
Kansas Geological Survey

Set of (water availability) maps for Southwest Kansas Groundwater Management District

By

Woods, J.J., and Sophocleous, M.A.

2002-26E. Summary of procedures used to construct the GMD3 map set of KGS Open-file Report 2006-26, and interpretation of historic percent change in saturated thickness (map plate D).

By Marios Sophocleous

Kansas Geological Survey Open File Report 2002-26

GEOHYDROLOGY



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Woods, J.J., and Sophocleous, M.A., 2002. Set of (water availability) maps for Southwest Kansas Groundwater Management District. Kansas Geological Survey Open-File Report 2002-26.

Contents

- 2002-26A. Saturated thickness at section centers in the High Plains aquifer predevelopment data, 1 sheet, scale 1:300,000.
- 2002-26B. 1999, 2000, 2001 averaged saturated thickness at section centers in the High Plains aquifer, 1 sheet, scale 1:300,000.
- 2002-26C. Change in saturated thickness at section centers in the High Plains aquifer predevelopment 1999-2001, 1 sheet, scale 1:300,000.
- 2002-26D. Percent change in saturated thickness at section centers in the High Plains aquifer predevelopment to 1999-2001, 1 sheet, scale 1:300,000.
- 2002-26E. Summary of procedures used to construct the GMD3 map set of KGS Open-file Report 2006-26, and interpretation of historic percent change in saturated thickness (map plate D).

June 19, 2002

Hank Hansen, Manager
Southwest Kansas Groundwater
Management District No. 3
409 Campus Drive, Suite 106
Garden City, KS 67846

Dear Hank:

I am pleased to enclose a set of four draft maps (Plates A-D, KGS Open-File Report 2002-26) documenting the historic depletion of the High Plains aquifer in your District for your evaluation.

Draft Plate A contains the updated predevelopment (1940) saturated thickness map of your District together with the data points considered. This map was updated to make it fully compatible with the new PLSS, aquifer extent, and bedrock coverages we employed in the maps we have recently sent to you (KGS Open-File Report 2001-45). To avoid ambiguities (and unlike previous predevelopment maps produced by KGS), we excluded data points from consideration that were tapping Cretaceous or Jurassic units in addition to Ogallala Formation, or had unspecified geologic unit designations. The remaining points are posted on the updated predevelopment saturated thickness map.

Draft Plate B is the average 2000 saturated thickness map (averaged from saturated thickness estimates during the years 1999, 2000, and 2001) together with the measured data points.

Draft Plate C is the historic change in saturated thickness from predevelopment (Plate A) to present time (Plate B); and draft Plate D is the percent change in saturated thickness since predevelopment {that is the ratio of historic saturated thickness change map –Plate C to the predevelopment saturated thickness map –Plate A, multiplied by 100 (for percent calculations), provided the current saturated thickness –Plate B is greater than 50 ft.}

Based on the results displayed in draft Plate D, approximately 75% of your District had enough data point coverage to complete these percent calculations (the remaining portion either consisted of areas where the High Plains aquifer was absent or had no data coverage). Using this area as our base (shown as colored cells or sections in Plate D), the number of cells (sections) with 20% or more historic decline amounts to 54% if we include the areas with current saturated thickness of 50 ft or less in that base, or 60% if we don't. Even if we include the entire GMD3 area as our base, the number of cells or sections with 20% or more historic decline amounts to 40% of the District.

Hope this information is useful to you. Please do not hesitate to contact me for any questions or additional needs you may have. Thank you.

Best regards,

Marios Sophocleous

Senior Scientist

Marios@kgs.ukans.edu

Map enclosures

cc: Don Whittemore, Bill Harrison, Rex Buchanan, Brownie Wilson, John Woods

CHANGE IN SATURATED THICKNESS AT SECTION CENTERS IN THE HIGH PLAINS AQUIFER PREDEVELOPMENT TO 1999-2001



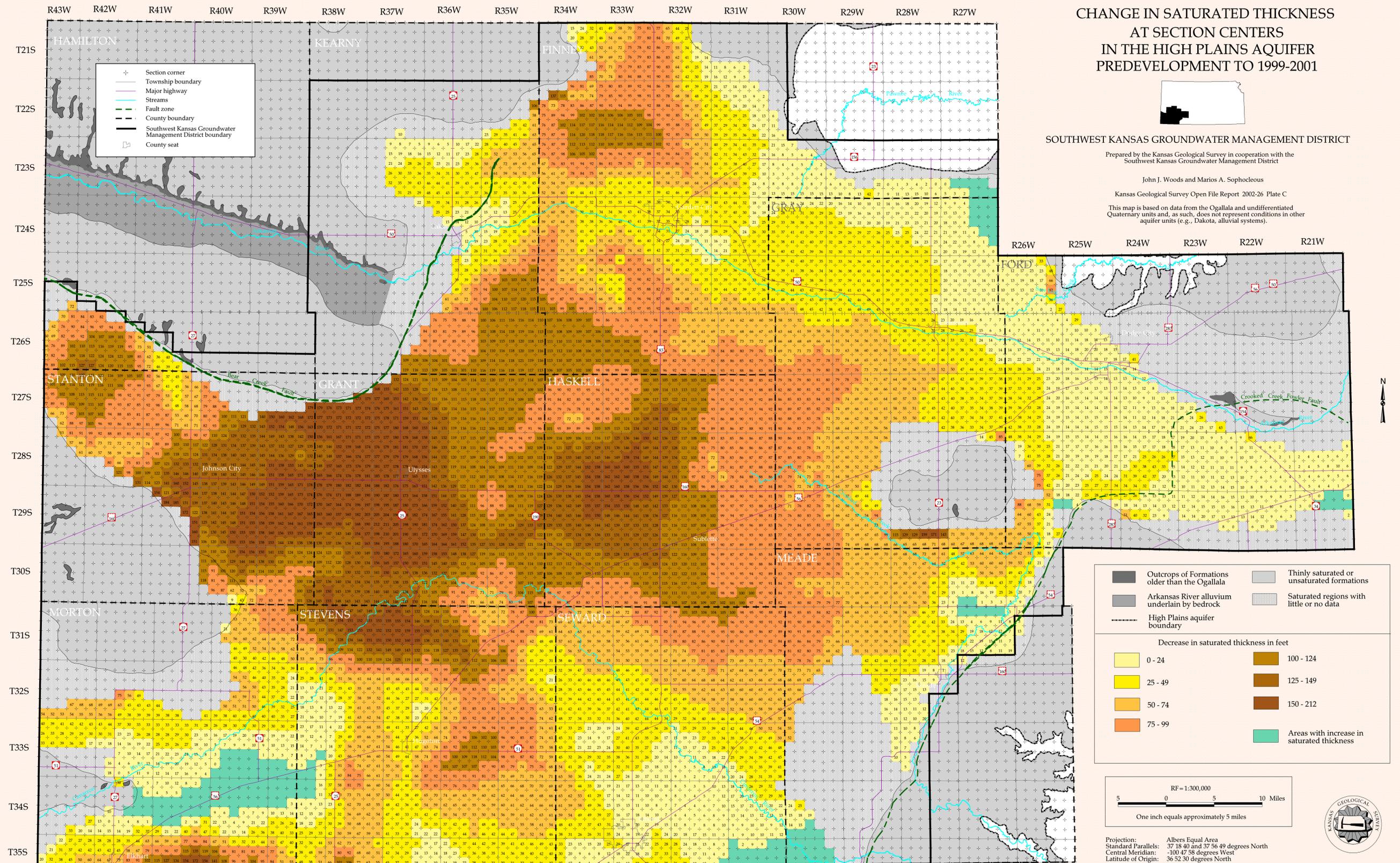
SOUTHWEST KANSAS GROUNDWATER MANAGEMENT DISTRICT

Prepared by the Kansas Geological Survey in cooperation with the Southwest Kansas Groundwater Management District

John J. Woods and Marios A. Sophocleous

Kansas Geological Survey Open File Report 2002-26 Plate C

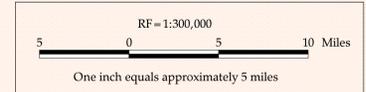
This map is based on data from the Ogallala and undifferentiated Quaternary units and, as such, does not represent conditions in other aquifer units (e.g., Dakota, alluvial systems).



Outcrops of Formations older than the Ogallala	Thinly saturated or unsaturated formations
Arkansas River alluvium underlain by bedrock	Saturated regions with little or no data
High Plains aquifer boundary	

Decrease in saturated thickness in feet

0 - 24	100 - 124
25 - 49	125 - 149
50 - 74	150 - 212
75 - 99	Areas with increase in saturated thickness



Projection: Albers Equal Area
 Standard Parallels: 37 18 40 and 37 56 49 degrees North
 Central Meridian: -100 47 58 degrees West
 Latitude of Origin: 36 52 30 degrees North



The Kansas Geological Survey and the Southwest Kansas Groundwater Management District do not guarantee this map to be free from errors or inaccuracies and disclaim any responsibility or liability for interpretations from the map or decisions based thereon.

1999, 2000, 2001 AVERAGED SATURATED THICKNESS AT SECTION CENTERS IN THE HIGH PLAINS AQUIFER



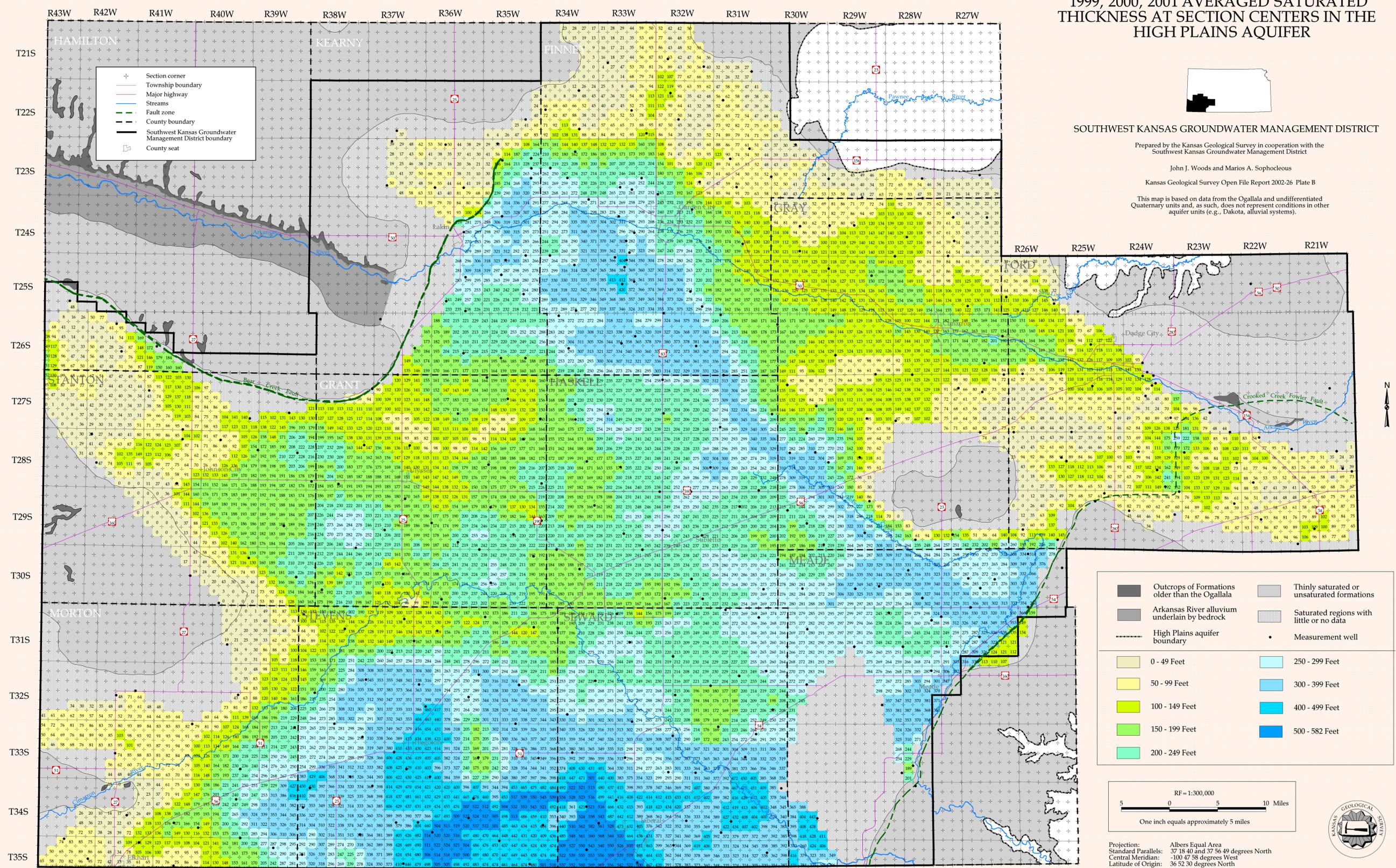
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Kansas Geological Survey Open File Report 2002-26 Plate B

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	Outcrops of Formations older than the Ogallala		Thinly saturated or unsaturated formations
	Arkansas River alluvium underlain by bedrock		Saturated regions with little or no data
	High Plains aquifer boundary		Measurement well
	0 - 49 Feet		250 - 299 Feet
	50 - 99 Feet		300 - 399 Feet
	100 - 149 Feet		400 - 499 Feet
	150 - 199 Feet		500 - 582 Feet
	200 - 249 Feet		

Scale: RF=1:300,000
 One inch equals approximately 5 miles

Projection: Albers Equal Area
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PERCENT CHANGE IN SATURATED THICKNESS AT SECTION CENTERS IN THE HIGH PLAINS AQUIFER PREDEVELOPMENT TO 1999-2001



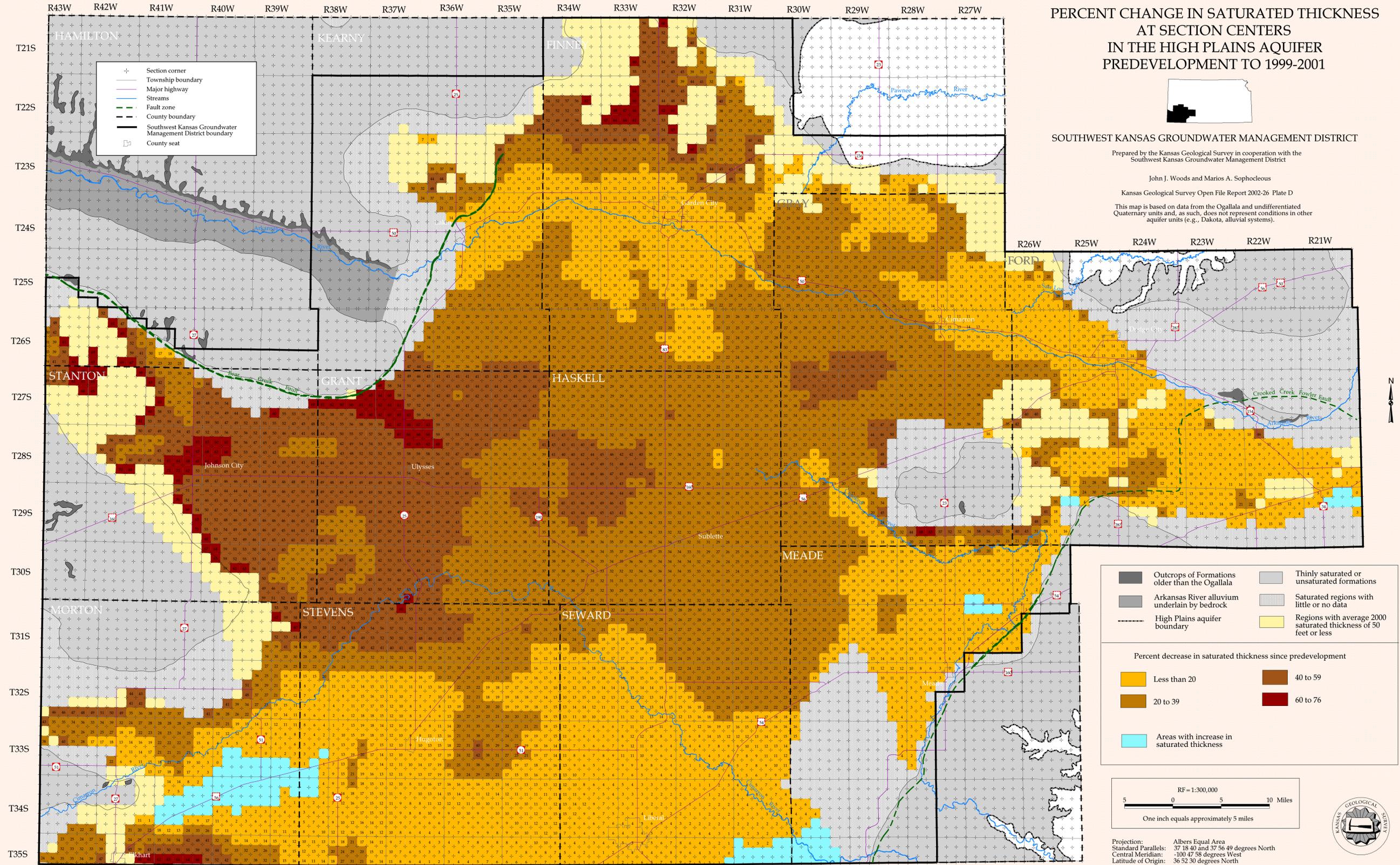
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Kansas Geological Survey Open File Report 2002-26 Plate D

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+ Section corner
 --- Township boundary
 --- Major highway
 --- Streams
 --- Fault zone
 --- County boundary
 --- Southwest Kansas Groundwater Management District boundary
 □ County seat

■ Outcrops of Formations older than the Ogallala
 ■ Arkansas River alluvium underlain by bedrock
 --- High Plains aquifer boundary
 ■ Thinly saturated or unsaturated formations
 ■ Saturated regions with little or no data
 ■ Regions with average 2000 saturated thickness of 50 feet or less

Percent decrease in saturated thickness since predevelopment

■ Less than 20	■ 40 to 59
■ 20 to 39	■ 60 to 76

■ Areas with increase in saturated thickness

RF = 1:300,000

One inch equals approximately 5 miles

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SATURATED THICKNESS AT SECTION CENTERS IN THE HIGH PLAINS AQUIFER PREDEVELOPMENT DATA



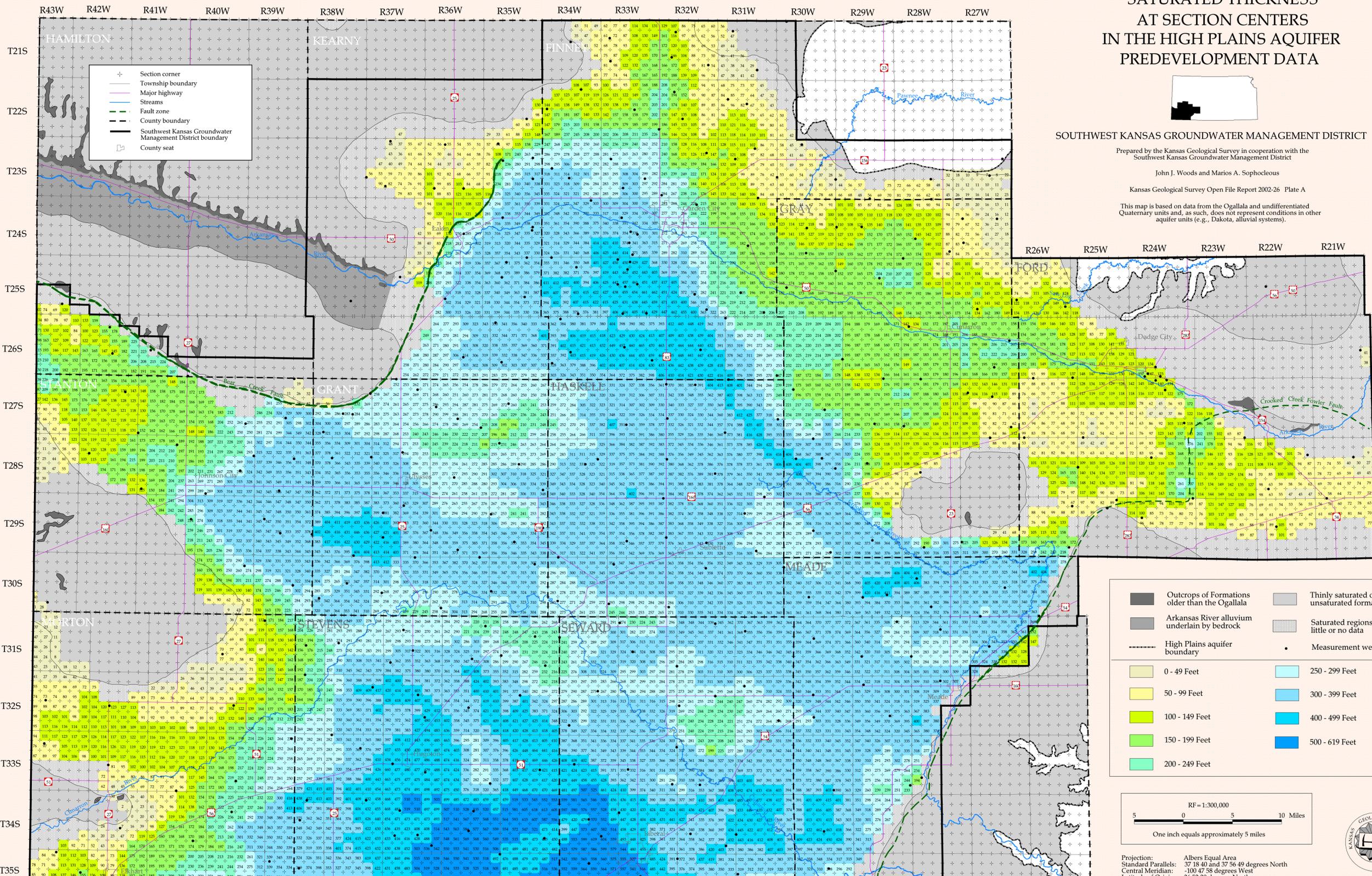
SOUTHWEST KANSAS GROUNDWATER MANAGEMENT DISTRICT

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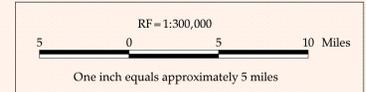
John J. Woods and Marios A. Sophocleous

Kansas Geological Survey Open File Report 2002-26 Plate A

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