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Regional Hydrogeologic Summaries from Domestic Well-water Quality in Rural Nebraska – East Central Dissected Plains

D. C. Gosselin

University of Nebraska - Lincoln

J. Headrick

X-H. Chen

S. E. Summerside

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East Central Dissected 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 8

Groundwater Region 8 occupies the area known as the East Central Dissected Plains (fig. 1). In this region, the base of the principal groundwater-bearing units is the eroded surface of the Cretaceous Pierre Shale. Overlying this unit is the Tertiary Ogallala Group, composed of fine- to medium-grained silty sand and sandstone, siltstone, sandy and clayey silt, and lesser amounts of volcanic ash. As much as 400 feet thick in the western part of the region, the Ogallala Group thins eastward until it is virtually absent in south-central Madison County, most of Platte County and a small area in eastern Buffalo County. The Ogallala Group is overlain by a complex series of Quaternary deposits consisting of river- and wind-deposited gravel, sand and silt that are thickest where they fill ancient valleys (paleovalleys). These deposits are mantled by wind-blown silt (loess). (Geologic cross sections are available by request from the Conservation and Survey Division.*)

The Quaternary deposits and the Ogallala Group are the primary units from which groundwater is pumped (table 1). The thicknesses of the primary groundwater-bearing units range from about 100 feet or less to about 500 feet or more. Depth to the regional water table varies as a function of topographic location. In upland areas, depth to water may be greater than 200 feet, whereas it may be less than 50 feet below the bottomlands in the principal valleys. The general water quality is good; natural dissolved solids range from 200 to 500 parts per million.

***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. The report *Domestic Well-water quality in Rural Nebraska* is available from the Nebraska Department of Health and Human Services. Photocopies are available at CSD; write: Map and Publications Sales/Conservation and Survey Division/113 Nebraska Hall/University of Nebraska-Lincoln/68588-0517; or call: (402) 472-7523.**

Sources of Information

- Gosselin, D.C., 1991, Bazile Triangle Groundwater Quality Study, Nebraska Water Survey Paper No. 68: University of Nebraska - Lincoln, Conservation and Survey Division, 29 p.
- Sniegocki, R.T., 1959, Geologic and Ground-Water Reconnaissance of the Loup River Drainage Basin, Nebraska: U.S. Geological Survey, Water-Supply Paper 1493, 105 p.
- Svoboda, G.R., 1959, Preliminary Groundwater Study - Boone County, Nebraska University of Nebraska, Conservation and Survey Division, 7 figures.

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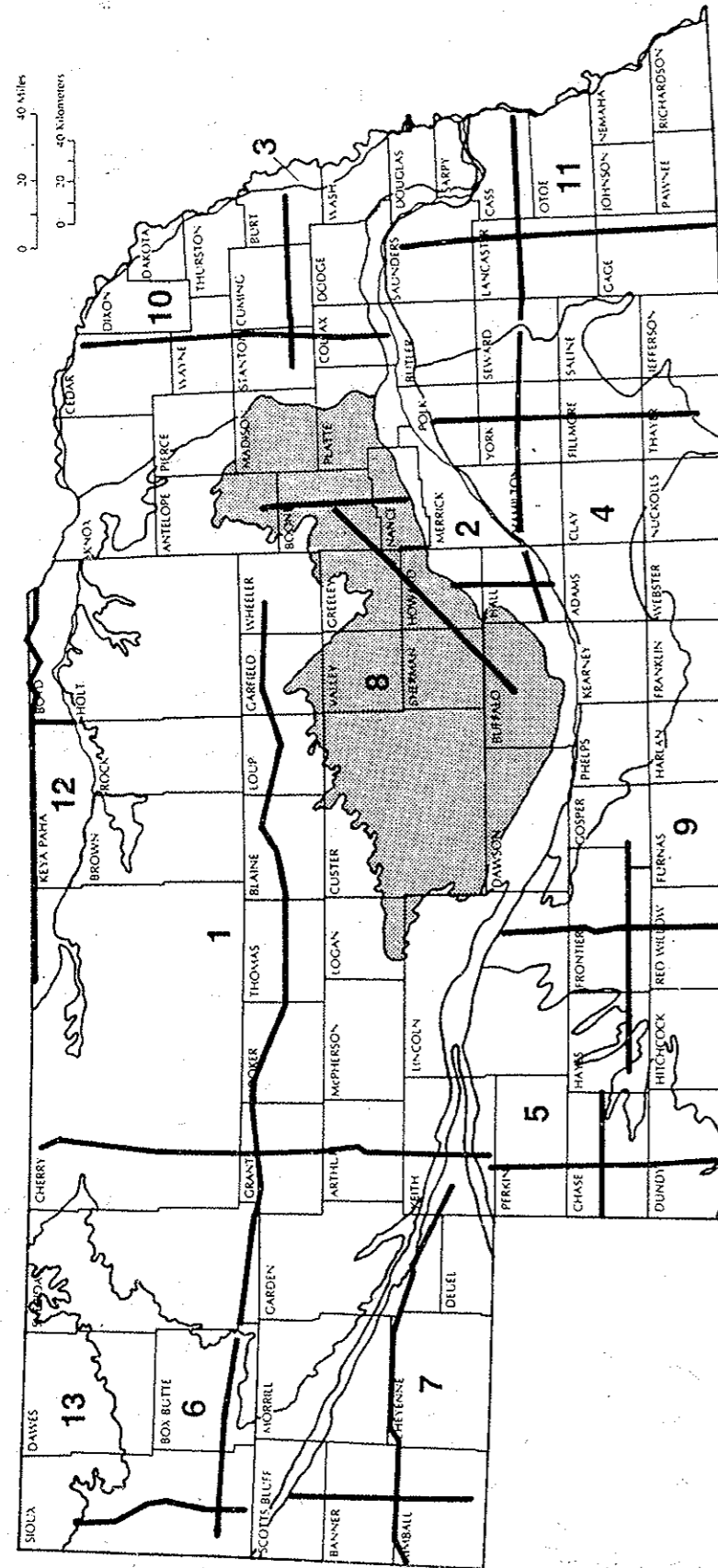


Fig. 1—Locations of geologic cross sections (Region 8 in gray)

Water-bearing Properties of Major Rock Units in Nebraska						
From <i>The Groundwater Atlas of Nebraska</i>			Conservation and Survey Division, University of Nebraska-Lincoln			
Era	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				
		Pliocene	~2.0		Sand, gravel and silt	
		Miocene	5	Ogallala	Sand, sandstone, siltstone and some gravel	
		Oligocene	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	67	Lance	Sandstone and siltstone	Generally not an aquifer; yields water to few wells in west.
			Fox Hills			
		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
		Triassic	208		Siltstone	Not an aquifer
		Paleozoic	Permian	245		
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.

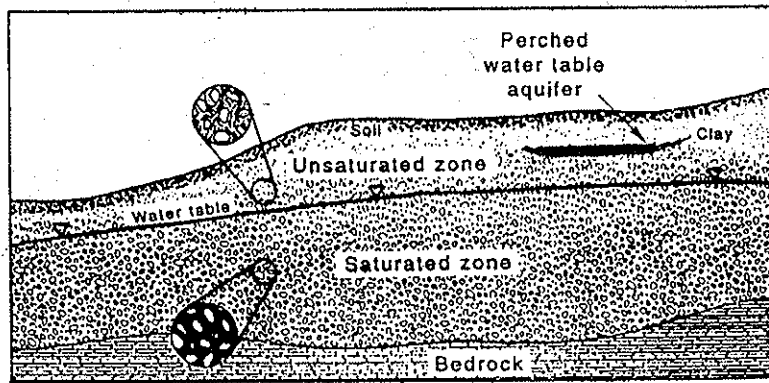
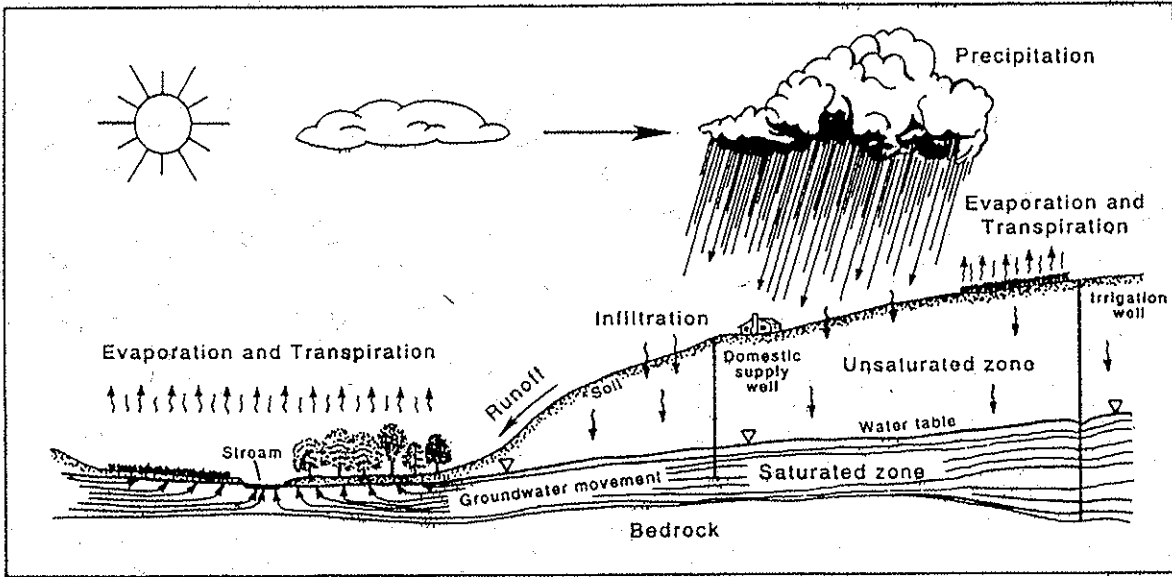


Fig. 2—Groundwater cycle and idealized cross section