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South Central Plains Hydrogeologic Summary from *Domestic Well-water Quality in Rural Nebraska*

(A data-analysis report for the Nebraska Department of Health compiled by D. C. Gosselin and others, 1996)

Groundwater Region 4

Groundwater Region 4 occupies the South Central Plains area of Nebraska and has an abundant groundwater supply (fig. 1). Pliocene and Pleistocene sand and gravel deposits, as well as the Ogallala Group, are the primary sources of groundwater and yield substantial amounts of water to wells. The Tertiary Ogallala Group, occurring in the western part of region, was deposited on the eroded, southeastern-sloping surface of the Cretaceous rocks. As much as 200 feet thick, the Ogallala Group consists of lime-cemented sand and gravel, loess-like silt, and unconsolidated sand and gravel. The overlying Quaternary system consists of more than 500 feet of clay, silt, sand, and gravel deposited by glacial and river-related processes. Deposits of wind-blown silt (loess) mantle the surface. (Geologic cross sections are available on request from the Conservation and Survey Division.*)

In the eastern part of the region, the base of the principal groundwater-bearing units is the Lower Cretaceous Dakota Group, which consists of interbedded layers of sandstone and shale (table 1). The Dakota Group ranges in thickness from 350 to 400 feet and overlies less permeable Permian shale and limestone deposits. Although not widely used in region 4 as a water supply because of its highly mineralized water and relatively deep depths to water, the Dakota Group could be used as a secondary source of groundwater. In the rest of the region, the base of the principal groundwater-bearing units is the top of the low-permeability deposits of shale, shaly chalk and limestone that make up the following Upper Cretaceous formations that overlie the Dakota Group: Greenhorn-Graneros, Carlile, Niobrara, and Pierre.

Depth to the regional water table ranges from less than 50 feet to more than 200 feet. The saturated thicknesses of the several geologic units range from about 100 feet or less to about 300 feet or more. Generally, the water quality is good, and dissolved concentrations of mineral constituents typically range from 200 to 500 milligrams per liter.

***Cross sections for this or other regions of the state (fig. 1—Locations of geologic cross sections) are available from the Conservation and Survey Division for a small fee. Well-water quality data from this study can be obtained from the Nebraska Department of Health and Human Services. To contact CSD, write: Map and Publications Sales/Conservation and Survey Division/113 Nebraska Hall/University of Nebraska-Lincoln/68588-0517; or call: (402) 472-7523.**

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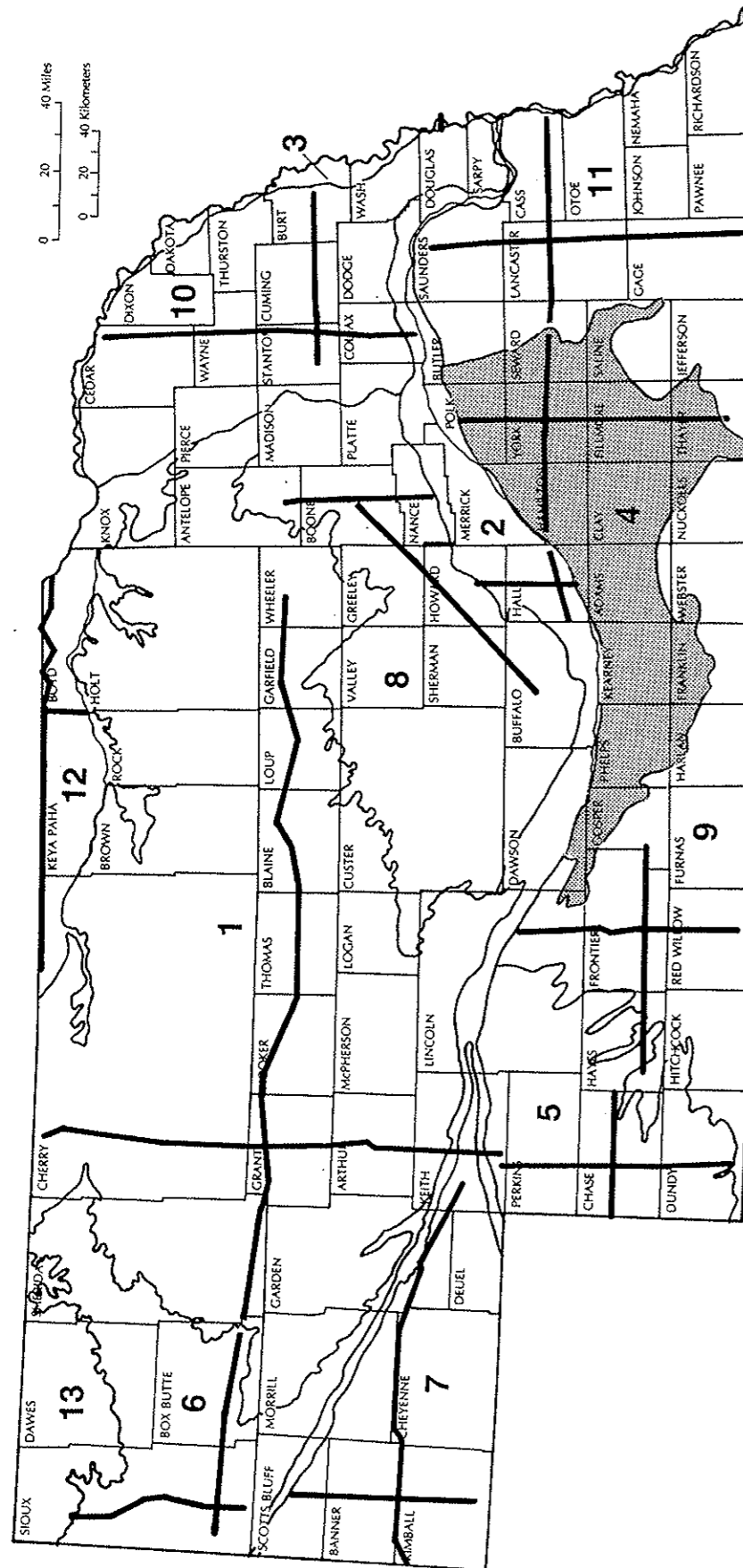


Fig. 1—Locations of geologic cross sections (Region 4 in gray)

Water-bearing Properties of Major Rock Units in Nebraska								
Era	From <i>The Groundwater Atlas of Nebraska</i> Conservation and Survey Division, University of Nebraska-Lincoln							
	Period	Epoch	Millions of years	Group or Formation	Lithology	Water-bearing Properties		
Cenozoic	Quaternary	Holocene	0.01		Sand, silt, gravel and clay	Principal groundwater reservoir; Ogallala is absent in east and northwest. Arikaree is present primarily in west.		
		Pleistocene	~2.0		Sand, gravel and silt			
	Oligocene	Pliocene	5	Ogallala	Sand, sandstone, siltstone and some gravel			
		Miocene	24	Arikaree	Sandstone and siltstone			
		White River			Siltstone, sandstone and clay in lower part		Secondary aquifer in west; water may be highly mineralized.	
	Eocene	37	Rocks of this age are not identified in Nebraska.					
	Paleocene	58	Rocks of this age are not identified in Nebraska.					
Mesozoic	Cretaceous	Late Cretaceous	Lance	Fox Hills	Sandstone and siltstone	Generally not an aquifer; yields water to few wells in west.		
			Pierre				Shale and some sandstone in west	Generally not an aquifer; sandstones in west yield highly mineralized water to few industrial wells.
			Niobrara	Shaly chalk and limestone	Secondary aquifer where fractured and at shallow depths, primarily in east.			
			Carlile	Shale; in some areas contains sandstones in upper part	Generally not an aquifer; sandstones yield water to few wells in northeast.			
			Greenhorn-Graneros	Limestone and shale	Generally not an aquifer, yields water to few wells in east.			
		Early Cretaceous	98	Dakota	Sandstone and shale	Secondary aquifer, primarily in east; water may be highly mineralized.		
		Jurassic	144		Siltstone and some sandstone	Not an aquifer		
		Triassic	208		Siltstone	Not an aquifer		
		Paleozoic		Permian	245		Limestone, dolomites, shales and sandstone.	Some sandstone, limestone and dolomites are secondary aquifers in east. Water may be highly mineralized.
				Pennsylvanian	286			
Mississippian	320							
Devonian	360							
Silurian	408							
Ordovician	438							
Cambrian	505							
Precambrian	570							

Table 1—Hydrostratigraphic chart (showing water-bearing rock units) of Nebraska
Time divisions are not to scale.

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