from the end of 2005 were chosen because these were the initial water levels for the predictive simulations of groundwater availability model runs 08-79 and 08-80 (Oliver, 2009a; Oliver, 2009b). The aquifer thickness in each cell in each aquifer unit was calculated as the difference between the bottom of the aquifer unit and the lesser of either top of the aquifer unit or the water level. Aquifer thickness, therefore, represents the thickness of the saturated portion of the aquifer formation.

In the confined portions of the aquifer, the water level as measured in a well (hydraulic head) is typically above the top of the aquifer formation. For this reason, potentiometric thickness was also calculated in each cell in each aquifer unit as the difference between the water level in 2005 (e.g. Figure 3 of Oliver, 2009a) and the bottom of the aquifer. Potentiometric thickness represents the maximum amount of water level change that could occur at a given point.

PARAMETERS AND ASSUMPTIONS:

The parameters and assumptions are described below:

- We used Version 2.01 of the groundwater availability model for the northern portion of the Gulf Coast Aquifer. See Kasmarek and Robinson (2004) and Kasmarek and others (2005) for assumptions and limitations of the model.
- The model includes four layers representing the Chicot Aquifer (Layer 1), the Evangeline Aquifer (Layer 2), the Burkeville Confining Unit (Layer 3), and the Jasper Aquifer (Layer 4).
- See groundwater availability model run reports 08-79 and 08-80 for parameters and assumptions for the model runs (Oliver, 2009a; Oliver, 2009b).

RESULTS:

The aquifer thicknesses of the Chicot, Evangeline, and Jasper aquifer units of the northern portion of the Gulf Coast Aquifer are presented in Figures 1, 2, and 3, respectively. The potentiometric thicknesses of the same units are presented in Figures 4, 5, and 6, respectively. In general the aquifer thicknesses and potentiometric thicknesses are lower near the outcrop areas of the aquifers (northern boundary in the district) and increase toward the south.

REFERENCES:

Kasmarek, M.C., and Robinson, J.L., 2004, Hydrogeology and simulation of groundwater flow and land-surface subsidence in the northern part of the Gulf Coast aquifer system, Texas: U.S. Geological Survey Scientific Investigations Report 2004-5102, 111 p.

Kasmarek, M.C., Reece, B.D., and Houston, N.A., 2005, Evaluation of groundwater flow and land-surface subsidence caused by hypothetical withdrawals in the northern part of the northern part of the Gulf Coast aquifer system, Texas: U.S. Geological Survey Scientific Investigations Report 2005-5024, 70 p.

Oliver, W., 2009a, GAM run 08-79: Texas Water Development Board, GAM Run 08-79 Report, 18 p.

Oliver, W., 2009b, GAM run 08-80: Texas Water Development Board, GAM Run 08-80 Report, 18 p.



Cynthia K. Ridgeway is Manager of the Groundwater Availability Modeling Section and is responsible for oversight of work performed by employees under her direct supervision. The seal appearing on this document was authorized by Cynthia K. Ridgeway, P.G., on April 14, 2009.

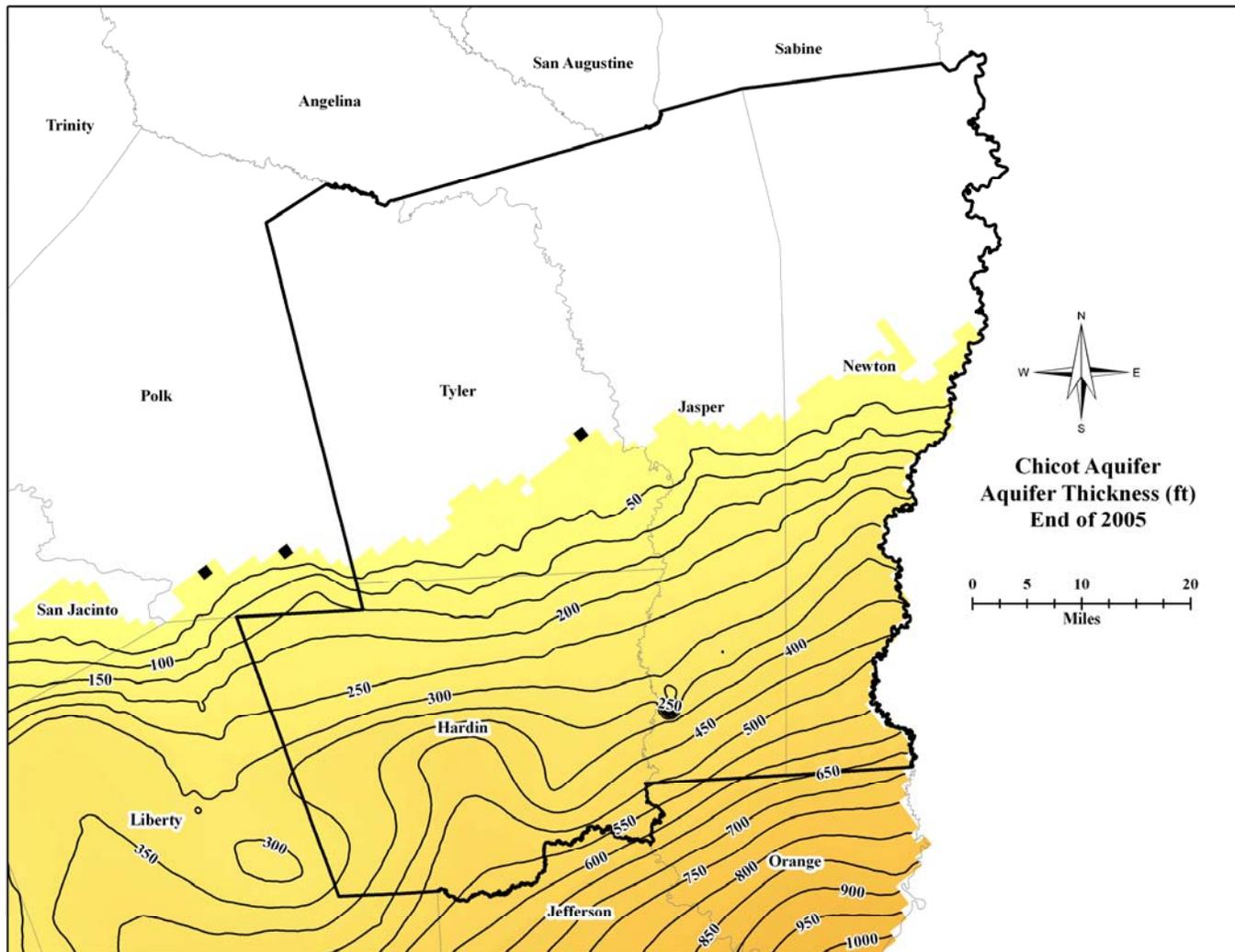


Figure 1. Thickness of the Chicot Aquifer portion of the Gulf Coast Aquifer at the beginning of the predictive groundwater availability model runs described in Oliver, 2009a and Oliver, 2009b. Thickness values are in feet. Contour interval is 50 feet. Black areas indicate model grid cells that are dry. The black border indicates the boundary of the district.

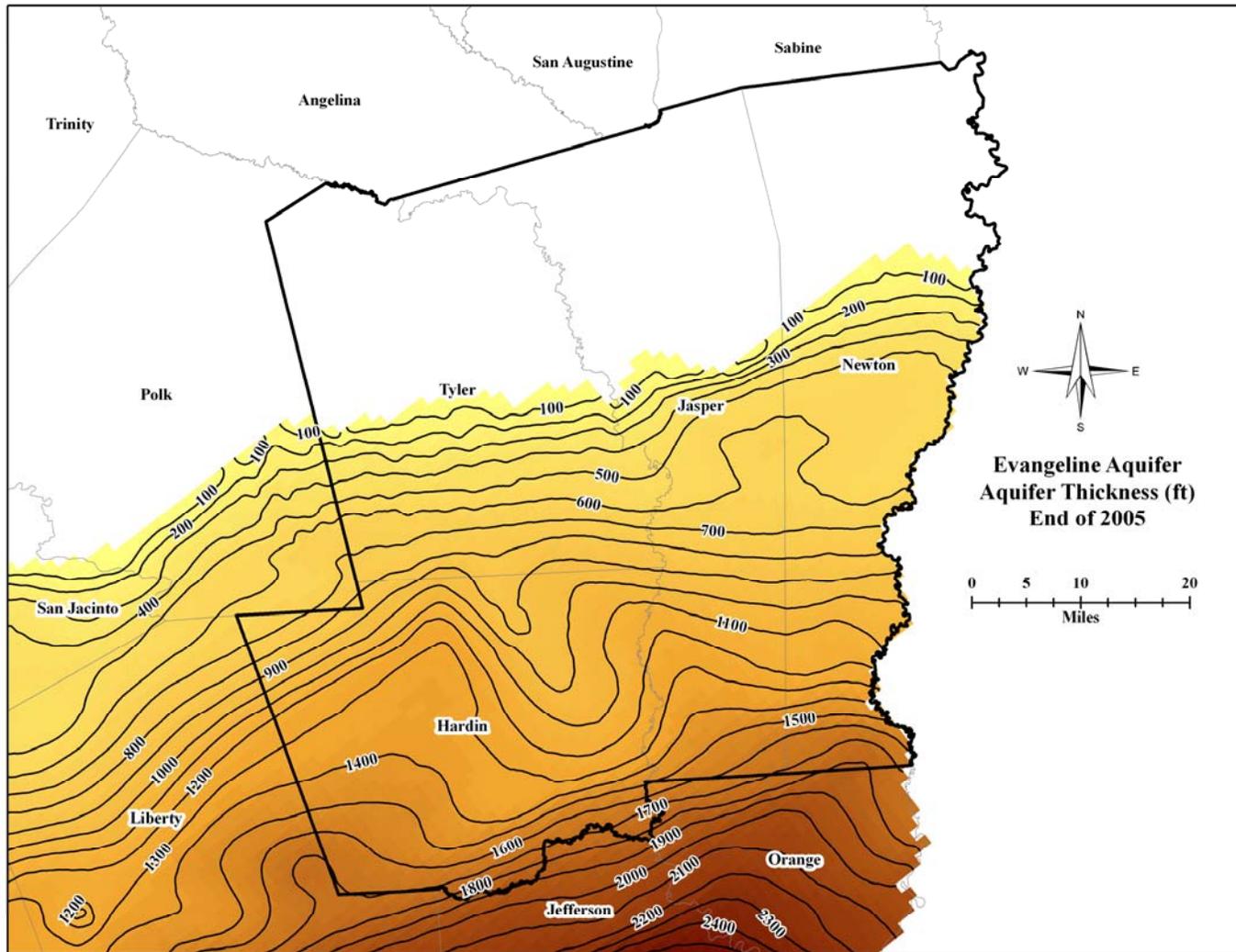


Figure 2. Thickness of the Evangeline Aquifer portion of the Gulf Coast Aquifer at the beginning of the predictive groundwater availability model runs described in Oliver, 2009a and Oliver, 2009b. Thickness values are in feet. Contour interval is 100 feet. The black border indicates the boundary of the district.

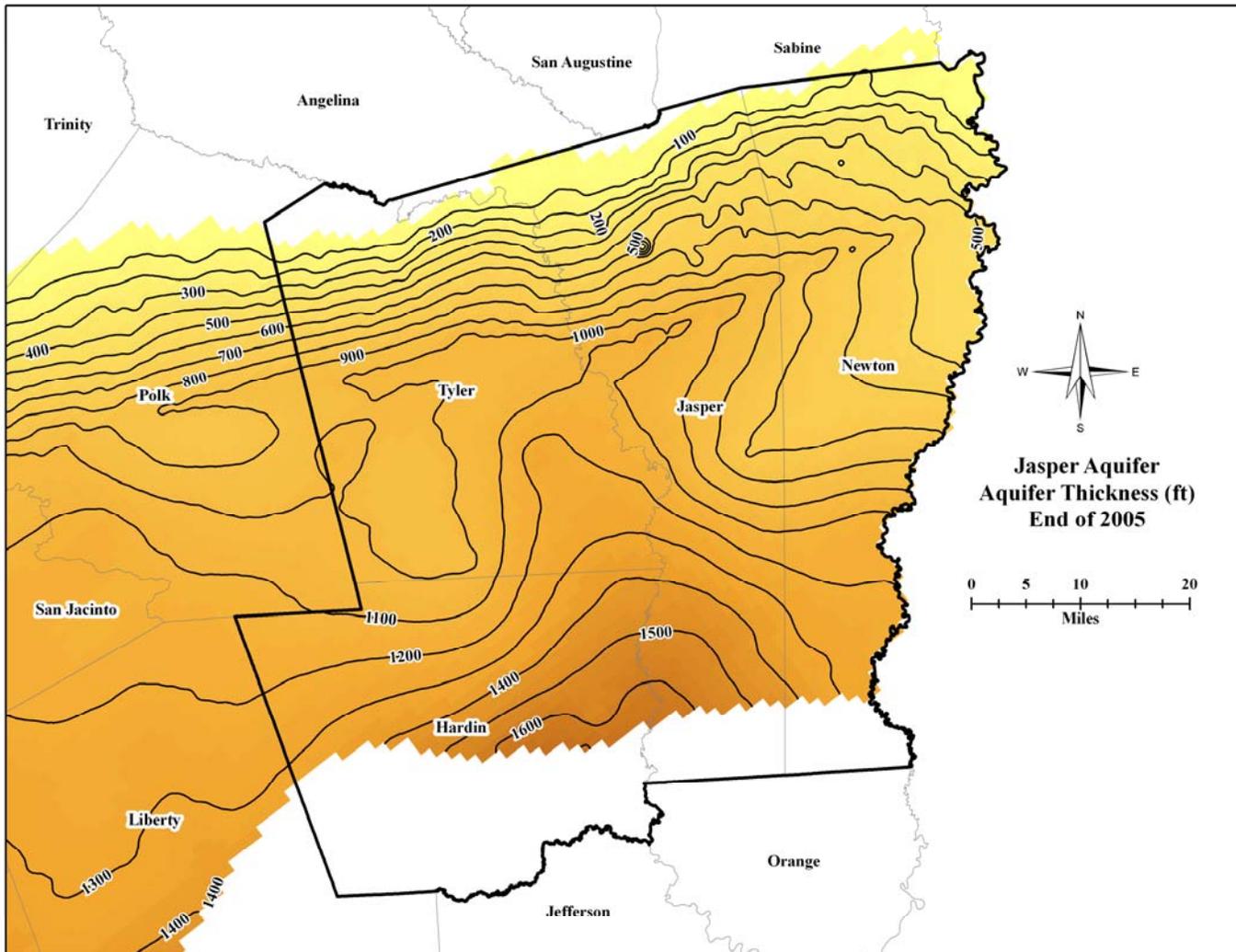


Figure 3. Thickness of the Jasper Aquifer portion of the Gulf Coast Aquifer at the beginning of the predictive groundwater availability model runs described in Oliver, 2009a and Oliver, 2009b. Thickness values are in feet. Contour interval is 100 feet. The black border indicates the boundary of the district.

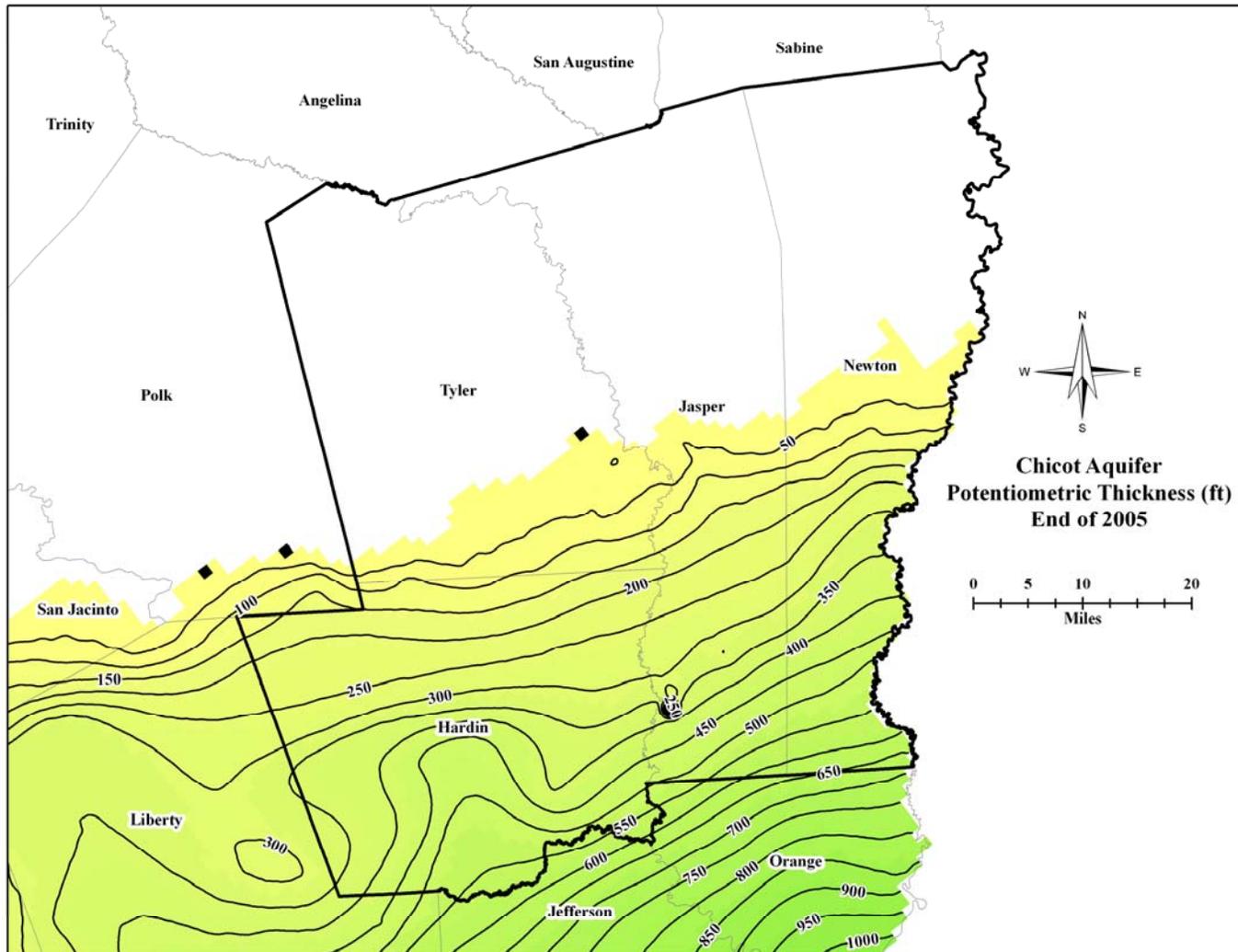


Figure 4. Potentiometric thickness of the Chicot Aquifer portion of the Gulf Coast Aquifer at the beginning of the predictive groundwater availability model runs described in Oliver, 2009a and Oliver, 2009b. Thickness values are in feet. Contour interval is 50 feet. Black areas indicate model grid cells that are dry. The black border indicates the boundary of the district.

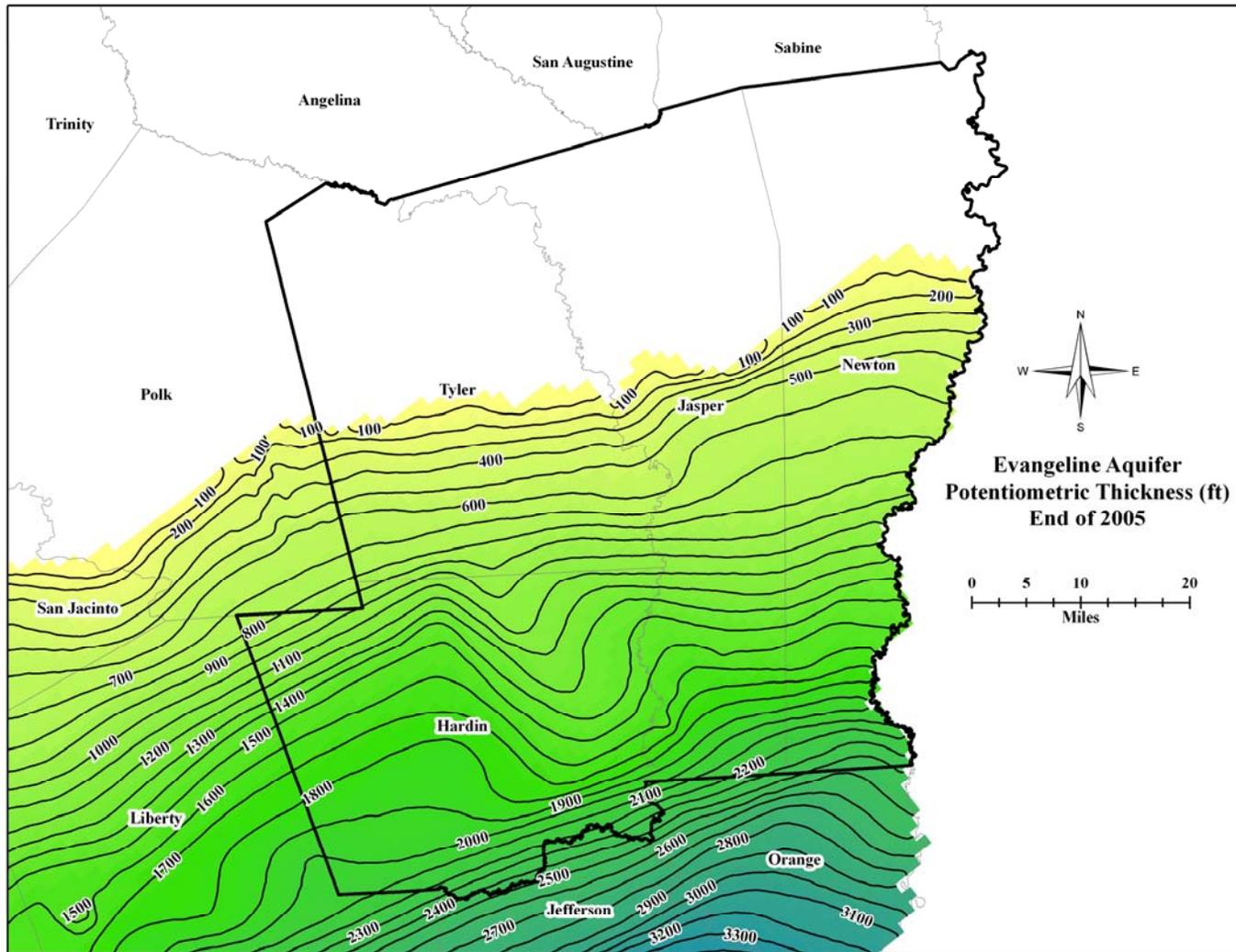


Figure 5. Potentiometric thickness of the Evangeline Aquifer portion of the Gulf Coast Aquifer at the beginning of the predictive groundwater availability model runs described in Oliver, 2009a and Oliver, 2009b. Thickness values are in feet. Contour interval is 100 feet. The black border indicates the boundary of the district.

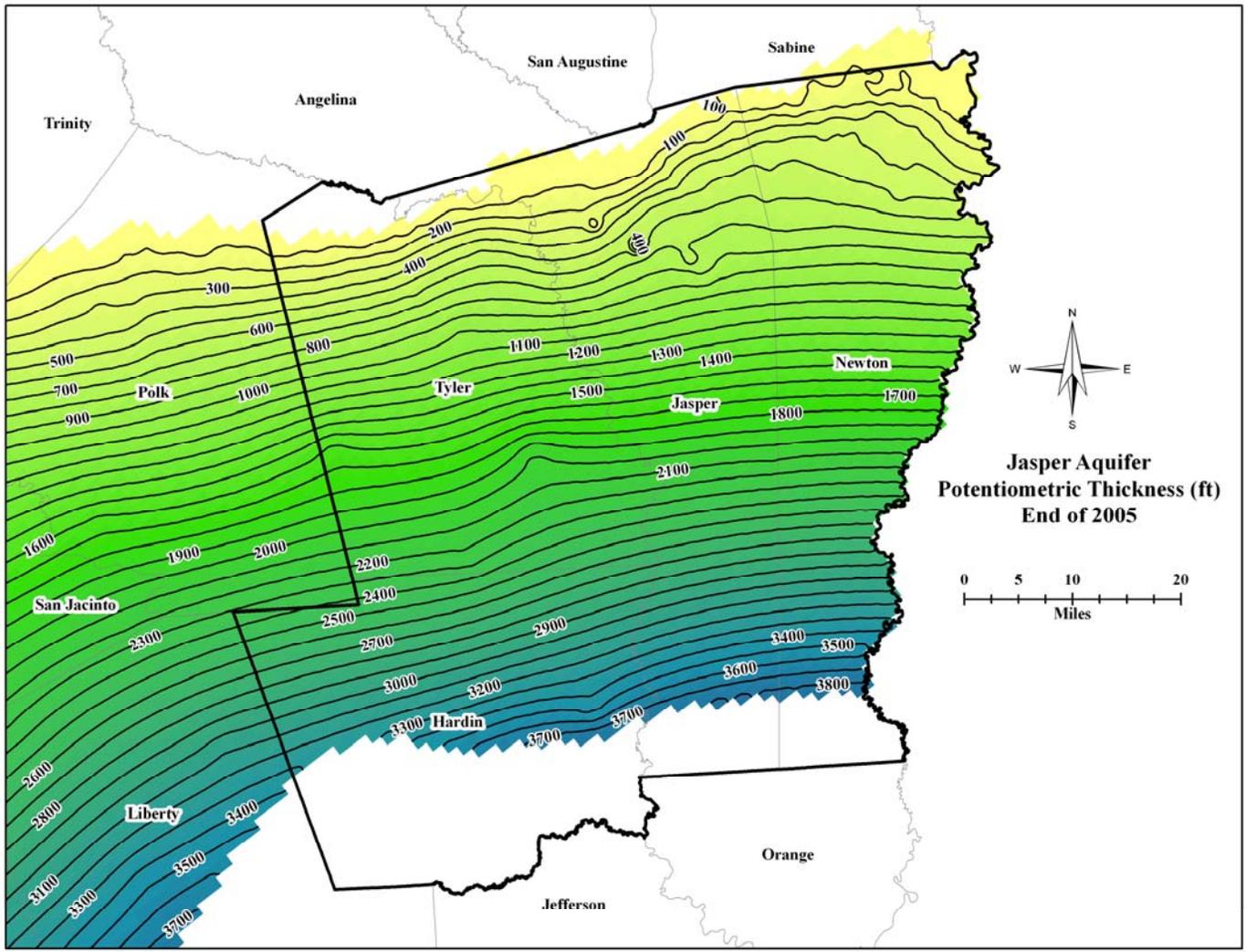


Figure 6. Potentiometric thickness of the Jasper Aquifer portion of the Gulf Coast Aquifer at the beginning of the predictive groundwater availability model runs described in Oliver, 2009a and Oliver, 2009b. Thickness values are in feet. Contour interval is 100 feet. The black border indicates the boundary of the district.