


11-2006

Water Resources and Geologic Field Trip in York and Seward Counties, Nebraska

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51st Annual Midwest Ground Water Conference



“Convergence of Rural and Urban Ground Water Issues”

FIELD TRIP

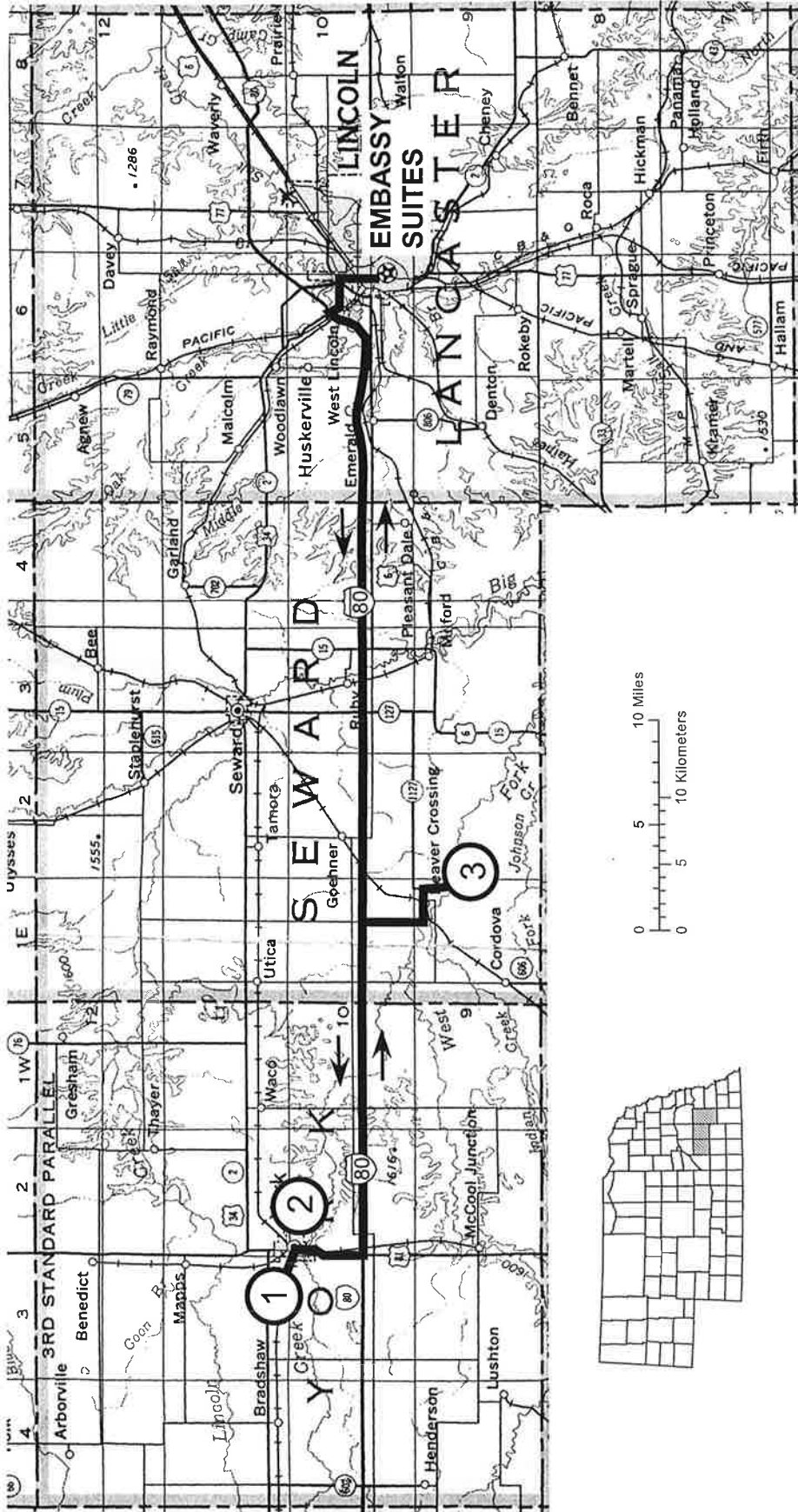
November 6, 2006

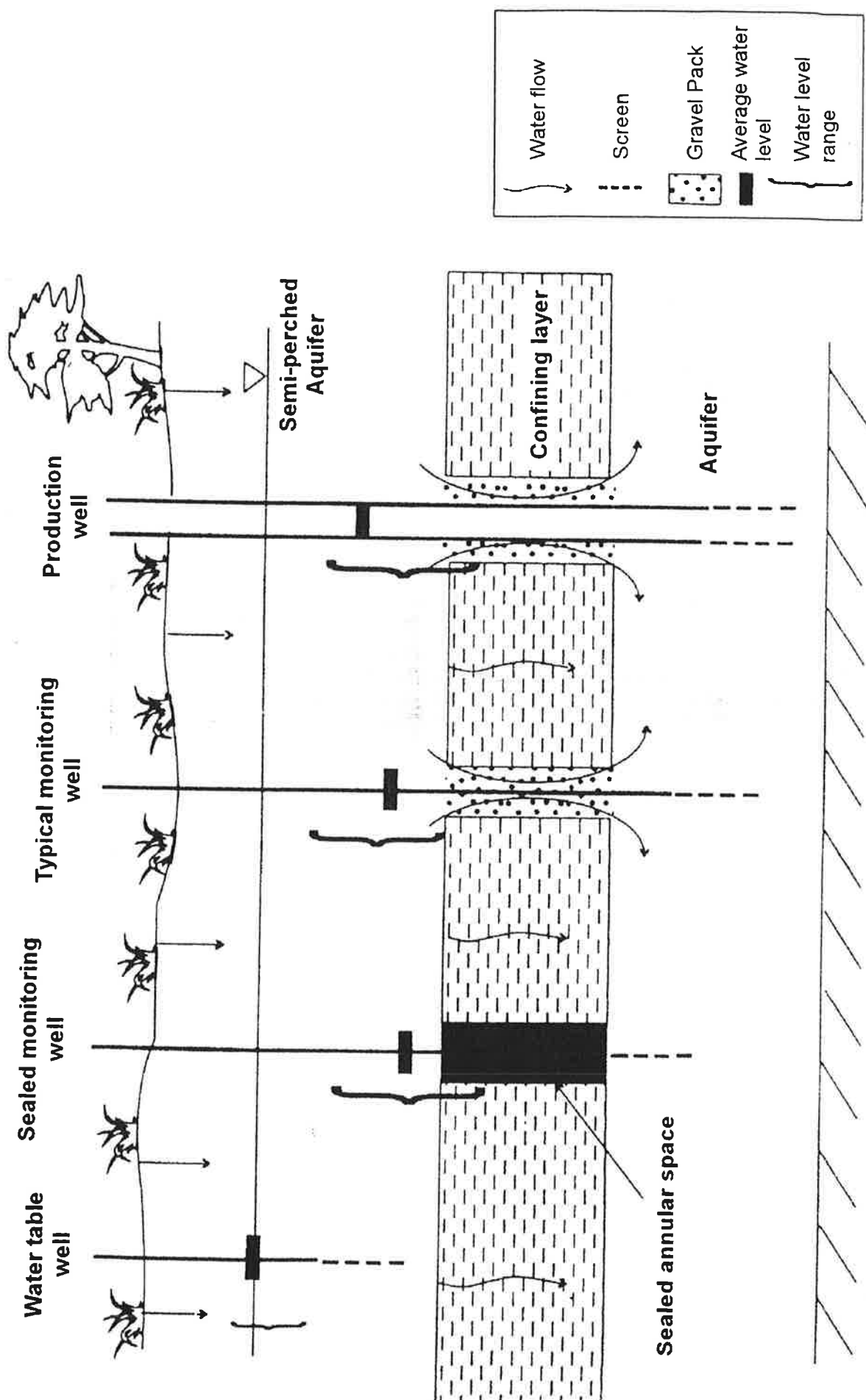
York and Seward Counties, Nebraska

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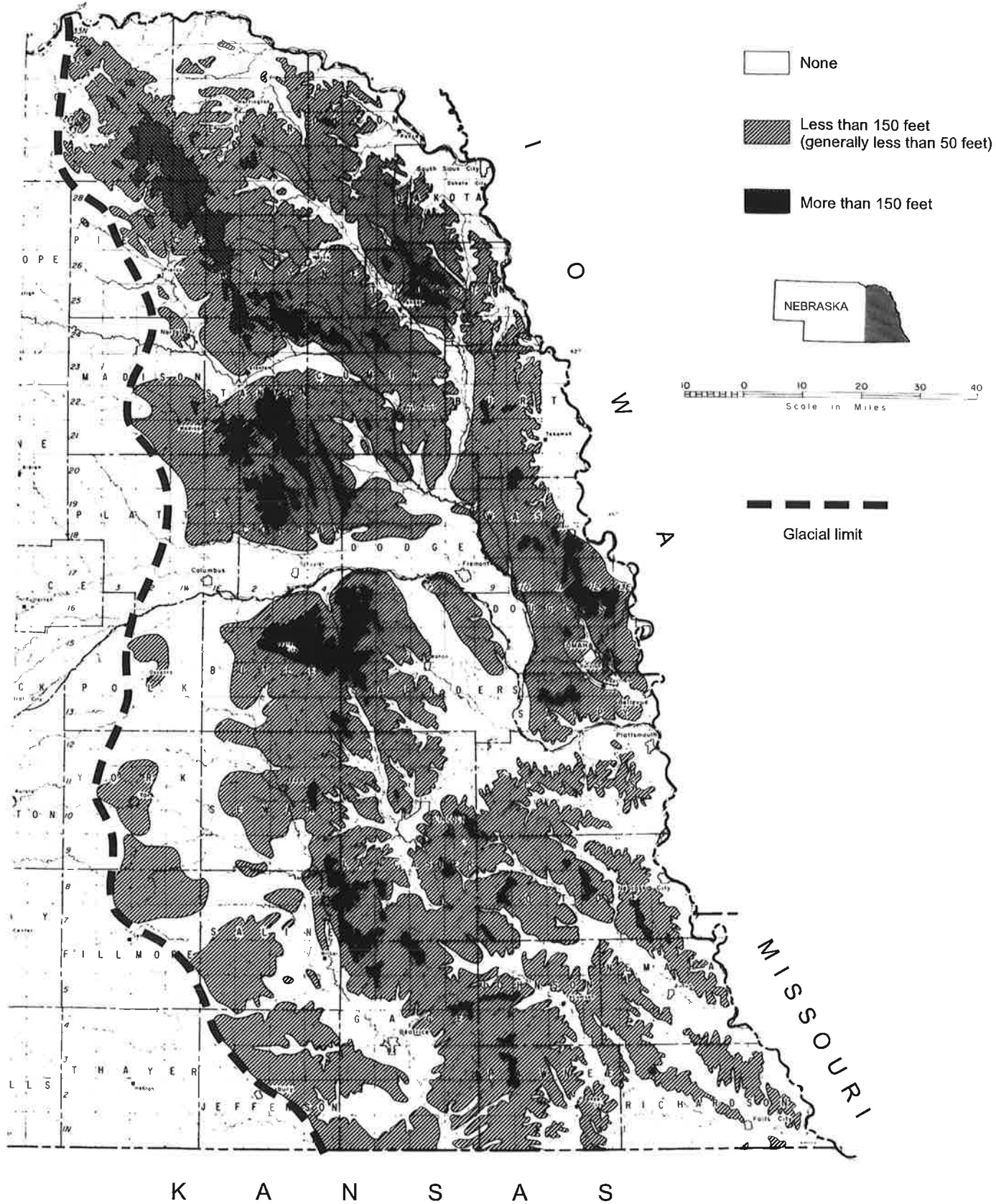






GLACIATION OF NEBRASKA: ~2.5 Ma - 600 ka

SOUTH DAKOTA



Cretaceous Strata in the Field Trip Area

KANSAS SOUTHEASTERN NEBR.

UPPER CRETACEOUS	Con.	lower Niobrara Formation <i>(marine chalks)</i>	lower Niobrara Formation (Nuckolls Co.)	local secondary aquifer, where fractured
		Carlile Shale Fm. <i>(marine shale)</i>	Carlile Shale (westernmost Jefferson and Thayer cos.)	usually not an aquifer
LOWER CRETACEOUS	Albian	Greenhorn Limestone Fm. <i>(marine limestone, chalk, shale)</i>	Greenhorn Ls. upper part	local secondary aquifer, where fractured
		Greenhorn Limestone Fm. (cont.)	Greenhorn Ls. lower part	
		Graneros Shale Fm. <i>(marine muds)</i>	Graneros Shale	secondary aquifer--can be a significant source in eastern Nebraska; potentially high yield, but can be highly mineralized
		Dakota Formation <i>(fluvial, estuarine, coastal plain, deltaic, and shoreface sandstones, shales, and mudstones)</i>	Dakota Formation ¹ <i>(fluvial, estuarine, coastal plain, deltaic, and shoreface sandstones, shales, and mudstones)</i>	
		Kiowa Formation <i>(continental to marine)</i>		
		Cheyenne Sandstone		

88.5 Ma

90.4 Ma

97.0 Ma

R. M. Joeckel, 2004

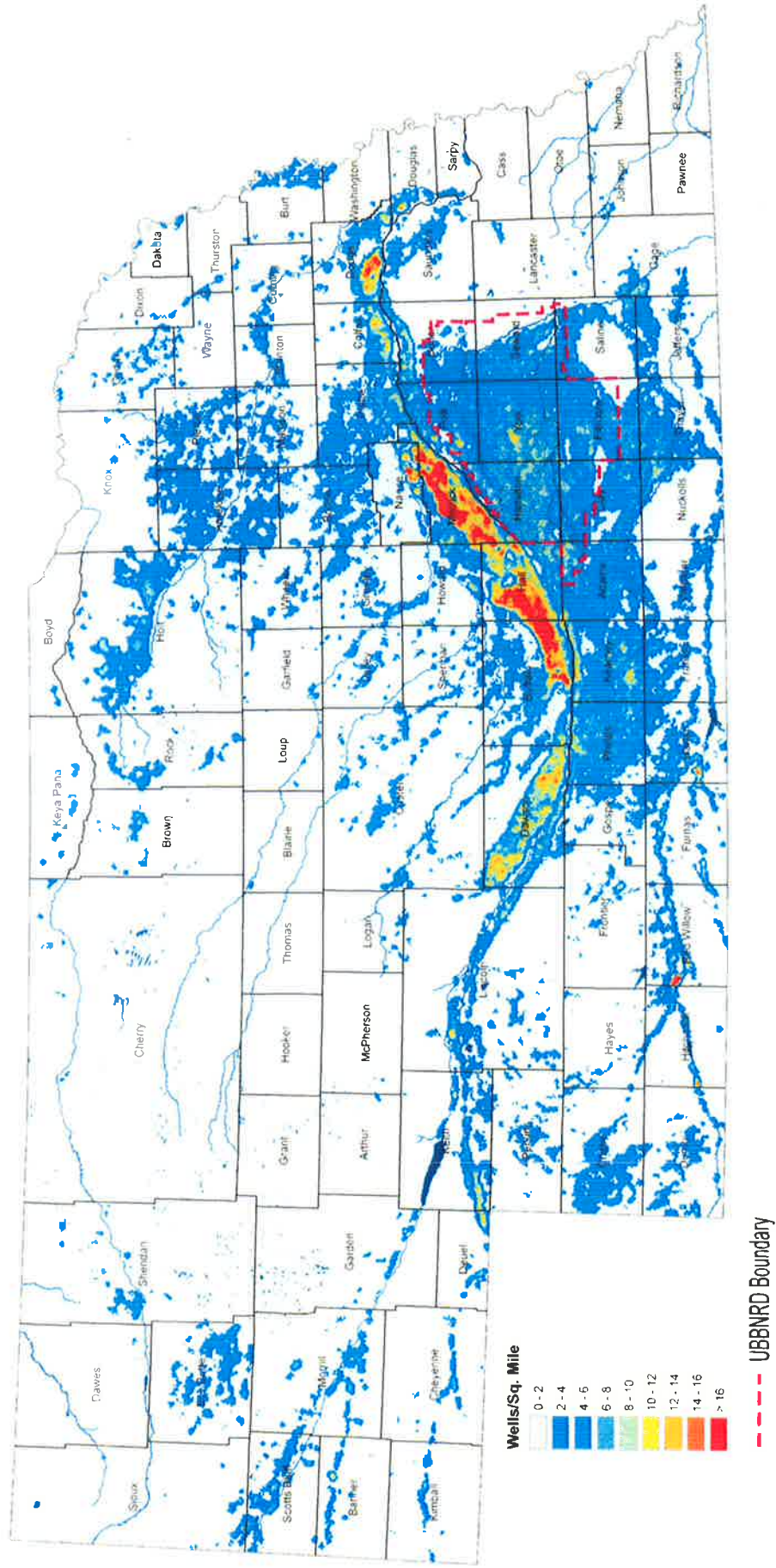
¹ = "Dakota Group" in NGS literature, with three members

² = formerly included in Graneros Shale in Nebraska

⊗ = X-bentonite

Density of Registered Irrigation Wells in Nebraska

August 2005



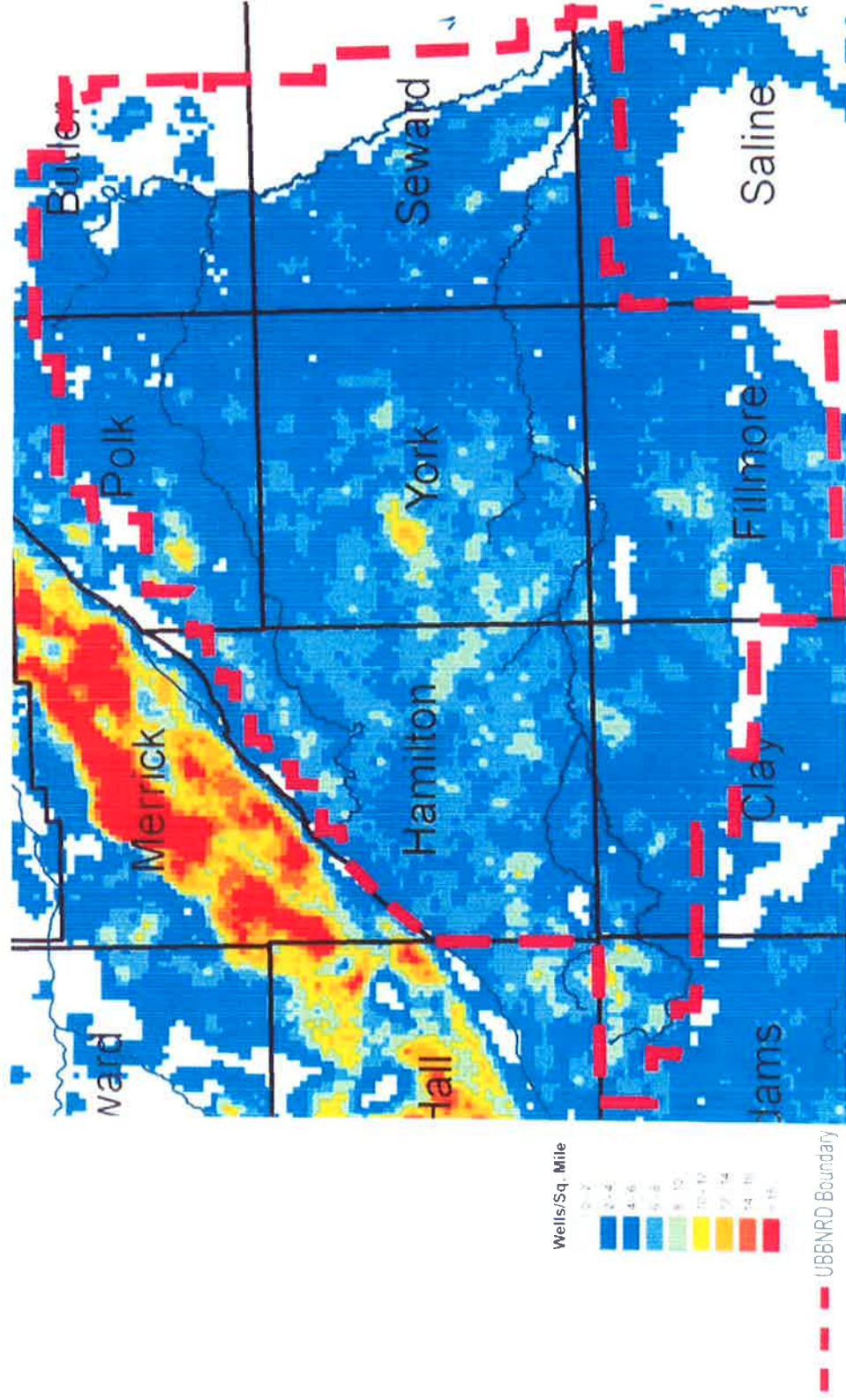
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Mark Burbach, Water Levels Coordinator, CSU

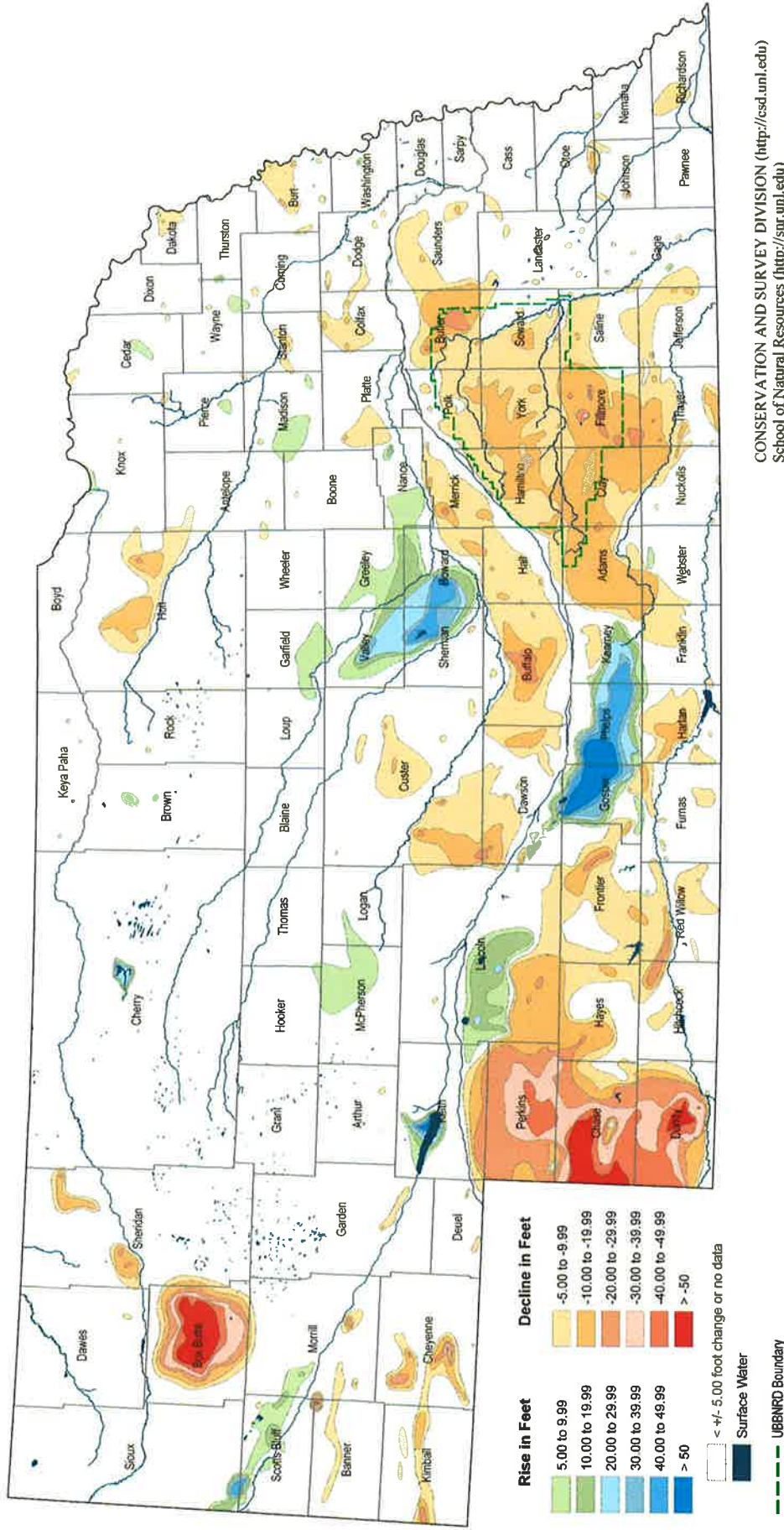


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Density of Registered Irrigation Wells in the Upper Big Blue NRD
August 2005



Groundwater-level Changes in Nebraska - Predevelopment to Spring 2006

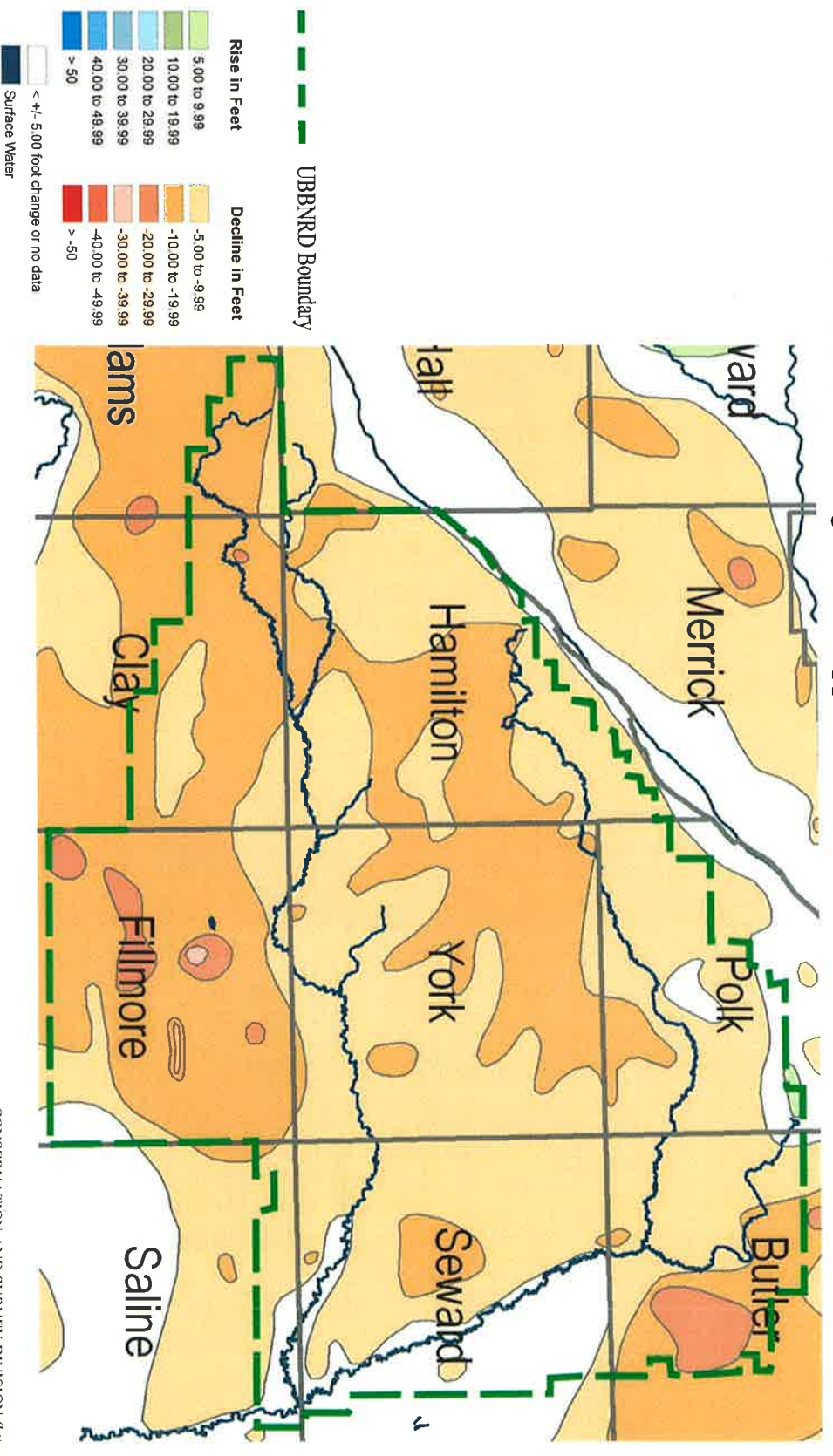


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Groundwater-level Changes in the Upper Big Blue NRD - Predevelopment to Spring 2006



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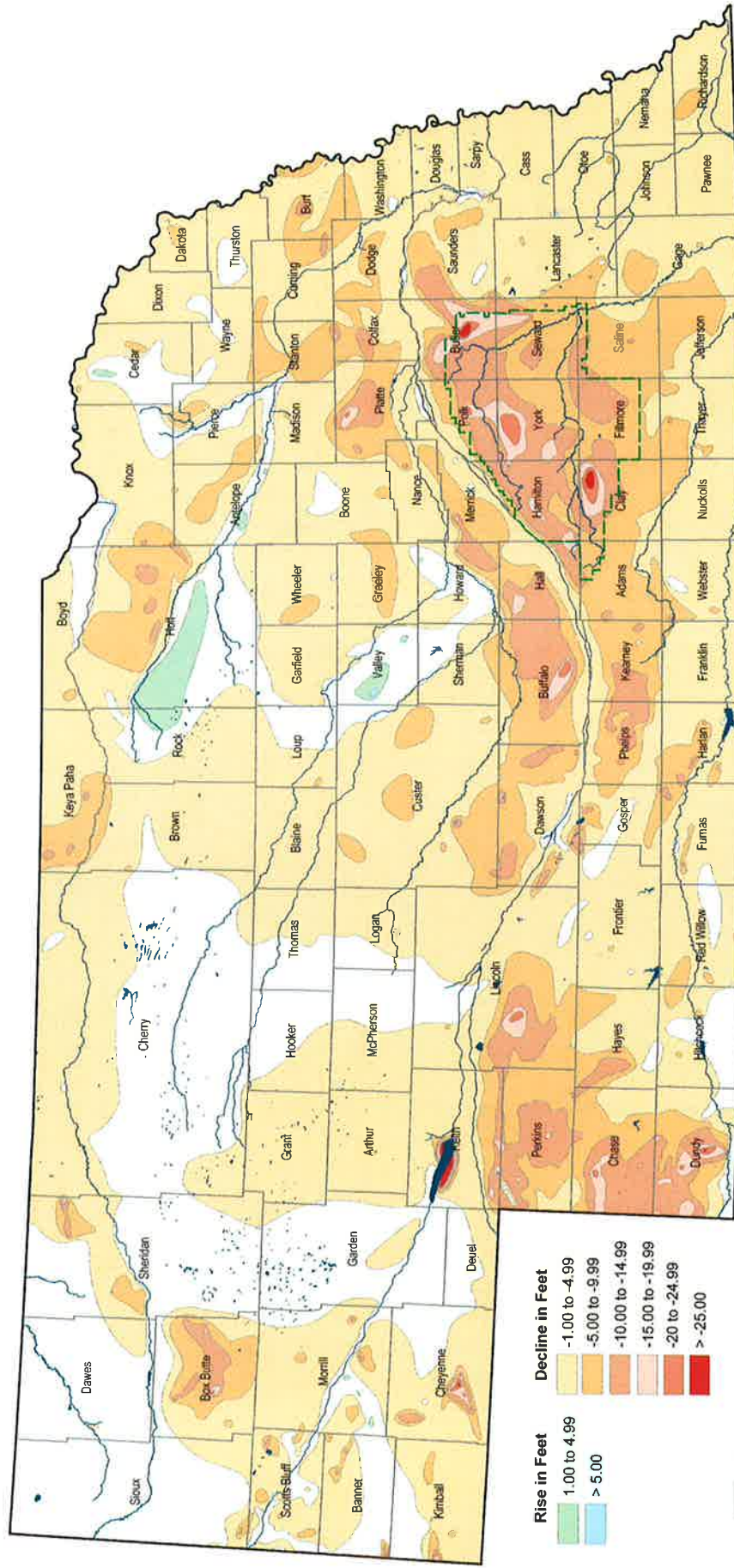
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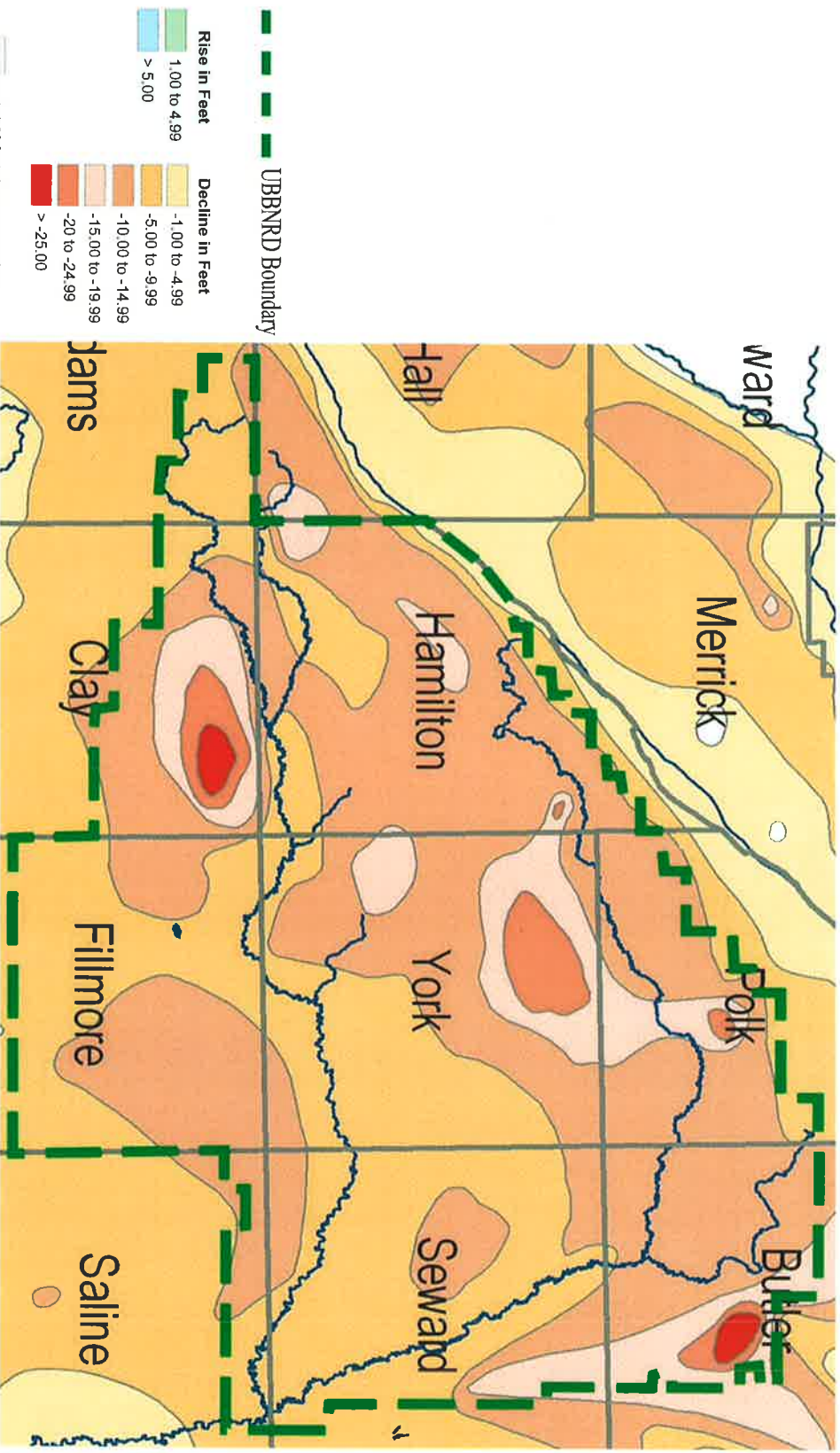
Groundwater-level Changes in Nebraska - Spring 2000 to Spring 2006



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Groundwater-level Changes in the Upper Big Blue NRD - Spring 2000 to Spring 2006



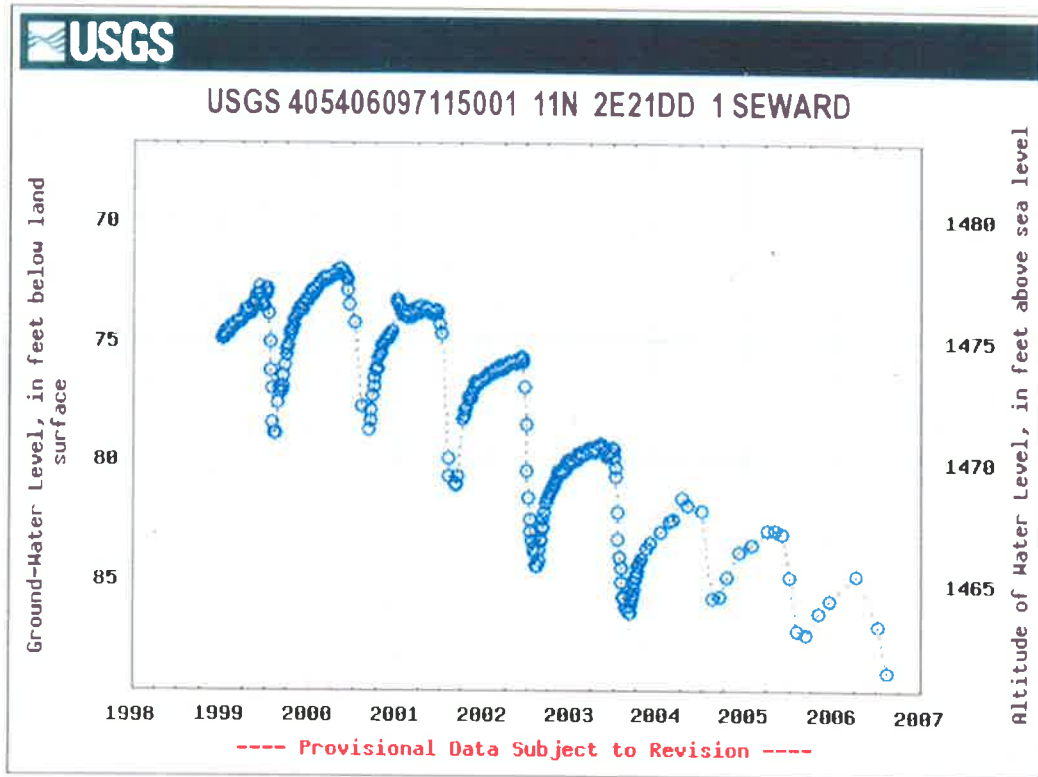
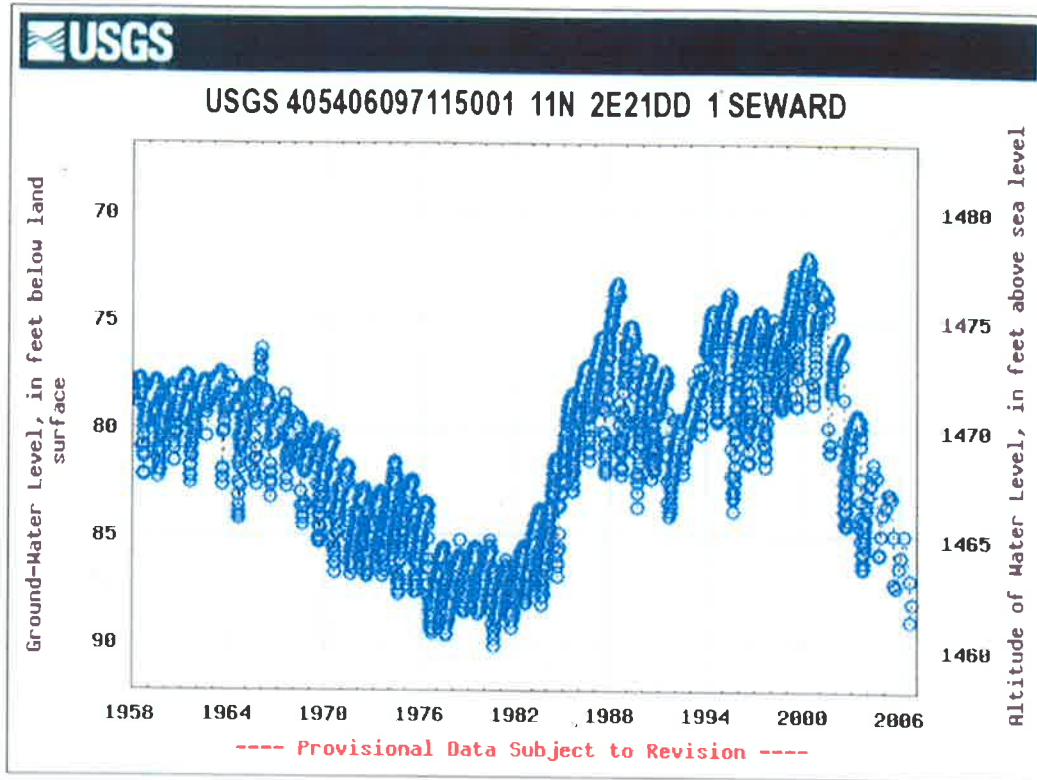
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Seward "Recorder" Well



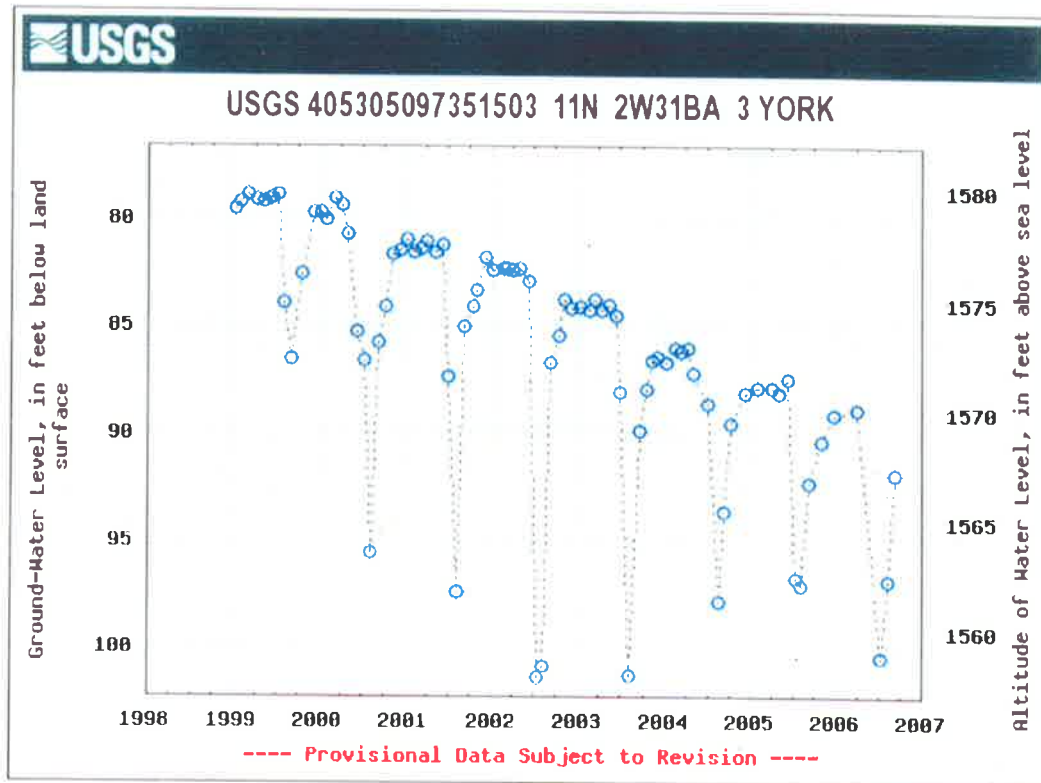
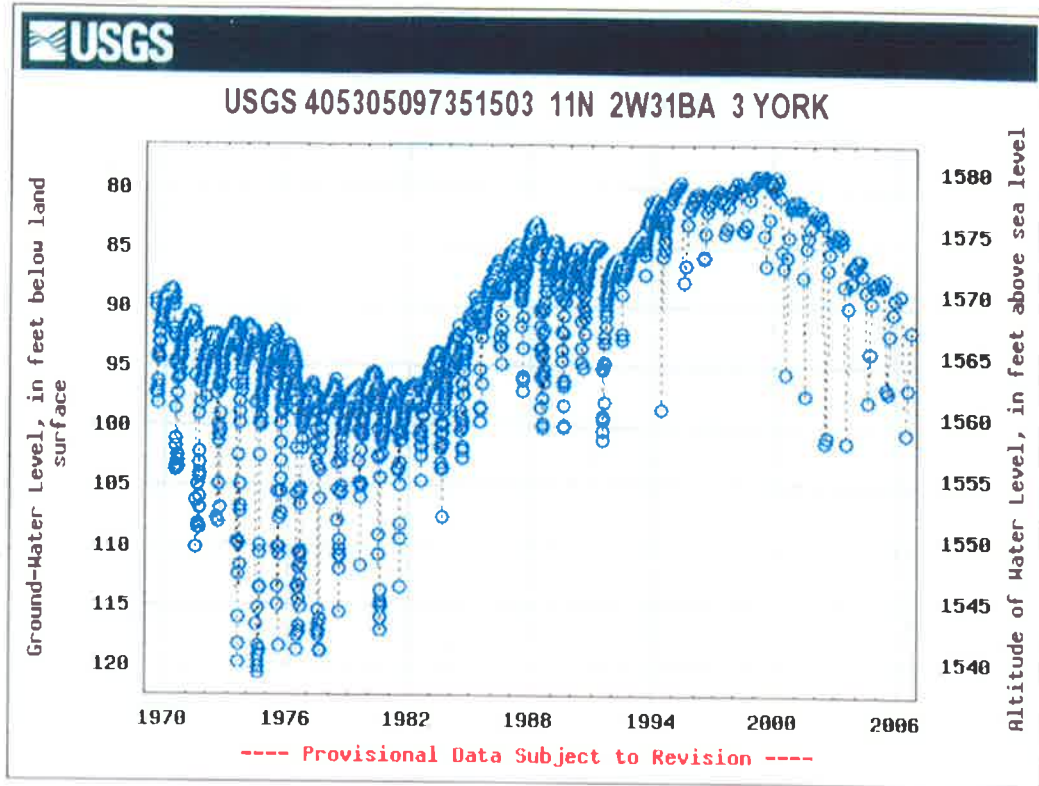
Well Depth = 123 ft

Predevelopment Water Level ~74

Highest Water Level, May 2000, ~72 ft

Deepest Water Level, August 1980, ~90 ft

York Recorder Well

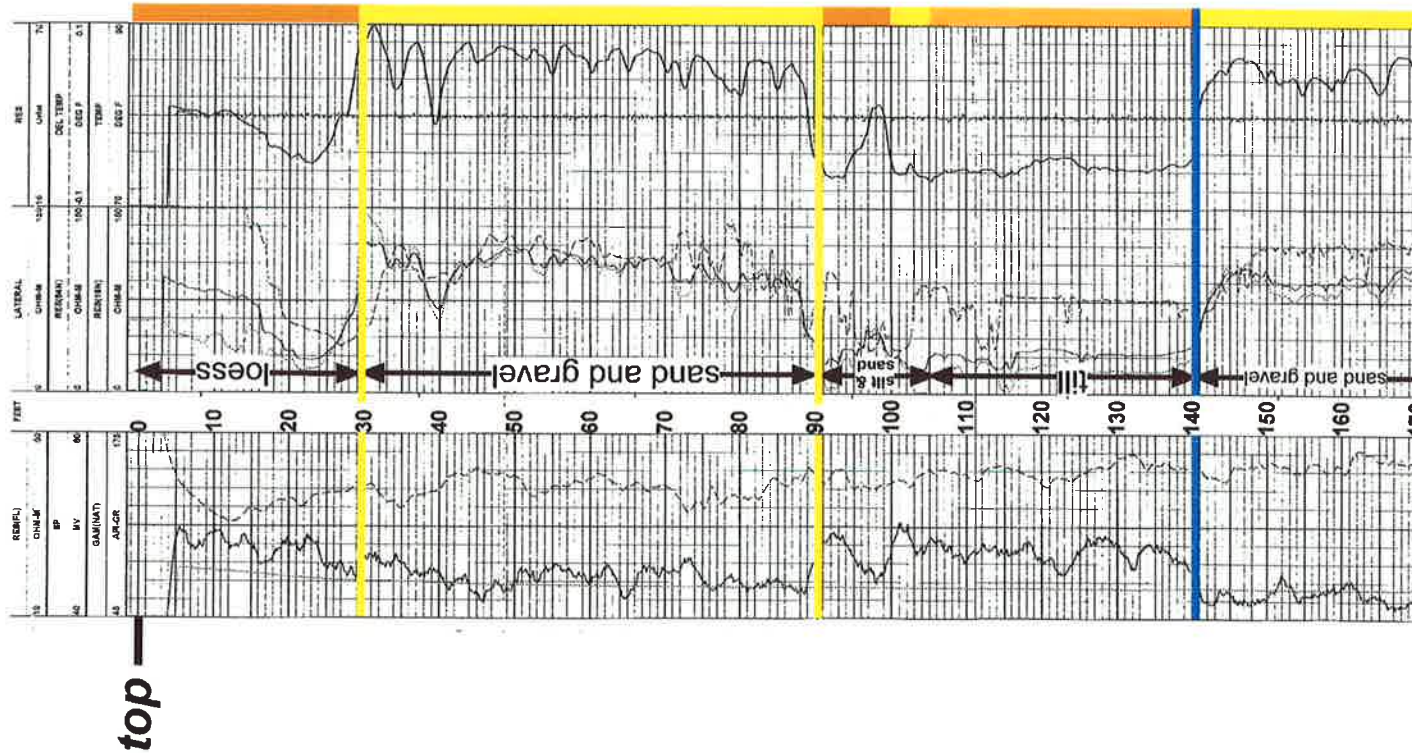


Well Depth = 165 ft

Predevelopment Water Level ~80 ft

Highest Water Level, June 1999, ~79 ft

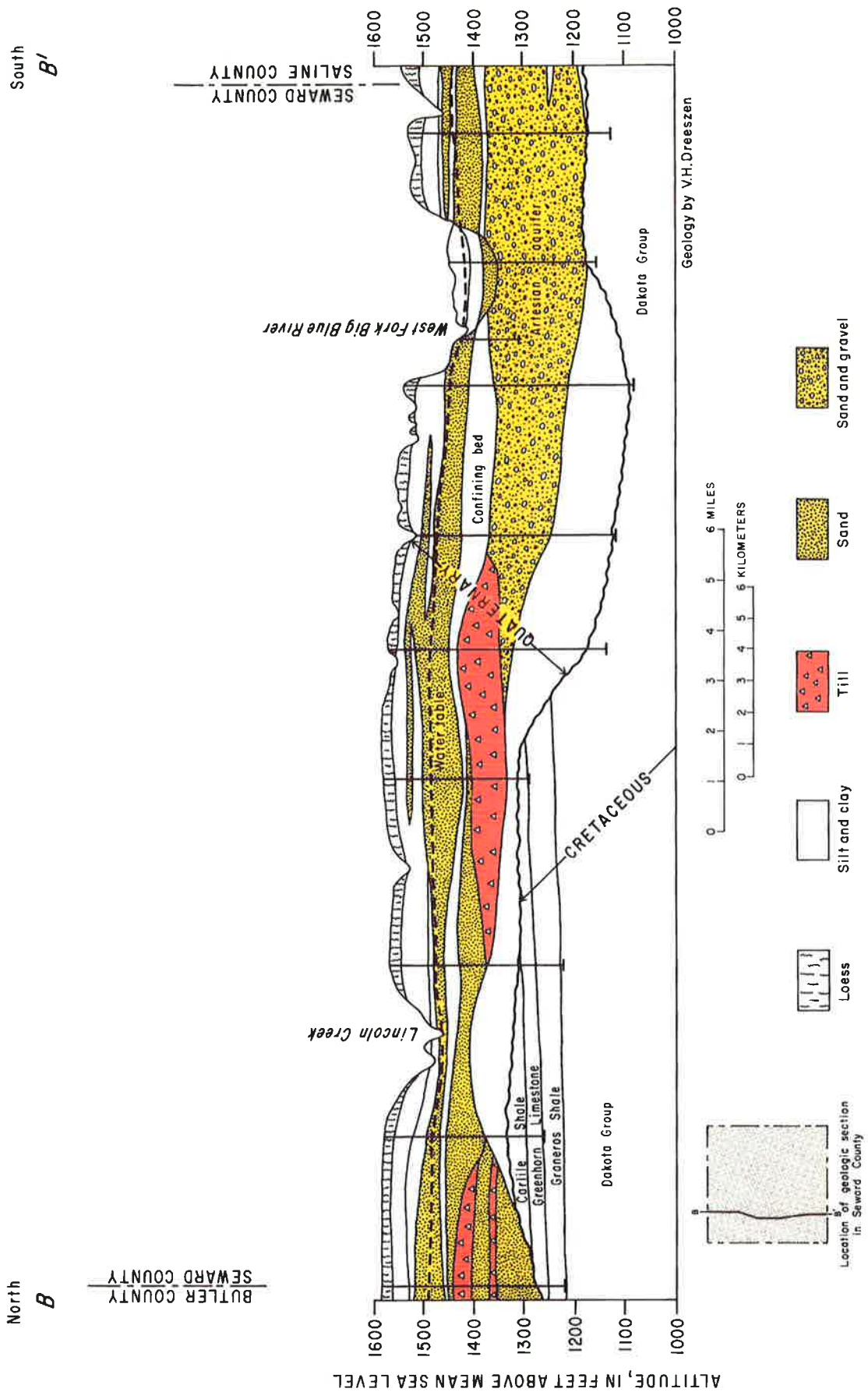
Deepest Water Level, July 1974, ~120 ft



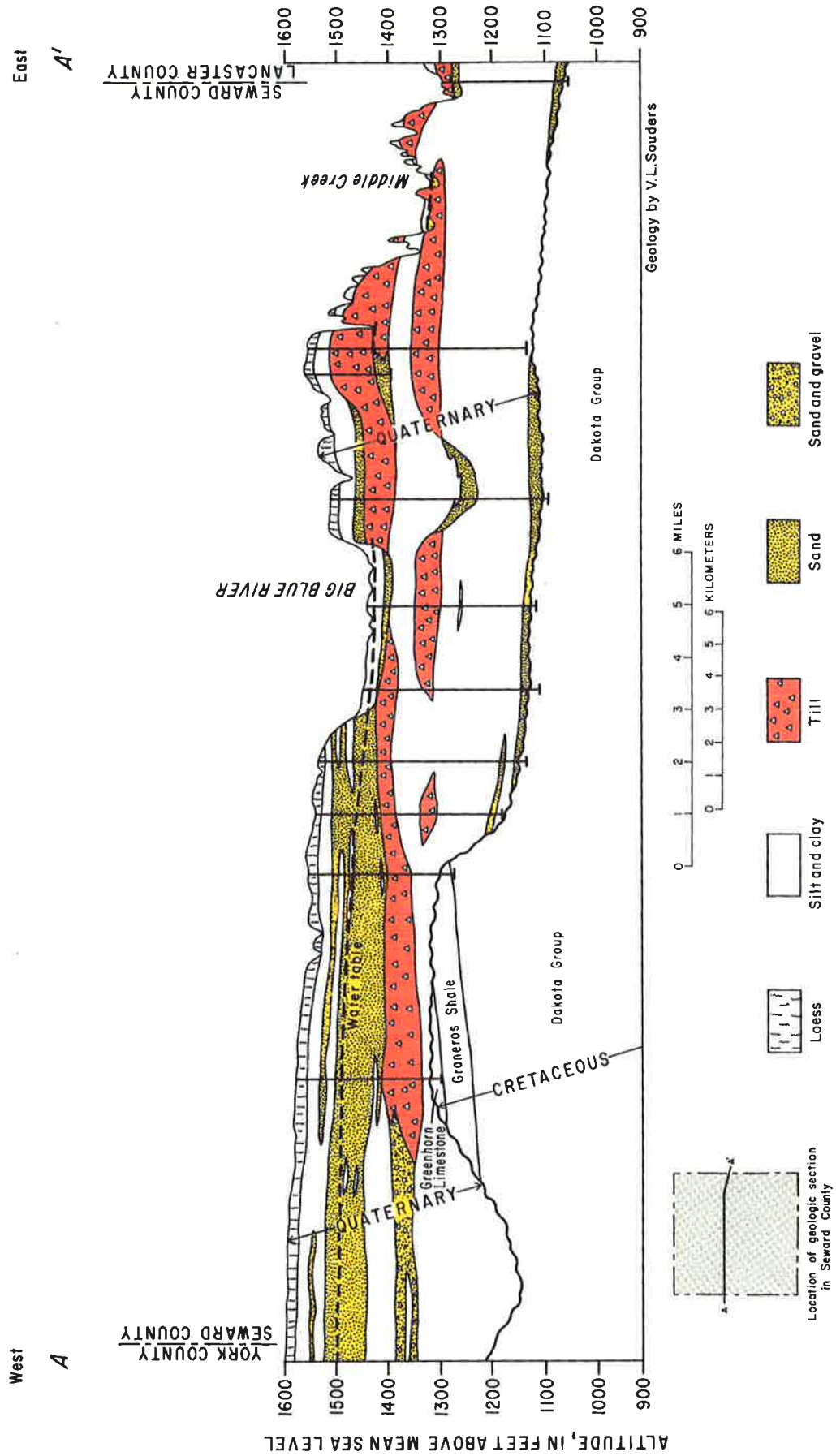
bottom
340 ft
(103.6 m) TD

UBB 01-05: York, Nebraska (Sargent Logging)

GEOLOGIC SECTION ACROSS SEWARD COUNTY

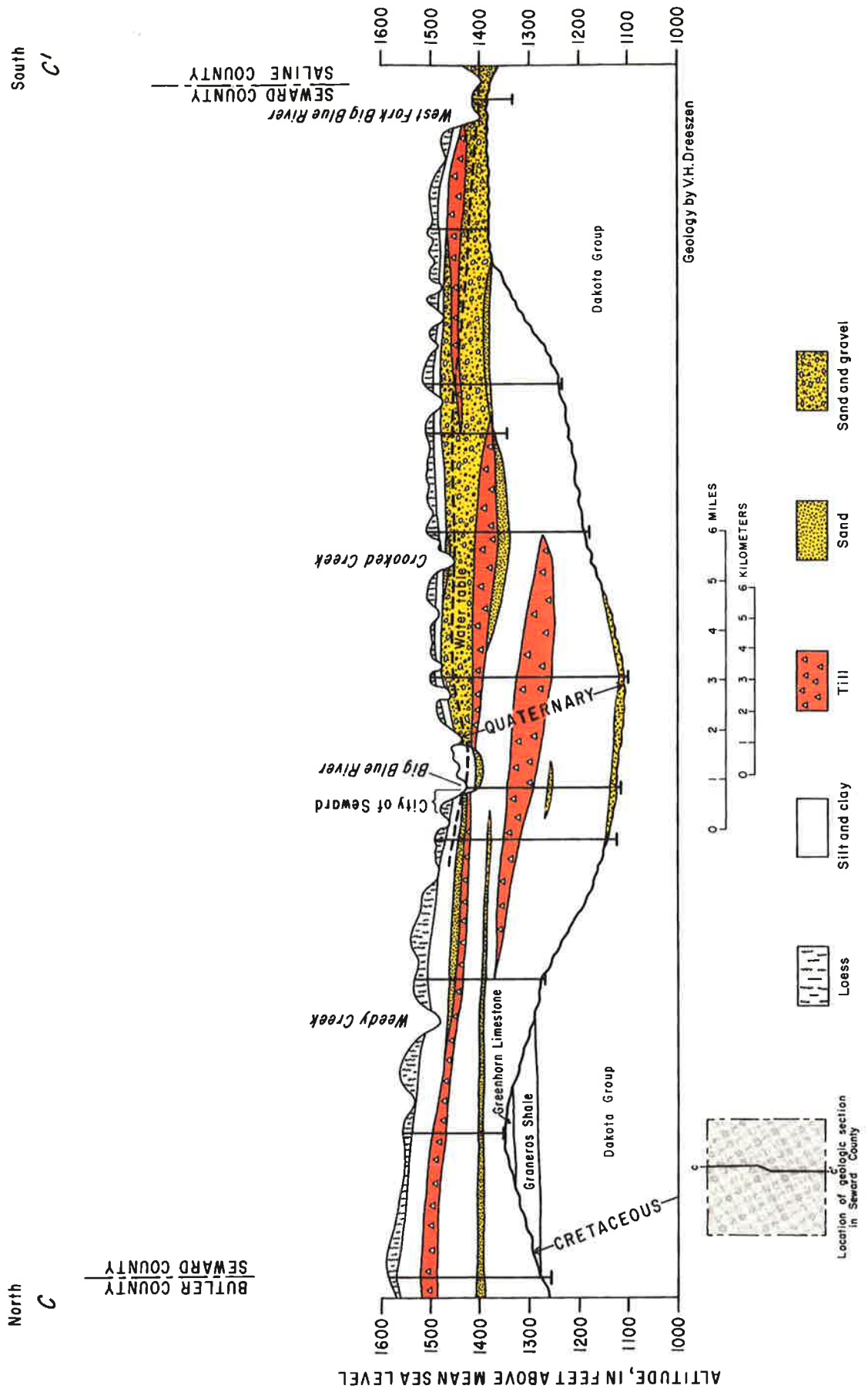


GEOLOGIC SECTION ACROSS SEWARD COUNTY

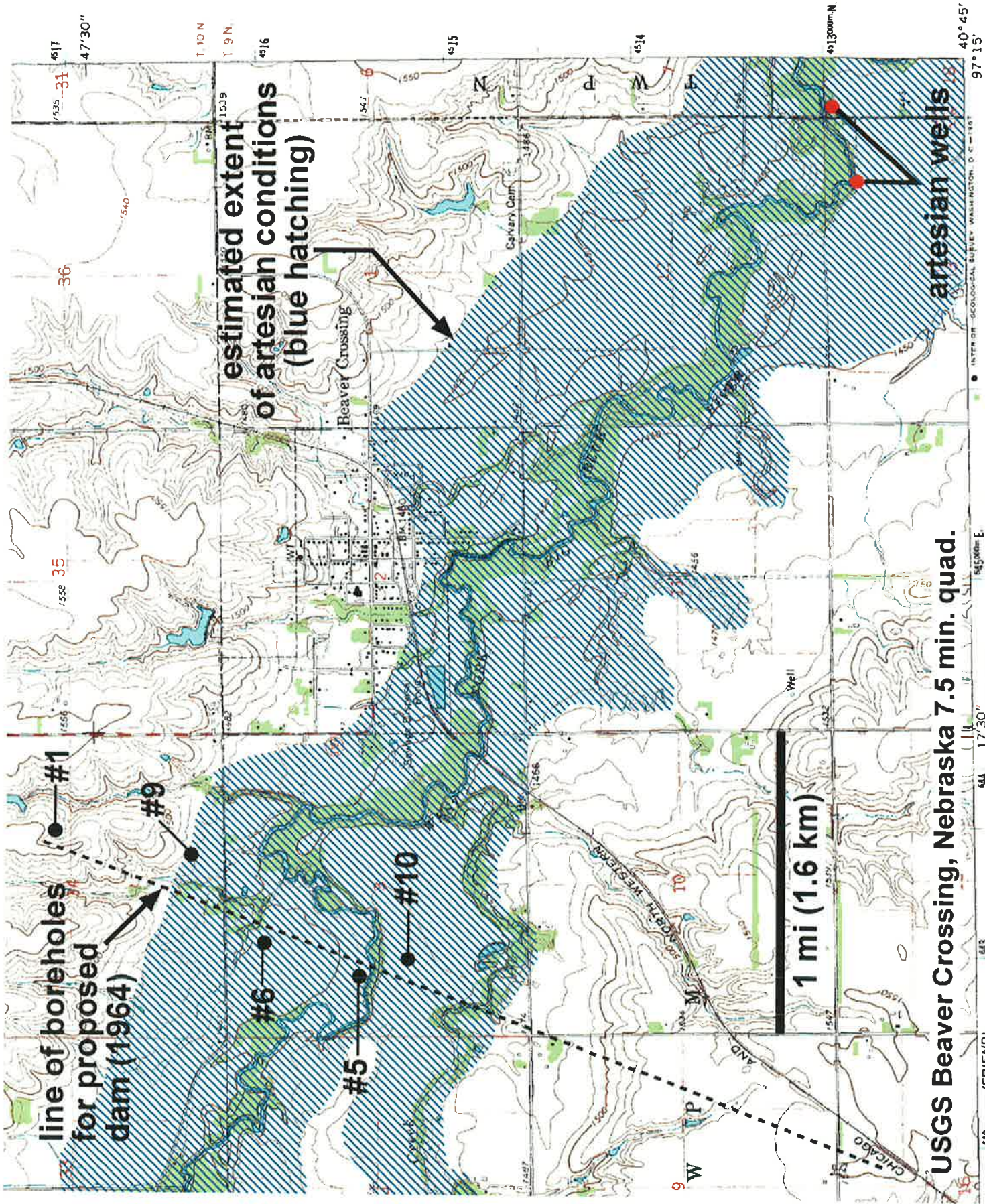


GEOLOGIC SECTION ACROSS SEWARD COUNTY

GEOLOGIC SECTION ACROSS SEWARD COUNTY



GEOLOGIC SECTION ACROSS SEWARD COUNTY



line of boreholes for proposed dam (1964)

estimated extent of artesian conditions (blue hatching)

1 mi (1.6 km)

USGS Beaver Crossing, Nebraska 7.5 min. quad.

artesian wells

42 (FRIEND) 6585 1/1 NE

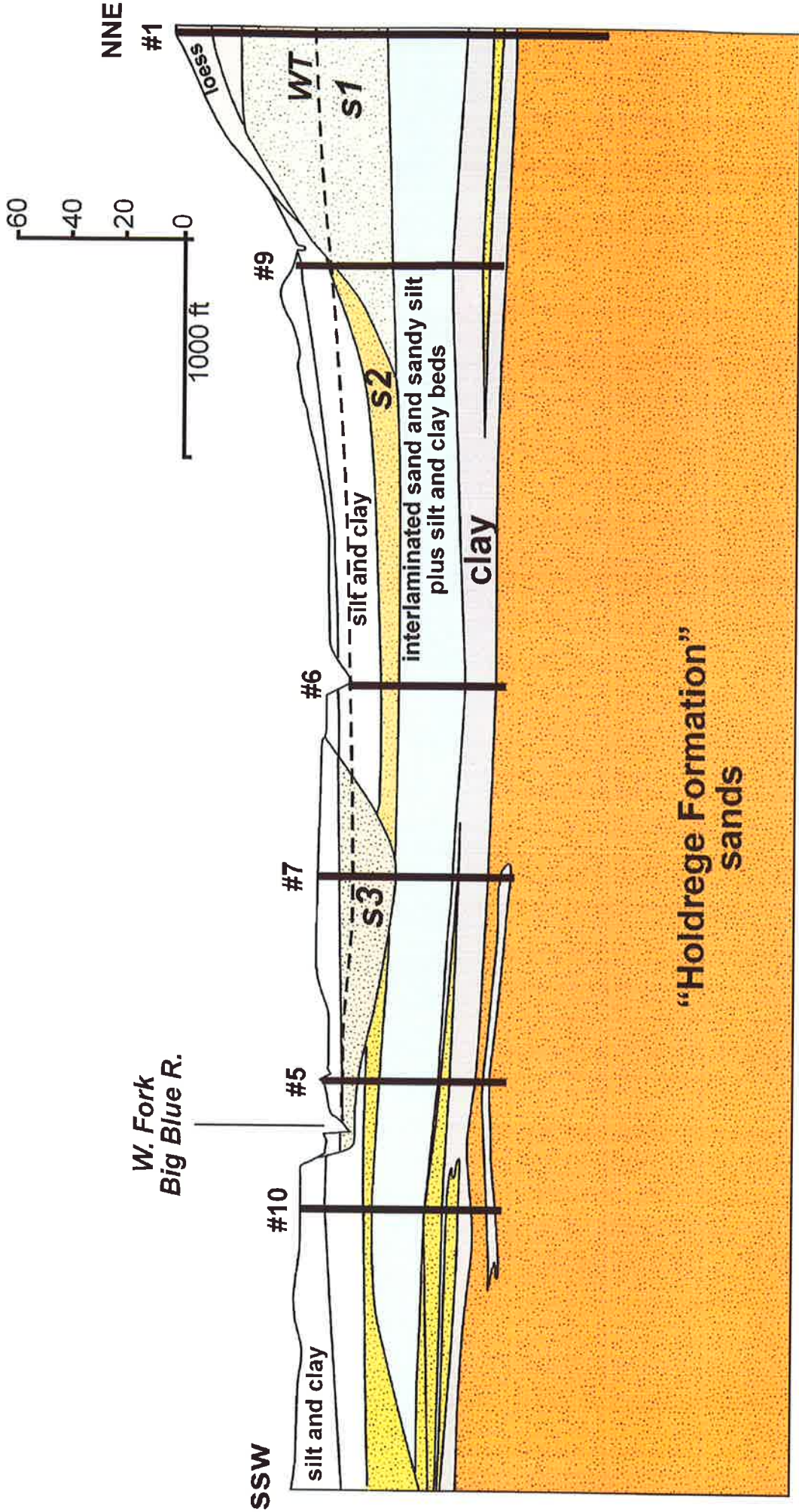
44 17'30" FRIEND 7 MI.

43 14'30" E

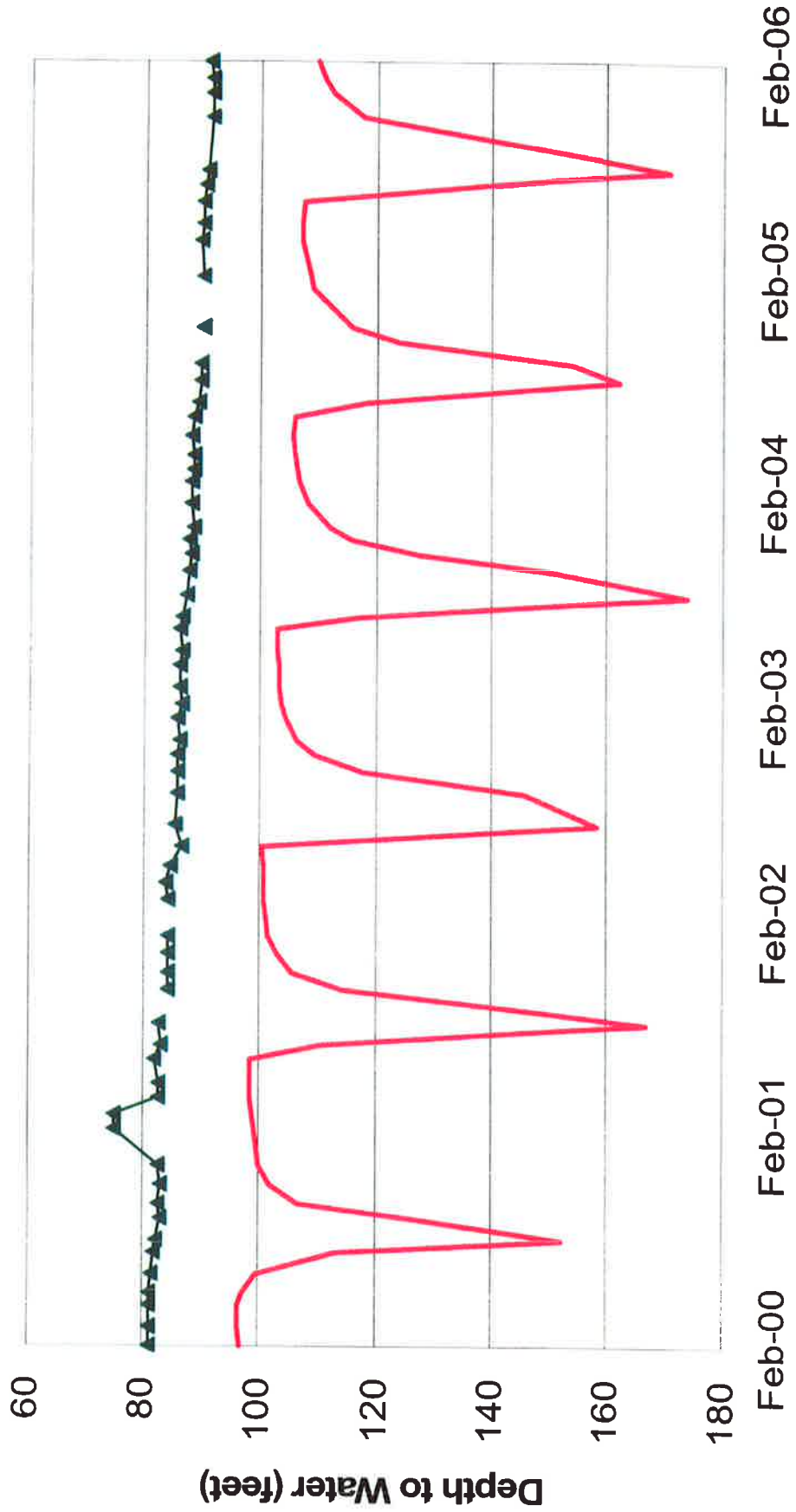
47'30" 97'15"

40° 45'

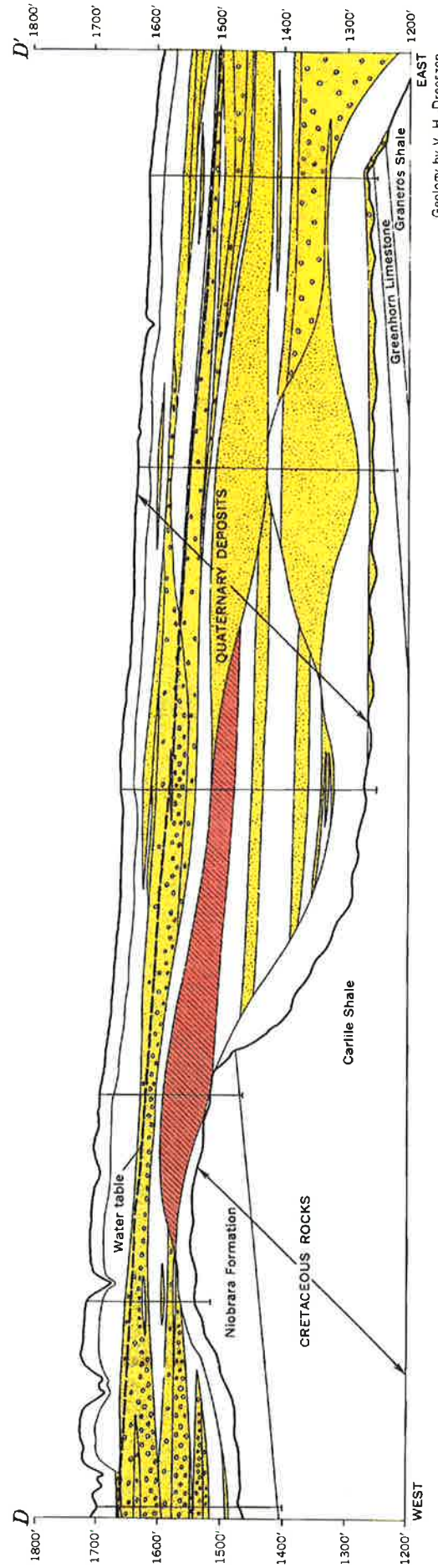
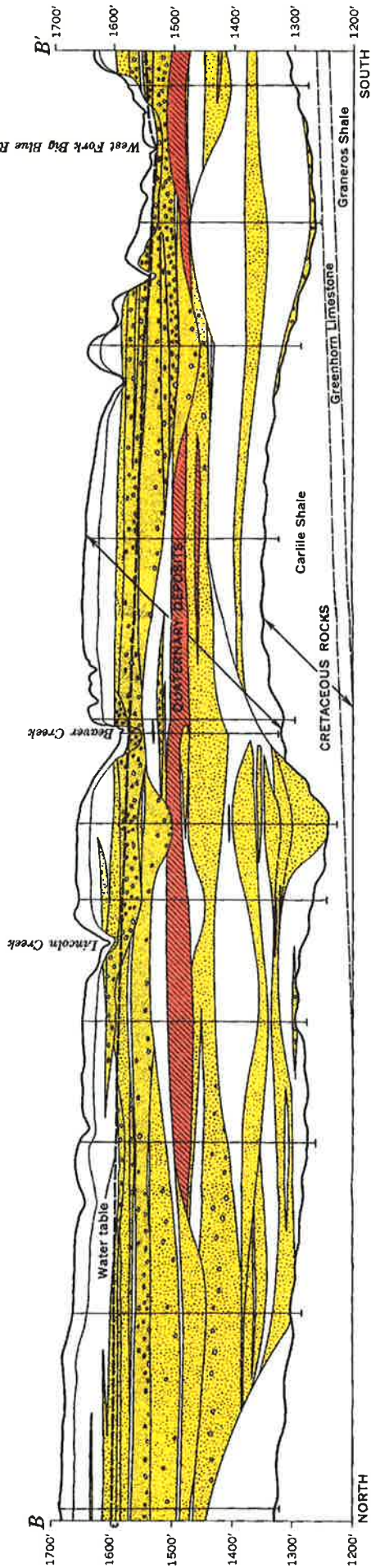
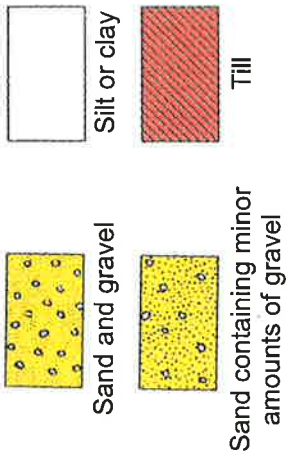
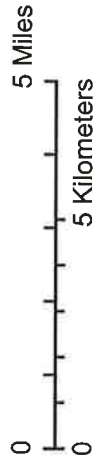
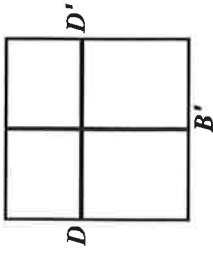
Cross-section parallel to proposed (1964) dam axis, Beaver Crossing, Nebraska



Rising City Shallow and Deep Observation Wells



YORK COUNTY



GEOLOGIC SECTIONS ACROSS YORK COUNTY

An Artesian History of Beaver Crossing

1862 - First settlement, next to a flowing spring named "old land mark". The spring was on the West Fork of the Big Blue River approximately 4 miles northwest of present day Beaver Crossing.

1871 - Town was relocated to its current location closer next to the flour mill on the West Fork of the Big Blue River.

1894 - First artesian well was drilled in the basement of Earl Eagers Mercantile. The well was drilled to 120 ft, had a flow of 10 ft above ground level and a water temperature of 47 degrees Fahrenheit. *Note: Prior to this time, surface water and shallow groundwater (approx 20 ft) was used for drinking water. Mr. Eagers original well was 20 ft deep and the water quality had turned poor.*

1894 + - Many new artesian wells were drilled within town and 3 -4 miles above and below the town. Wells were drilled between 110 and 140 ft deep and were cased with 1 - 5 inch pipe. Most Beaver Crossing residents utilized "milk tanks" cooled by artesian water for food preservation.

1905 - Cisterns were built by the city for fire suppression that were filled via artesian wells. One well had a documented flow of 43 gpm.

1908 - Artesian Park was officially open. Fed by artesian wells, it was 225 feet across and had a documented capacity of 1500 swimmers (7/17/19).

1920's - Smileys Water Gardens opened as a trout farm. Using artesian wells to feed 9 concrete ponds (50 x 8 x 3 ft deep), the water temperature was a constant 54 degrees Fahrenheit.

1931 - Smileys Water Gardens consisted of 50 ponds for trout, goldfish, 37 varieties of water lilies, and 200 varieties of dahlias and iris.

1930's - Drought struck the area and most of the wells in town stopped flowing. A committee was formed to find and cap all of the "wild wells". Once the "wild wells" were capped, flow was restored.

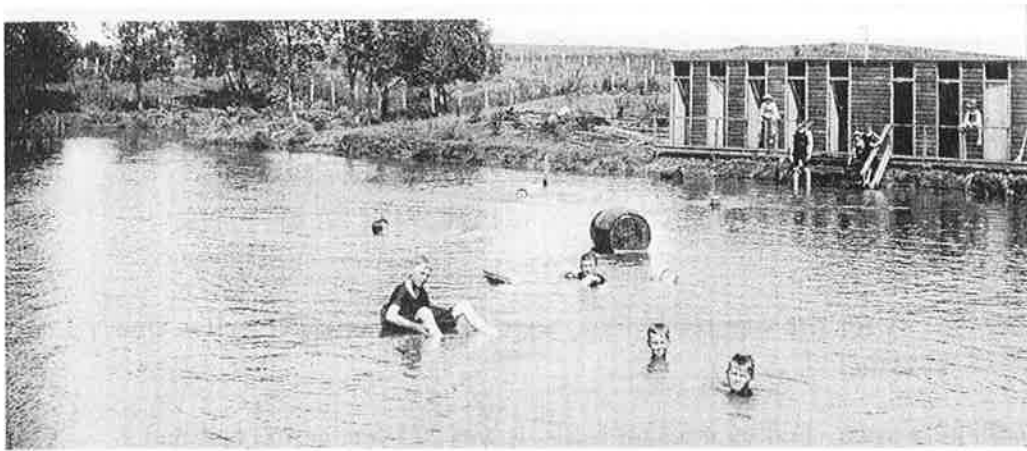
1937 - C.F. Dimery drilled a city well for the newly organized public works. The well was 130 ft deep, utilized a 10-inch casing and had a flow of 200 gpm.

1938 - Erle Smiley dies and Smileys Water Gardens close.

1940's - Irrigation comes to Nebraska.

1946 - Artesian park closes.

Artesian Well



Top & Left – Artesian Park (1908 – 1946).
Largest swimming pool in Nebraska. Fed by artesian wells, 225 feet across and had a documented capacity of 1500 swimmers.



Left & Bottom – Smiley Water Gardens (1920's – 1938). Fifty interconnected ponds fed by artesian wells. Commercially raised trout, goldfish, water lilies, dahlias, and iris.

