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Regional Hydrogeologic Summaries from Domestic Well-water Quality in Rural Nebraska – Missouri River Lowlands

D. C. Gosselin

University of Nebraska - Lincoln

J. Headrick

X- H. Chen

S. E. Summerside

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Missouri River Lowlands 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 3

Groundwater Region 3 occupies the lowlands of the Missouri River valley (fig. 1). The principal aquifer is composed primarily of Quaternary river-deposited (alluvial) sand and gravel beneath the floodplain of the Missouri River. These deposits are generally less than 100 feet thick and consist primarily of fine- to medium-grained sand and fine-grained gravel interlayered with lesser amounts of silt and clay. In some areas, deposits associated with glacial activity occur beneath the more recent river deposits; these mostly consist of clay-rich glacial till and fine- to coarse-grained sediments washed out of glaciers and/or alluvium. The glacier-related deposits occur mostly in ancient valleys (paleovalleys) that cut into bedrock under the Missouri River valley. Depth to water is usually less than 50 feet. Saturated thickness of the principal aquifer is less than 100 feet. (Geologic cross sections are available from the Conservation and Survey Division.*)

In the South Sioux City area, the Dakota Group is present beneath the alluvial and glacial deposits (table 1). In this area, the Dakota Group sandstone is used as another source of groundwater. South of Sioux City, the base of the aquifer consists of limestone and shale of Pennsylvanian age. Upstream from Sioux City, the base of the principal aquifer conforms to the surface of the Cretaceous rocks, which include the Greenhorn-Graneros, Carlile and Niobrara formations, as well as the Dakota Group.

***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

Burchett, R.R., 1965, Correlation of Formations Drilled in Test Holes for Interstate 480 Bridge between Omaha, Nebraska and Council Bluffs, Iowa: Nebraska Geological Survey Paper 17, University of Nebraska, Conservation and Survey Division, 30 p.

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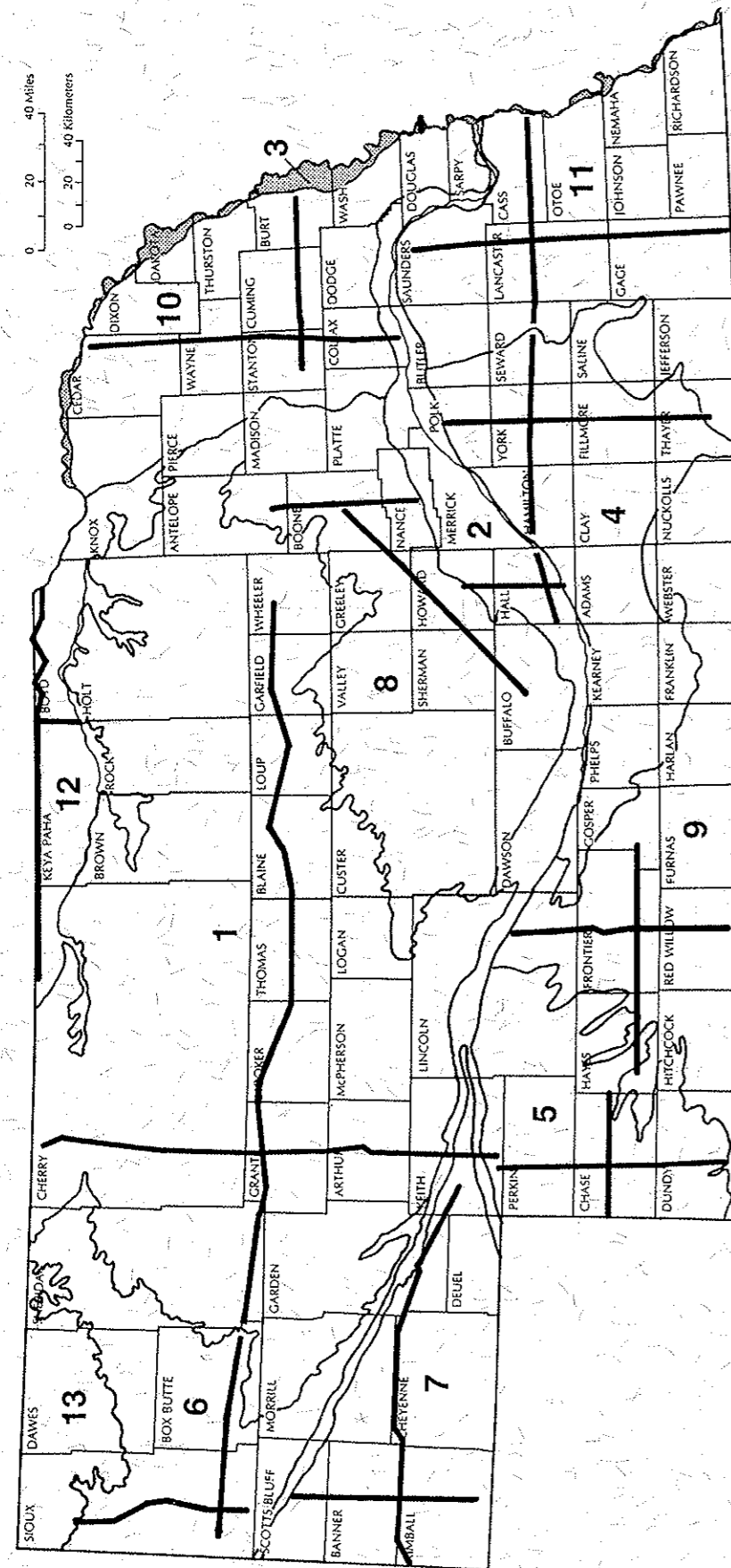


Fig. 1—Locations of geologic cross sections (Region 3 in gray)

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				
		Pliocene	5	Ogallala	Sand, gravel and silt		
		Miocene	24	Arikaree	Sand, sandstone, siltstone and some gravel		
		Oligocene		White River	Sandstone and siltstone		Secondary aquifer in west; water may be highly mineralized.
					Siltstone, sandstone and clay in lower part		
		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	Not an aquifer
			Triassic	208		Siltstone	Not an aquifer
Paleozoic		245			Limestone, dolomites, shales and sandstone.	Some sandstone, limestone and dolomites are secondary aquifers in east. Water may be highly mineralized.	
		286					
		320					
		360					
		408					
		438					
		505					
Precambrian	570						

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

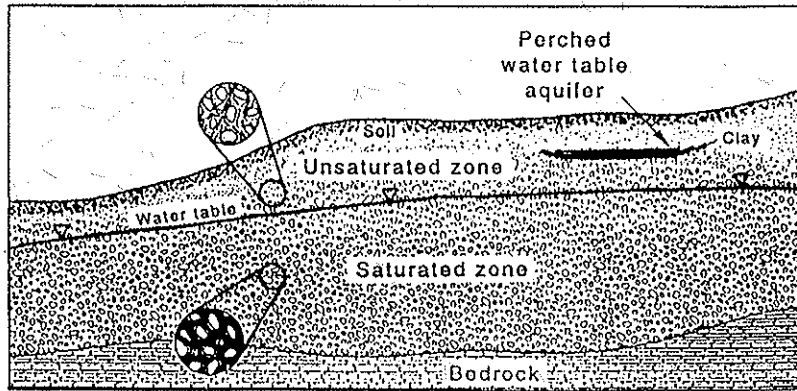
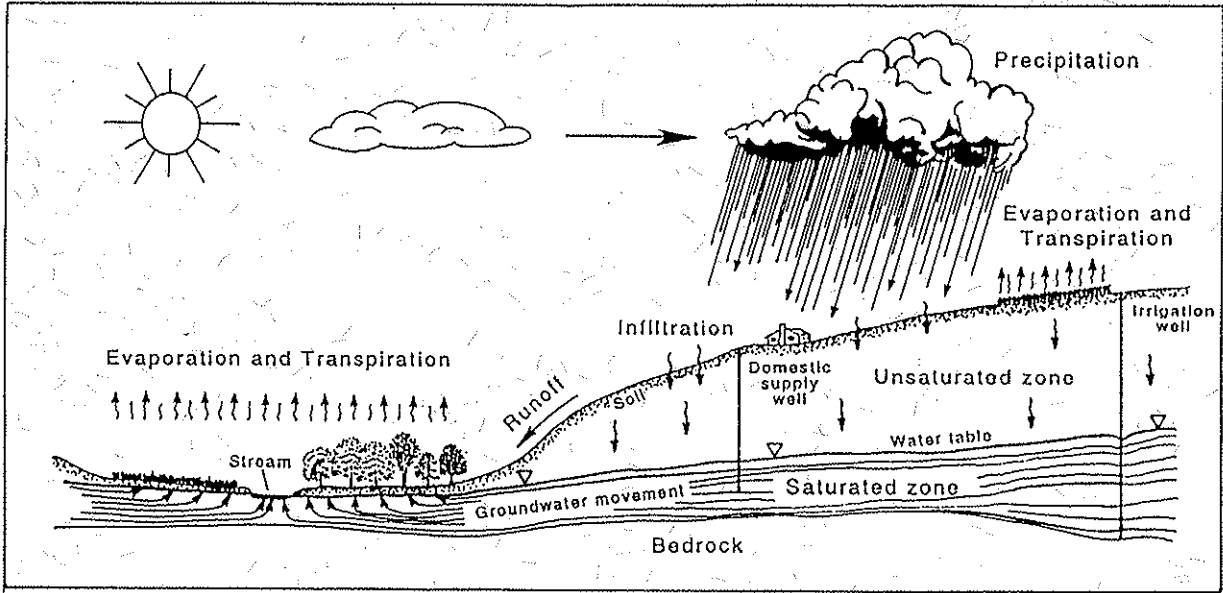


Fig. 2—Groundwater cycle and idealized cross section