

# GAM run 05-17

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Groundwater Availability Modeling Section  
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## **REQUESTOR:**

Mr. Stefan Schuster with Freese and Nichols, Inc. on behalf of the Panhandle Regional Water Planning Group

## **DESCRIPTION OF REQUEST:**

Mr. Schuster requested that we run the Groundwater Availability Model (GAM) for the Seymour and Blaine aquifers for the period 1975 to 2060 and provide maps of saturated thicknesses for 1980, 1990, 2000, 2010, 2020, 2030, 2040, 2050, and 2060 in Hall, Childress, Collingsworth and Wheeler counties for the Blaine aquifer and Hall, Childress, and Collingsworth counties for the Seymour aquifer.

## **METHODS:**

We used the Groundwater Availability Model (GAM) for the Seymour aquifer (Ewing, and others, 2004). For the historical simulation (1975 to 1999), we used pumpage as included in the GAM with average annual recharge. We ran the GAM for the Seymour aquifer using average annual recharge for the period through 2060 and predictive pumpage based on new demands that the Panhandle Regional Water Planning Group plans to include in their 2006 regional water plan. Once we ran the GAM, we calculated saturated thickness by subtracting the bottom elevation of the Seymour aquifer as included in the GAM from the GAM calculated water levels. If the calculated water level exceeded the elevation of the top of the Seymour, the water level was changed to match the elevation value and then the difference between the top and bottom elevations was considered the saturated thickness. We used the same procedure to calculate the saturated thickness of the Blaine in Hall, Childress, Collingsworth, and Wheeler counties. We imported the saturated thickness data on a cell-by-cell basis into Surfer8© for the Blaine aquifer and we contoured the information to create maps. We calculated and contoured the saturated thickness of the Seymour aquifer in Hall, Childress, and Collingsworth counties using ArcView.

## **PARAMETERS AND ASSUMPTIONS:**

- See Ewing and others (2004) for assumptions and limitations of the GAM.
- Root mean squared error for this model ranges from 9.7 feet to 27.5 feet for the Seymour aquifer and is 26.4 feet for the Blaine aquifer (Ewing and others, 2004). This error will have more of an effect on model results where the aquifer is thin

- Recharge represents average conditions for the predictive and historical period.

## **RESULTS:**

Figures 1 through 9 show GAM historic and predicted saturated thicknesses for the Blaine aquifer. Figures 10 through 18 show GAM historic and predicted saturated thicknesses for the Seymour aquifer.

## **REFERENCES:**

Ewing, J. E., Jones, T. L., Pickens, J. F., Chastain-Howley, A., Dean, K. E., Spear, and A. A., 2004, Groundwater availability model for the Seymour aquifer: final report prepared for the Texas Water Development Board by INTERA Inc., 432 p.

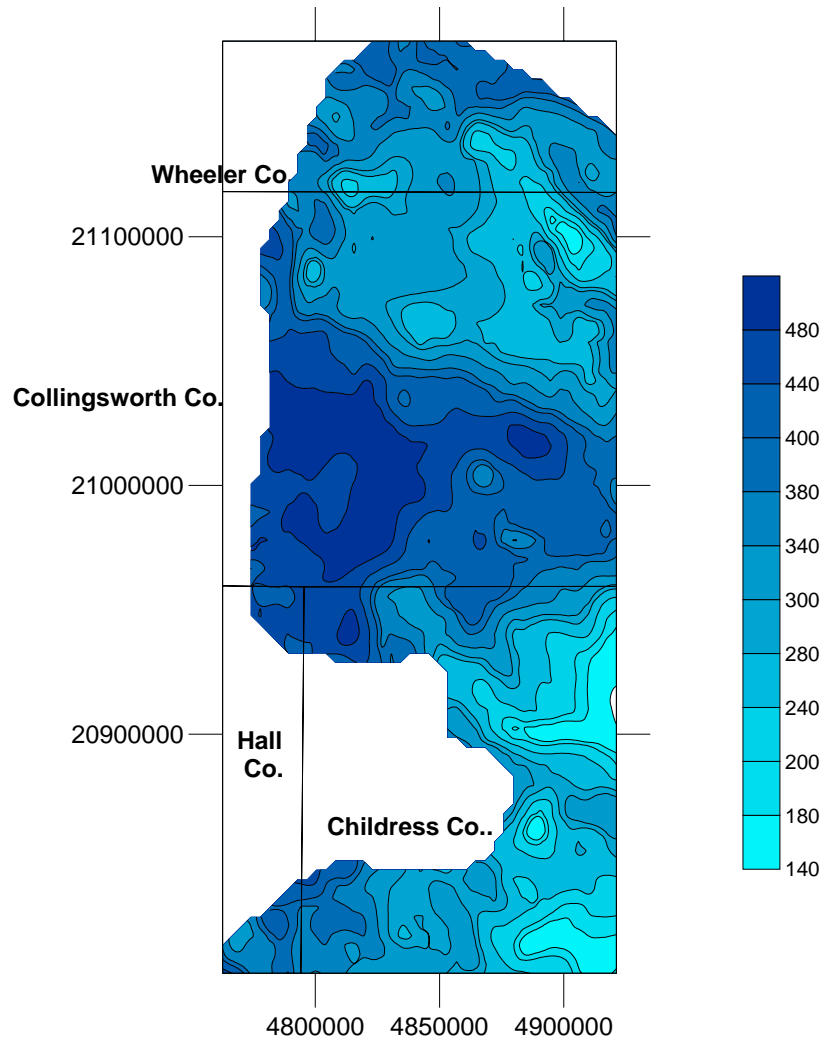


Figure 1: Saturated Thickness in feet of the Blaine aquifer in Childress, Collingsworth Hall and Wheeler counties in 1980. North is at the top of the figure and the maps units are in feet.

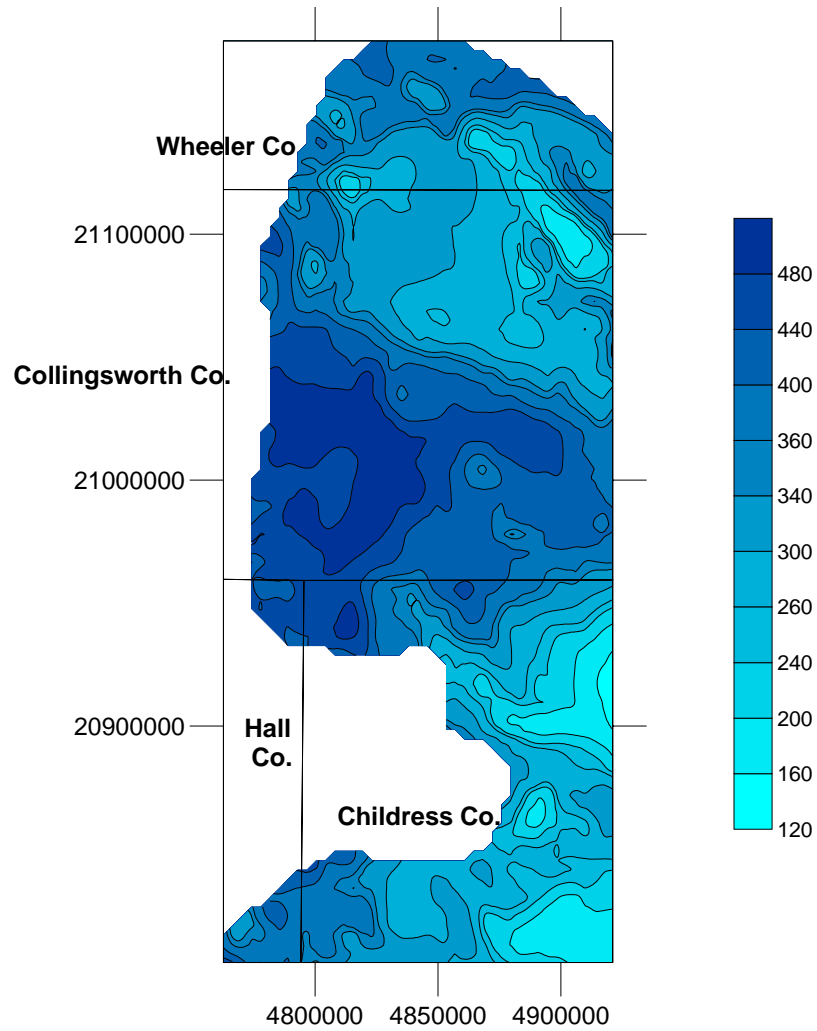


Figure 2: Saturated Thickness in feet of the Blaine aquifer in Childress, Collingsworth Hall and Wheeler counties in 1990. North is at the top of the figure and the maps units are in feet.

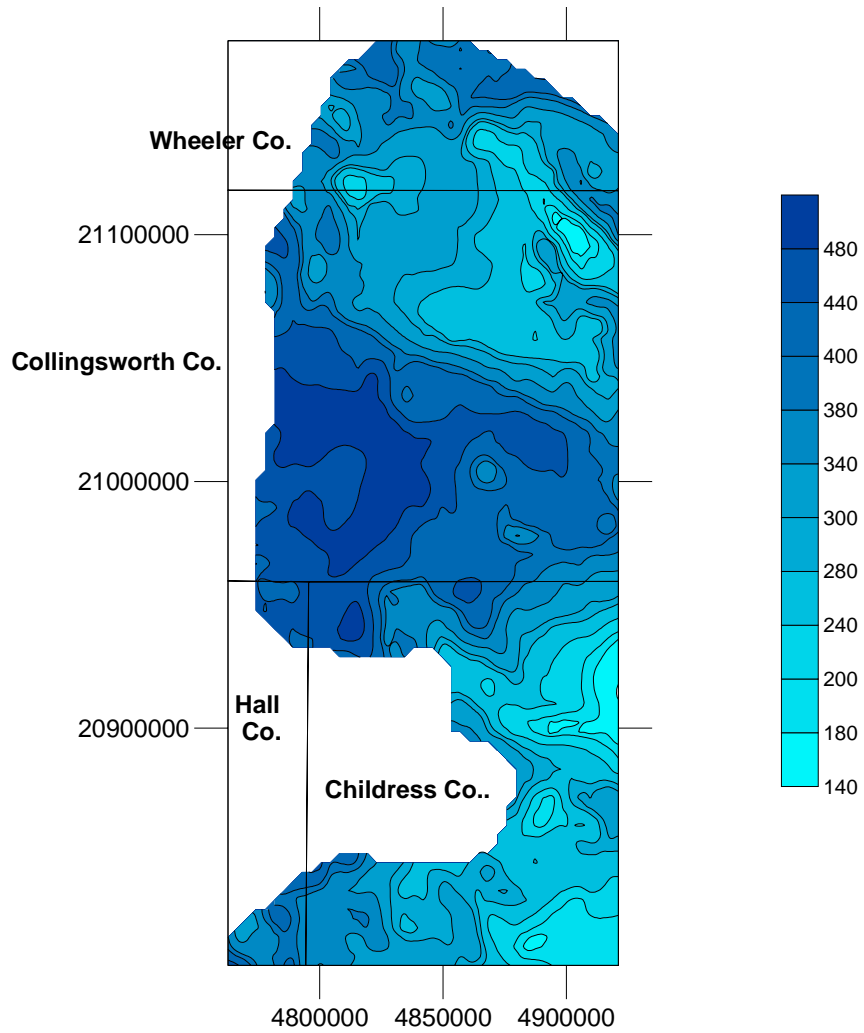


Figure 3: Saturated Thickness in feet of the Blaine aquifer in Childress, Collingsworth Hall and Wheeler counties in 2000. North is at the top of the figure and the maps units are in feet.

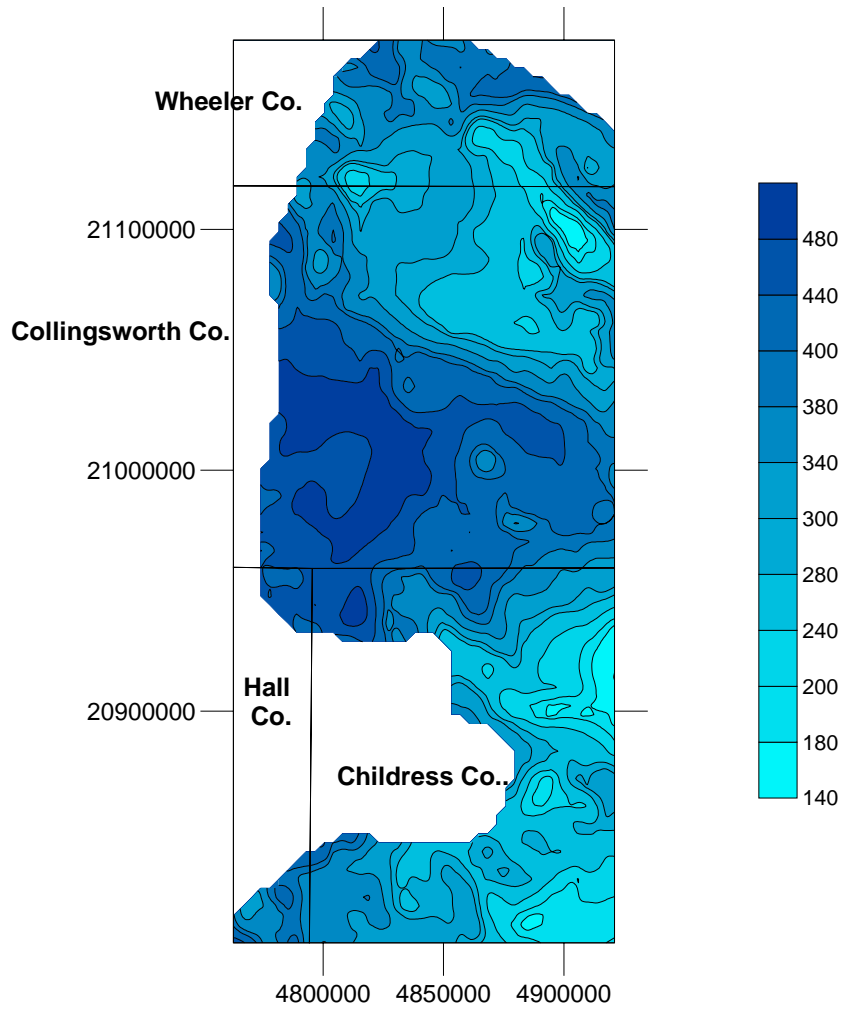


Figure 4: Saturated Thickness in feet of the Blaine aquifer in Childress, Collingsworth Hall and Wheeler counties in 2010. North is at the top of the figure and the maps units are in feet.

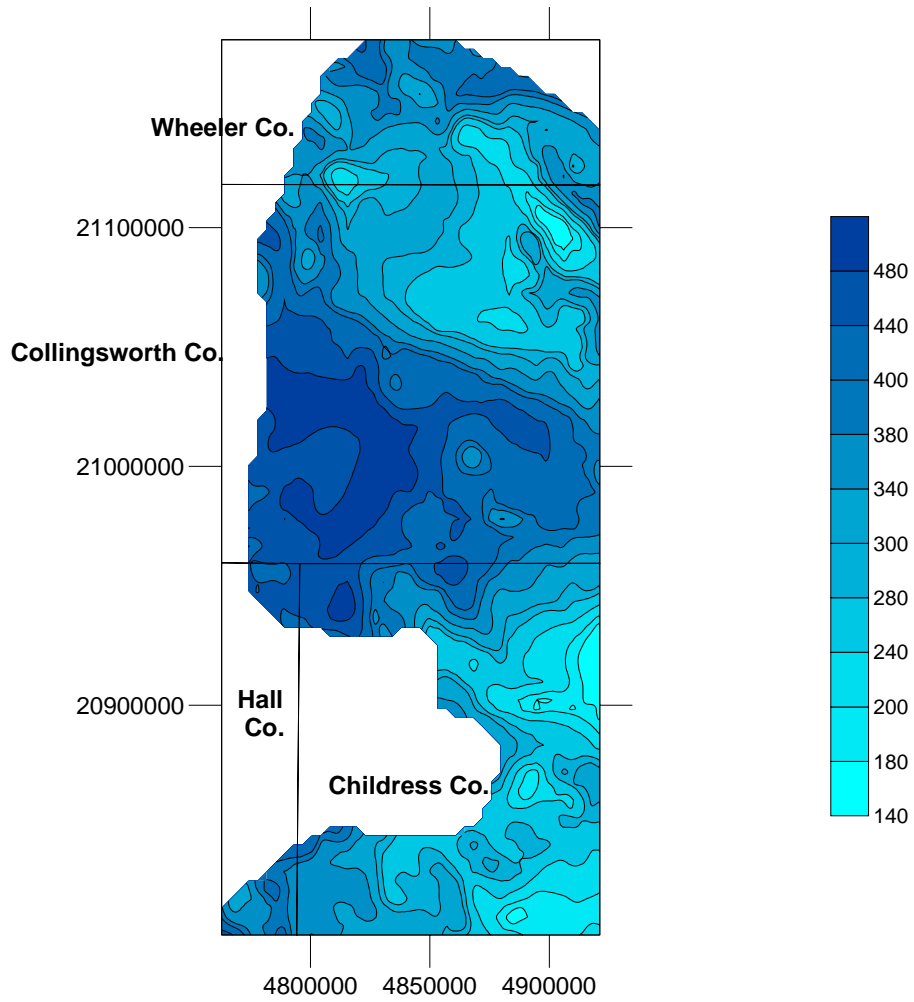


Figure 5: Saturated Thickness in feet of the Blaine aquifer in Childress, Collingsworth Hall and Wheeler counties in 2020. North is at the top of the figure and the maps units are in feet.

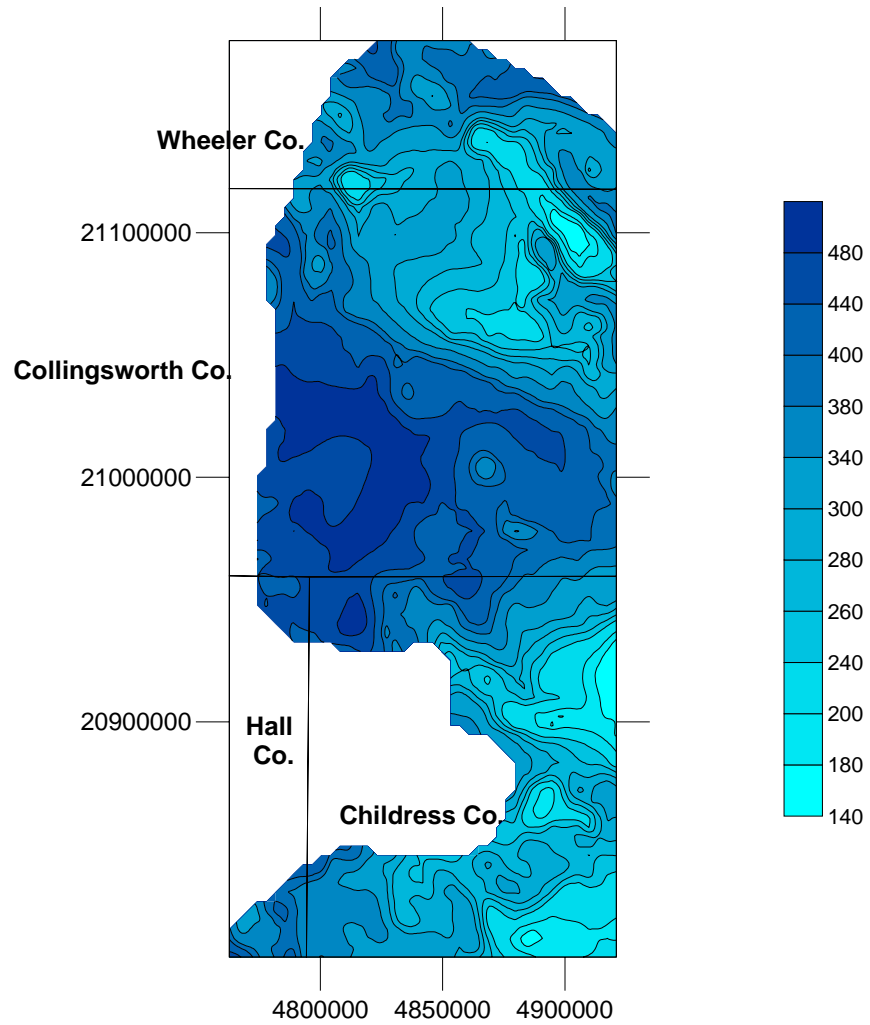


Figure 6: Saturated Thickness in feet of the Blaine aquifer in Childress, Collingsworth Hall and Wheeler counties in 2030. North is at the top of the figure and the maps units are in feet.



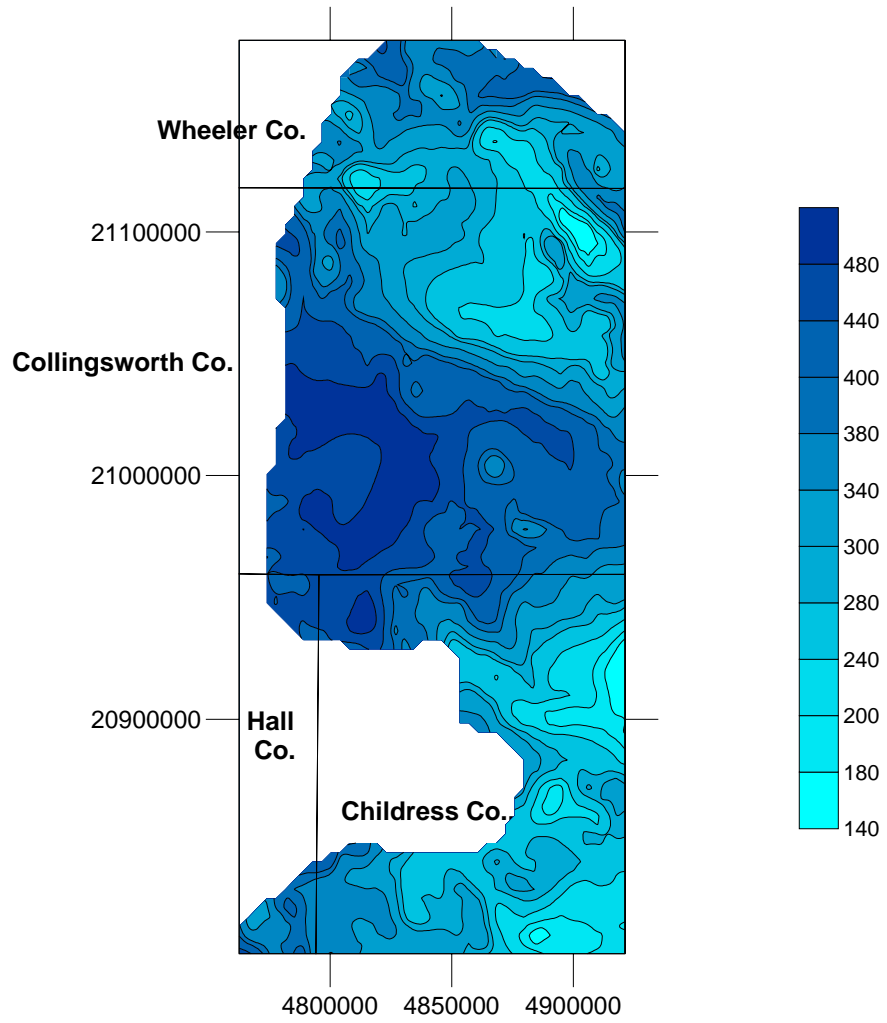


Figure 7: Saturated Thickness in feet of the Blaine aquifer in Childress, Collingsworth Hall and Wheeler counties in 2040. North is at the top of the figure and the maps units are in feet.

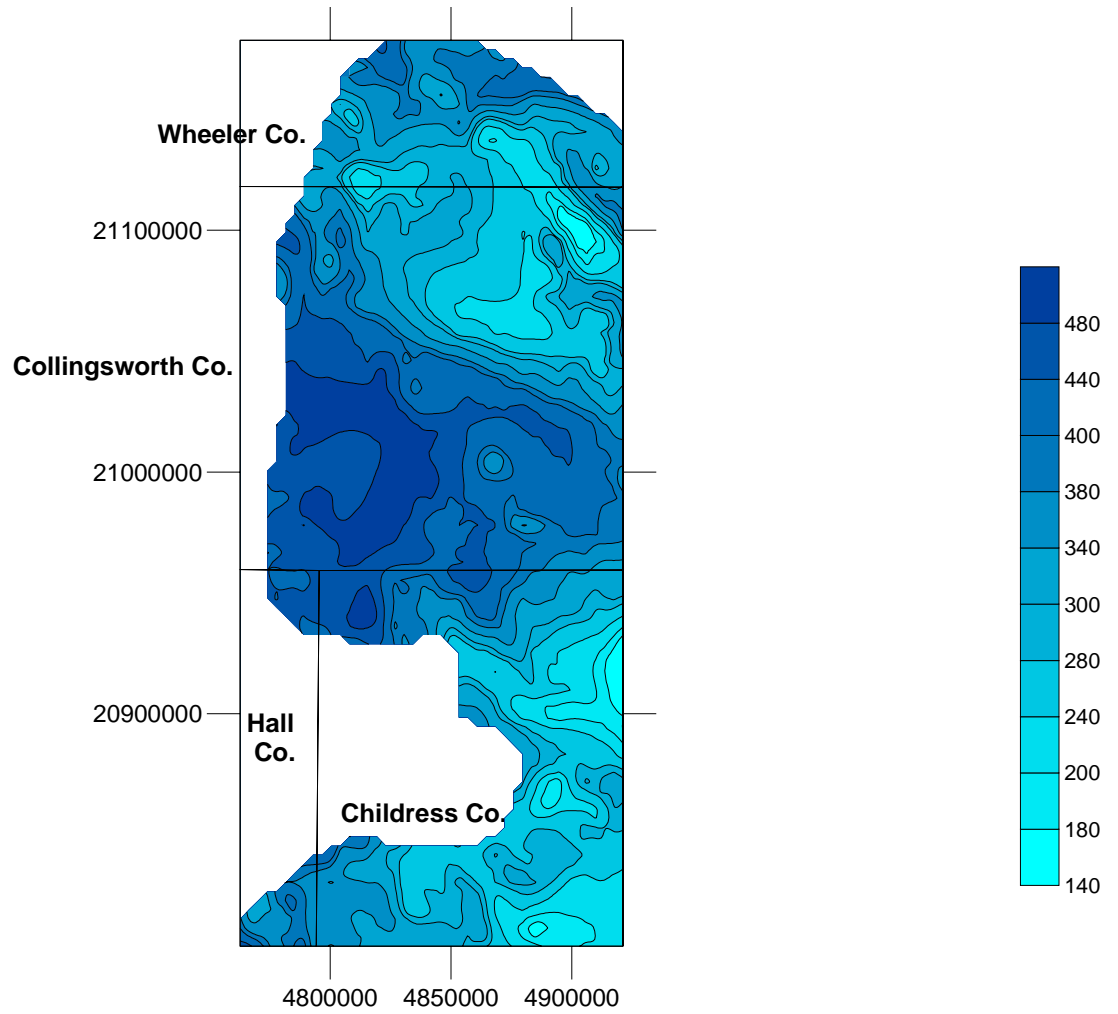


Figure 8: Saturated Thickness in feet of the Blaine aquifer in Childress, Collingsworth Hall and Wheeler counties in 2050. North is at the top of the figure and the maps units are in feet.

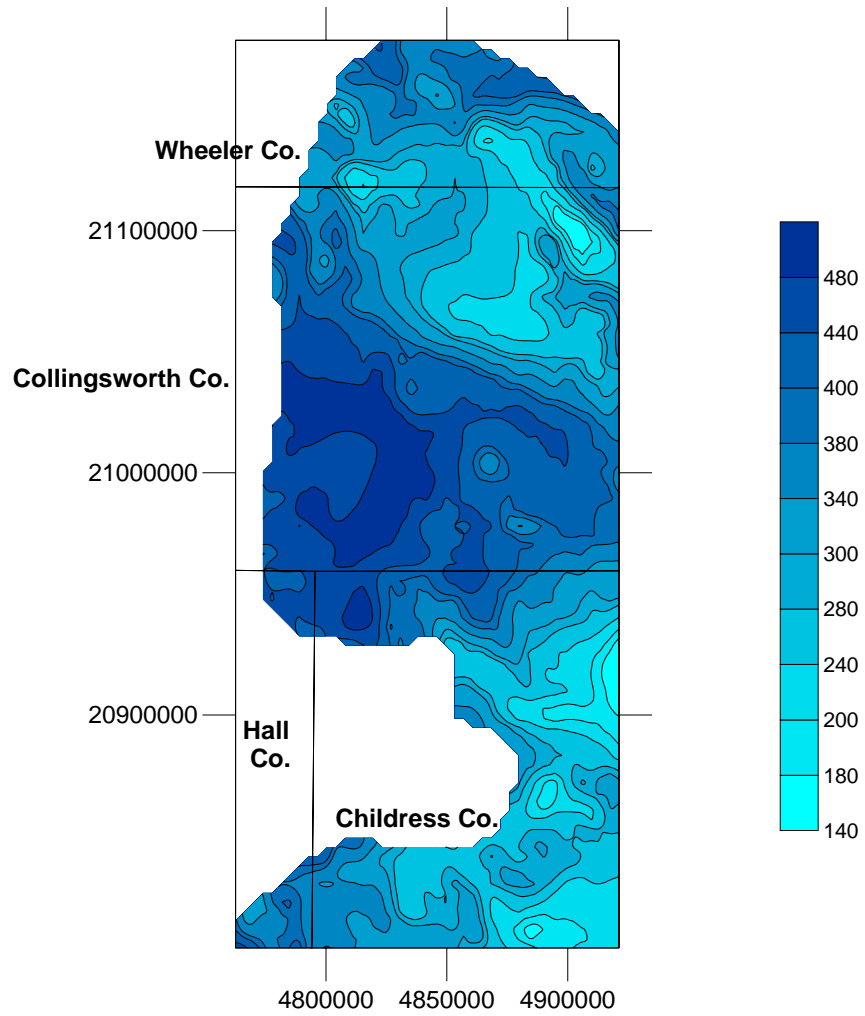


Figure 9: Saturated Thickness in feet of the Blaine aquifer in Childress, Collingsworth Hall and Wheeler counties in 2060. North is at the top of the figure and the maps units are in feet.

# Saturated Thickness in the Seymour aquifer in 1980

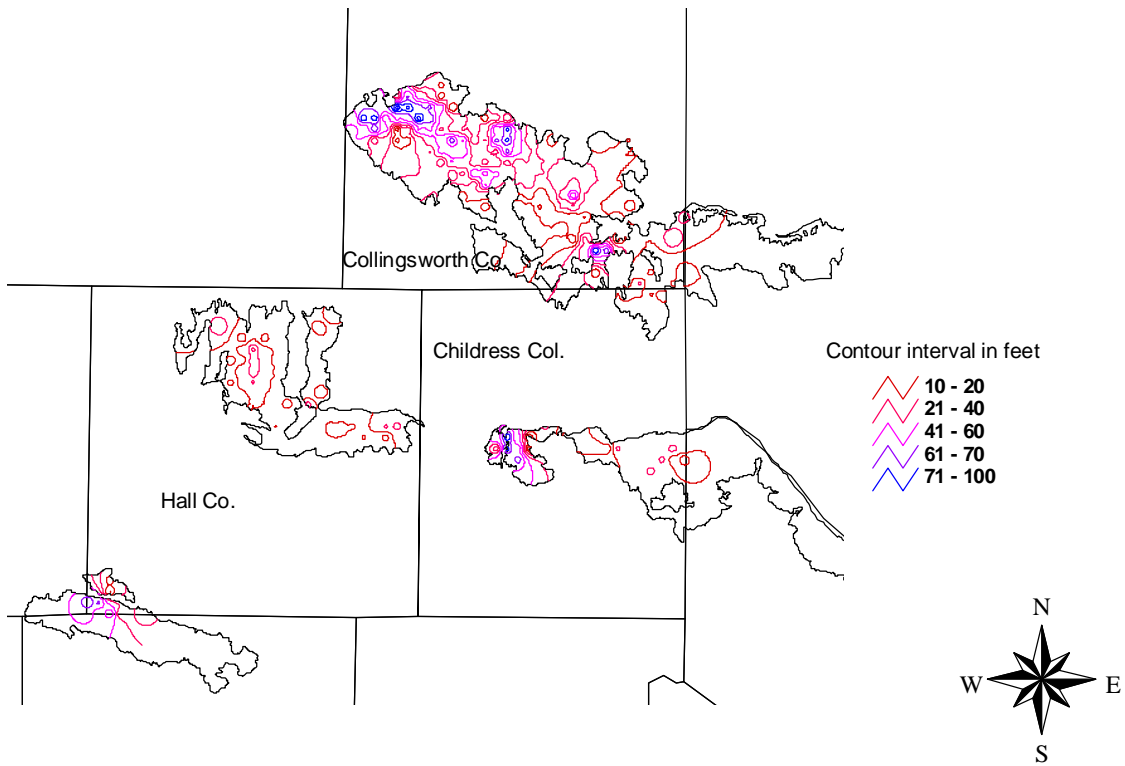


Figure 10: Saturated thickness of the Seymour aquifer in 1980.

# Saturated Thickness of the Seymour aquifer in 1990

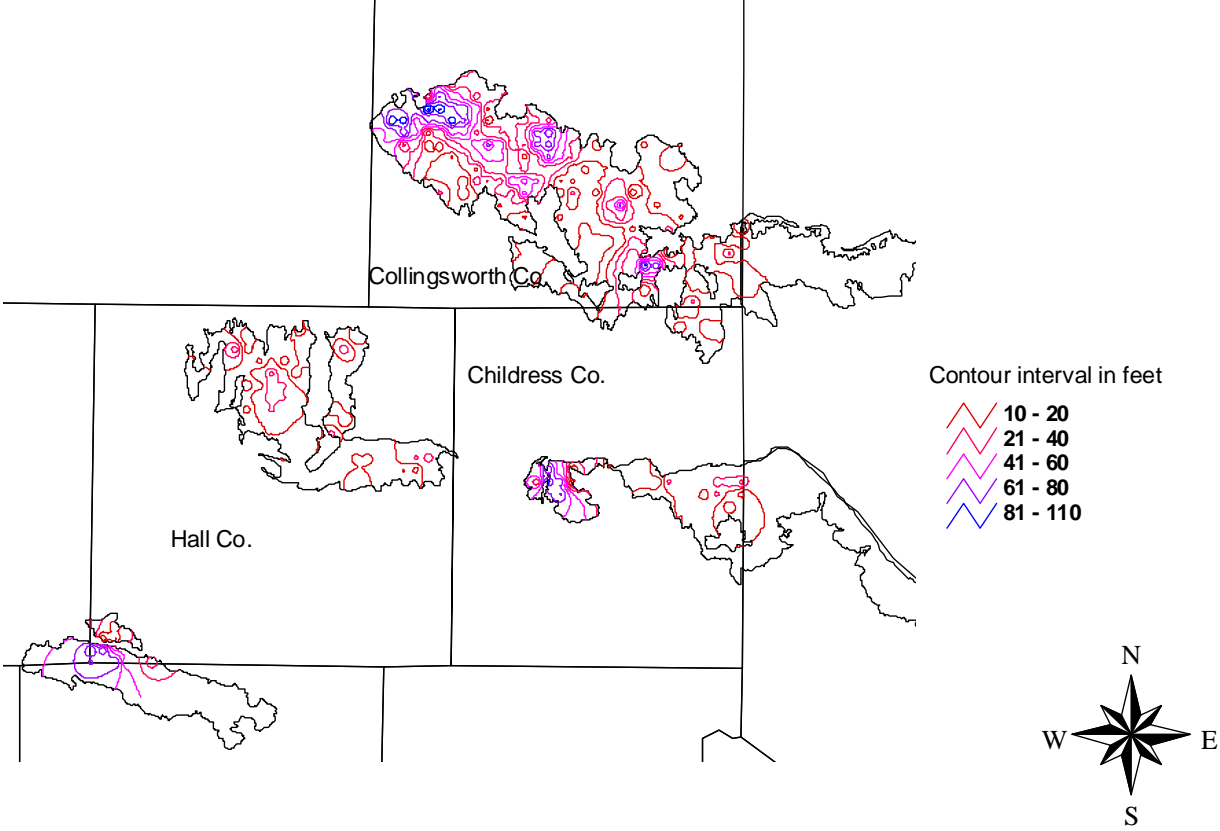


Figure 11: Saturated thickness of the Seymour aquifer in 1990.

# Saturated Thickness of the Seymour aquifer in 2000

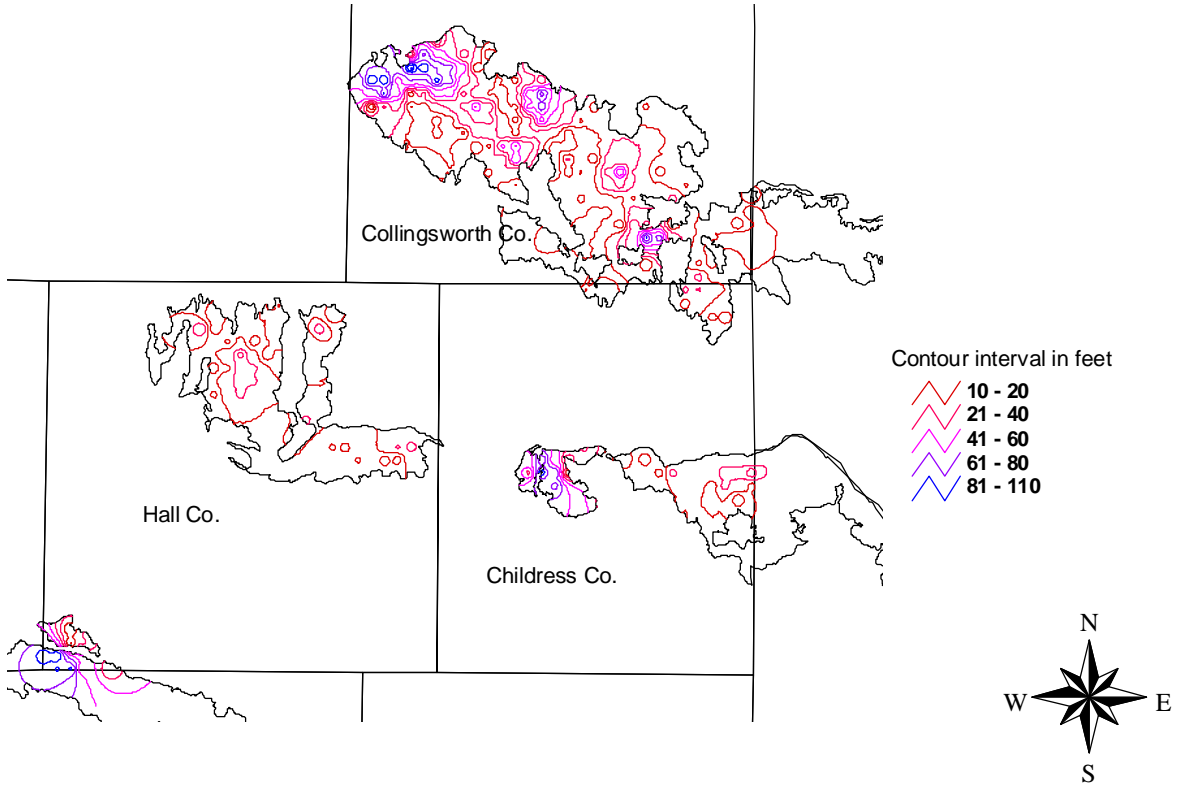


Figure 12: Saturated thickness of the Seymour aquifer in 2000.

# Saturated Thickness of the Seymour aquifer in 2010

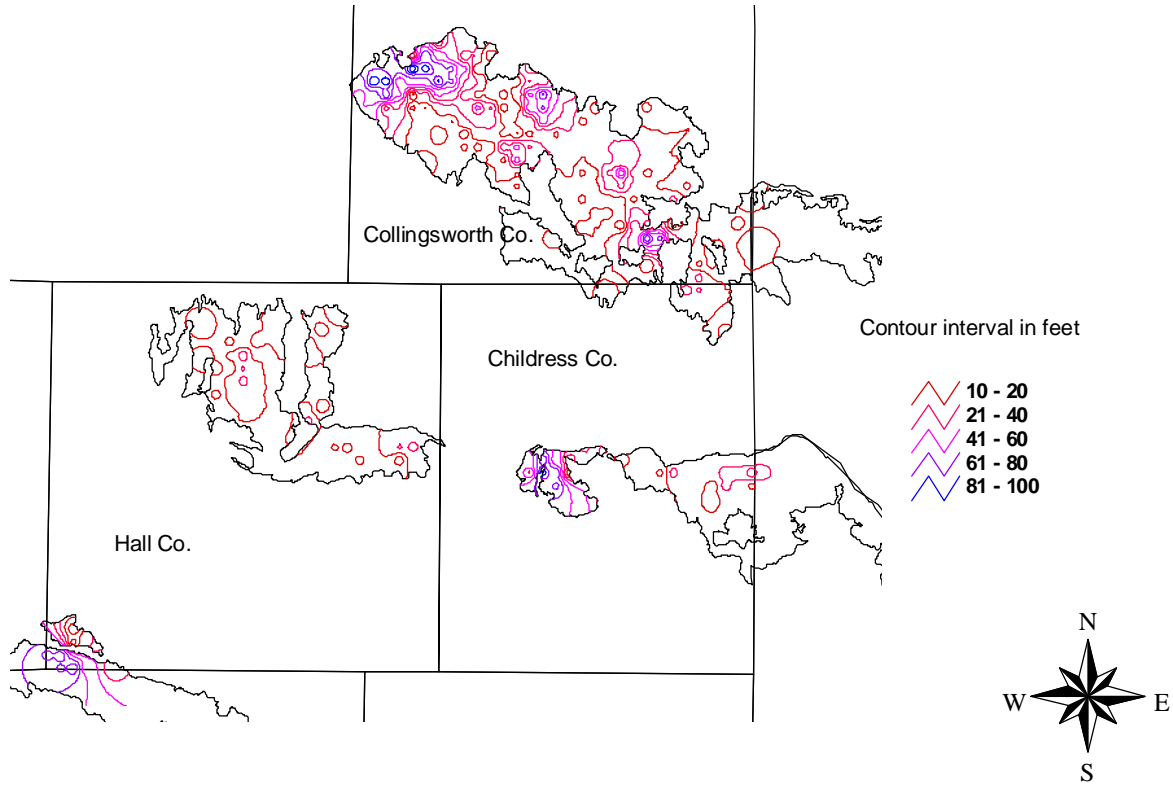


Figure 13: Saturated thickness of the Seymour aquifer in 2010.

# Saturated Thickness in the Seymour aquifer in 2020

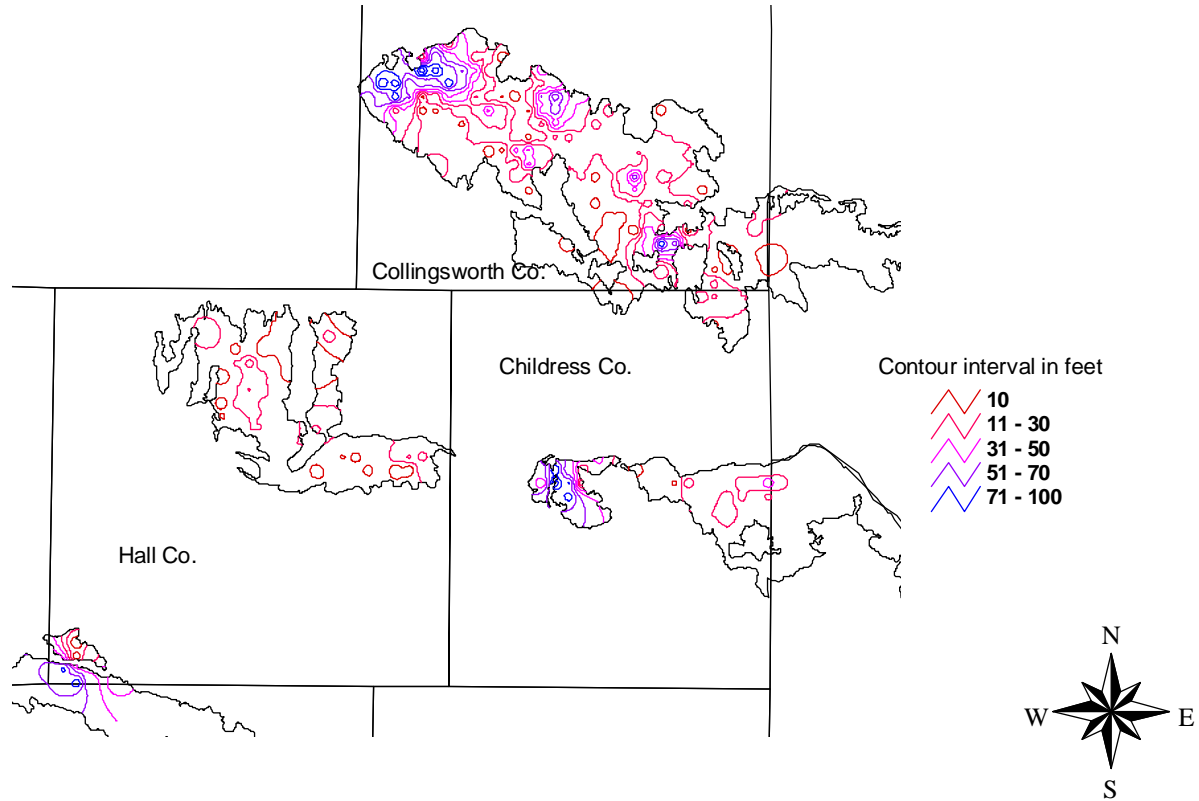


Figure 14: Saturated thickness of the Seymour aquifer in 2020.



# Saturated Thickness of the Seymour aquifer in 2030

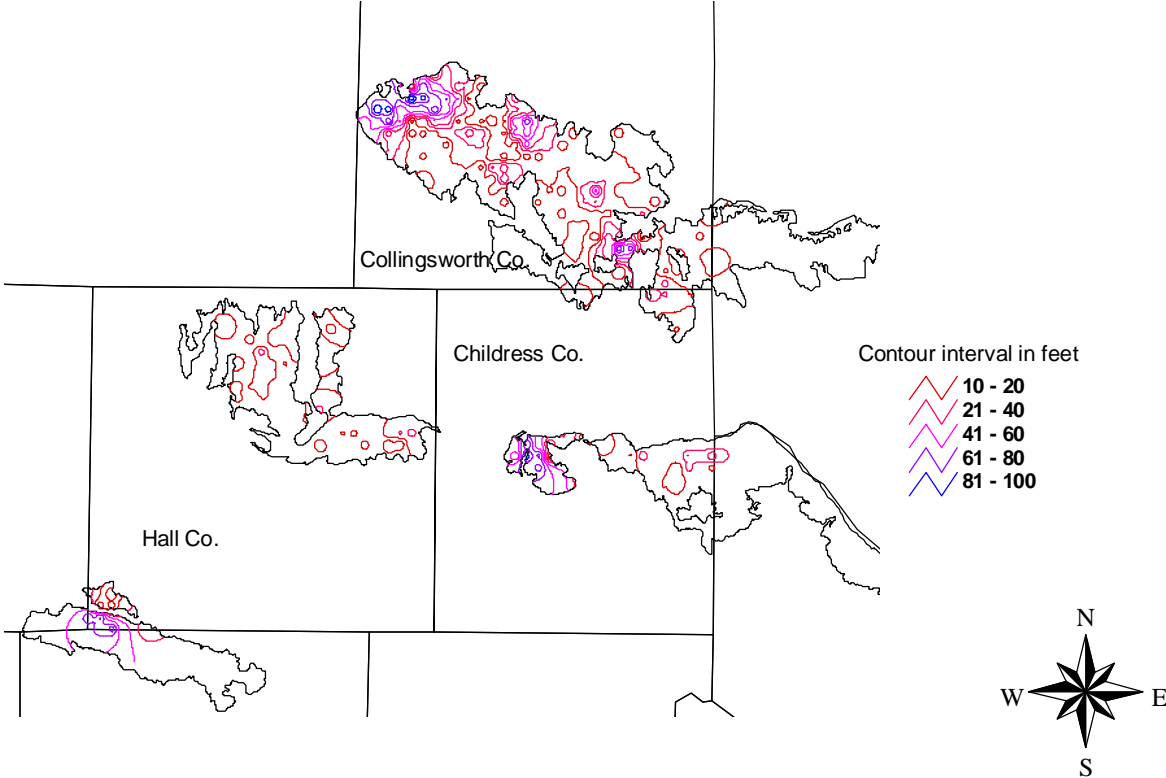


Figure 15: Saturated thickness of the Seymour aquifer in 2030.

# Saturated Thickness of the Seymour aquifer in 2040

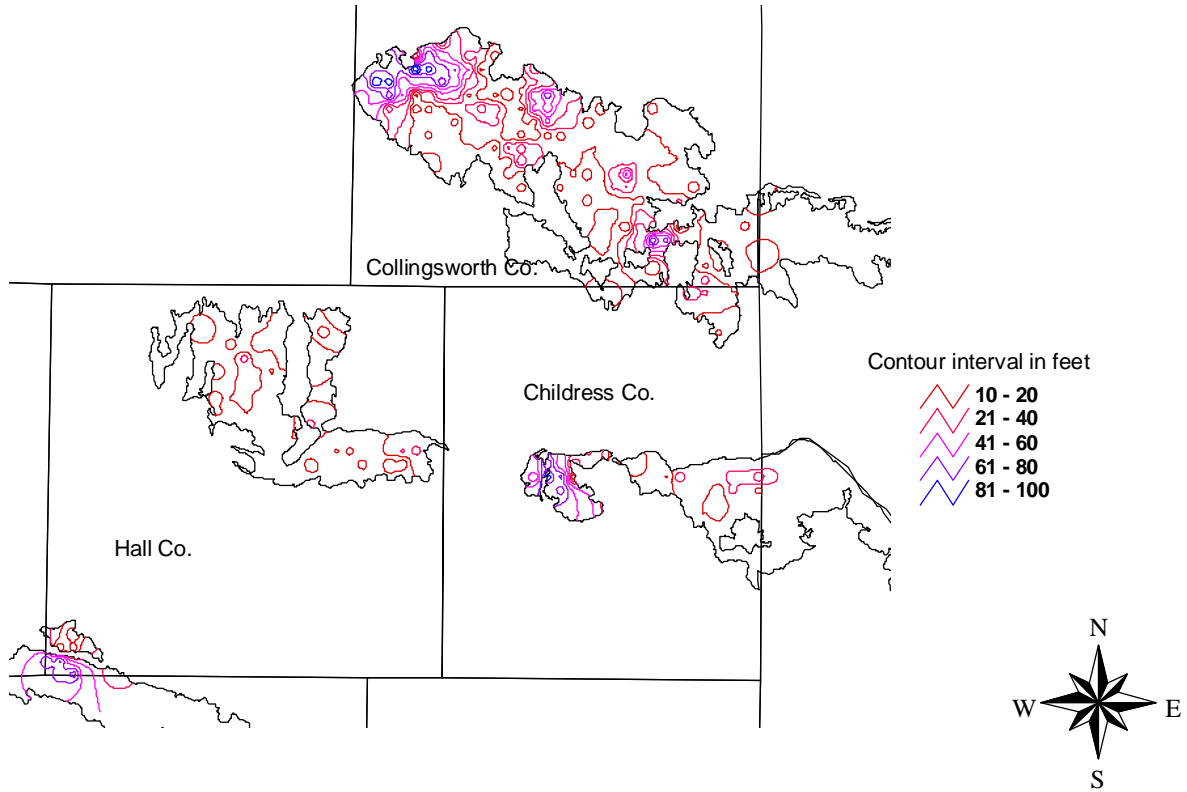


Figure 16: Saturated thickness of the Seymour aquifer in 2040.

# Saturated Thickness of the Seymour aquifer in 2050

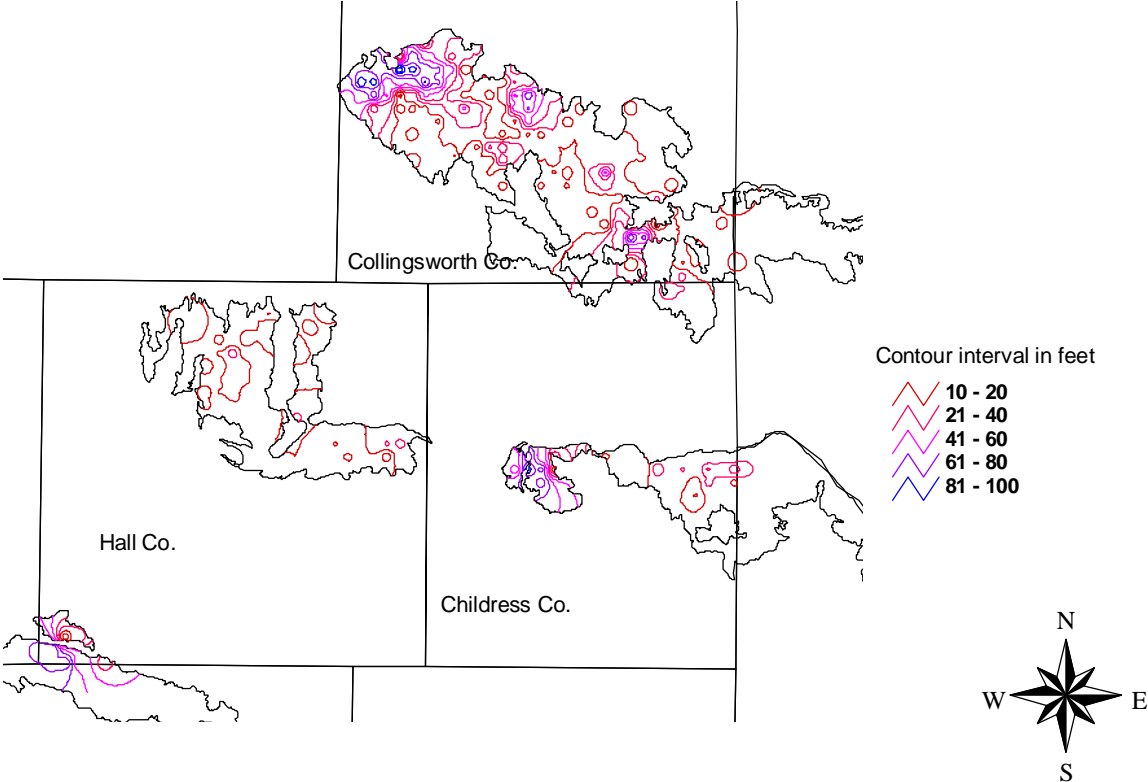


Figure 17: Saturated thickness of the Seymour aquifer in 2050.

# Saturated Thickness of the Seymour aquifer in 2060

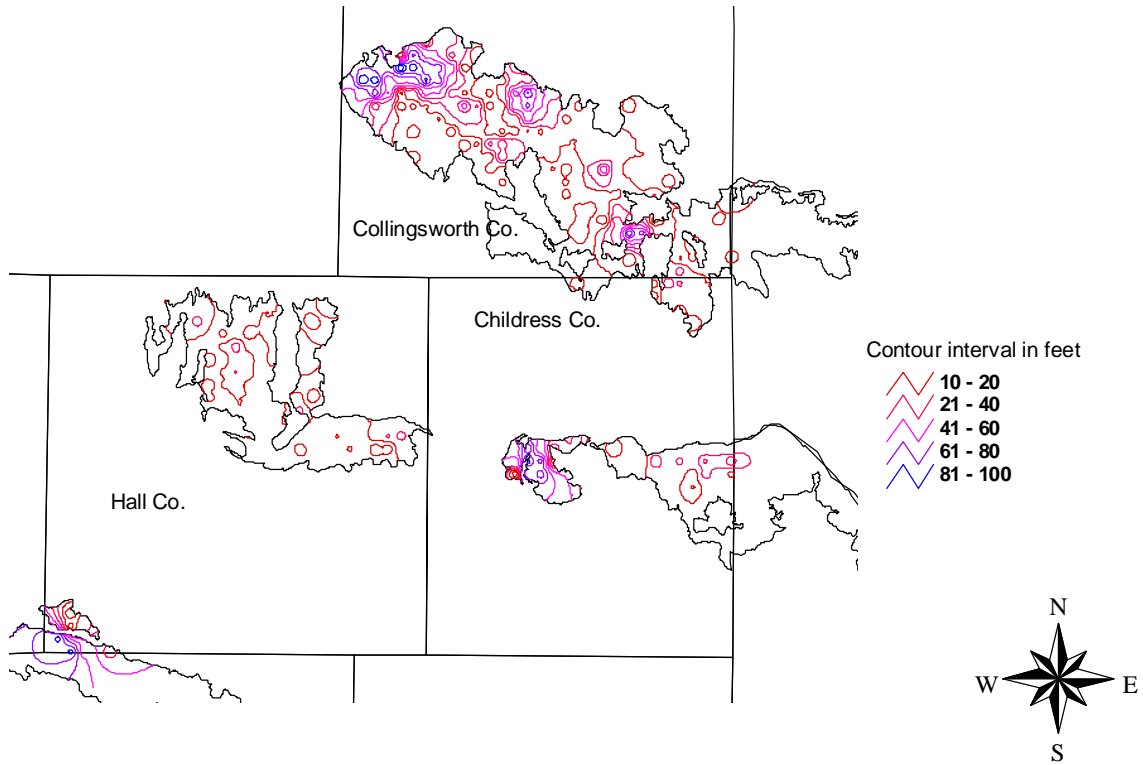


Figure 18: Saturated thickness of the Seymour aquifer in 2060.