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## Regional Hydrogeologic Summaries from Domestic Well-water Quality in Rural Nebraska – Platte River Valley

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# Platte River Valley 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 2

Groundwater Region 2 occupies the North Platte, South Platte and Platte river valleys (fig. 1). Groundwater is primarily derived from river-deposited (alluvial) sand and gravel interlayered with lesser amounts of silt and clay. Large groundwater yields are obtained from these deposits. Where present, the Tertiary Ogallala Group is also used for groundwater. The Ogallala Group occurs beneath the alluvial deposits west of Grand Island to near Lake McConaughy on the North Platte and to the Colorado border on the South Platte. The Ogallala consists of complex deposits of sand, silt, clay, and gravel interbedded with lime- or silica-cemented sandstone. Thicknesses of individual layers differ significantly over short lateral and vertical distances. Depth to the water table is usually less than 50 feet. The saturated thickness of the principal aquifer ranges from about 100 feet or less throughout the regions to about 500 feet or more in Lincoln County. (Geologic cross sections are available on request from the Conservation and Survey Division.\*)

The geologic units that provide the base of the groundwater system differ along the Platte River valley (table 1). Downstream from Ashland to the Missouri River, the base of the groundwater system is Pennsylvanian limestones and shales. From Ashland to central Dawson County, the base of the groundwater system is Cretaceous rocks. These rock units include sandstone and shale of the Dakota Group, Greenhorn limestone, Graneros shale, Carlile shale, Niobrara chalk, and Pierre shale. West of central Dawson County, the base of the groundwater system is generally the siltstones and claystones of the Tertiary White River 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

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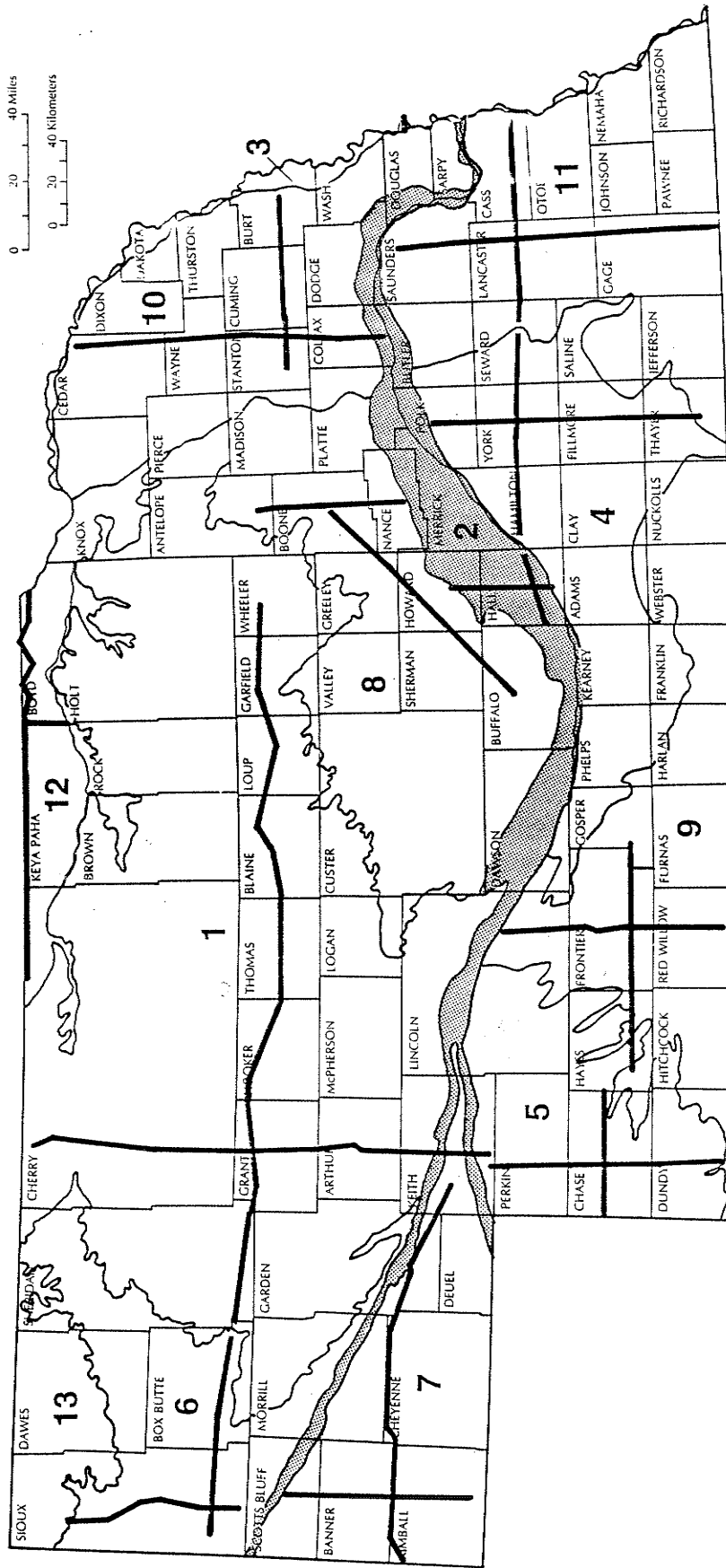


Fig. 1—Locations of geologic cross sections (Region 2 in gray)

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					
		Pliocene	~2.0	Ogallala	Sand, gravel and silt		
		Miocene	5		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						
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	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.

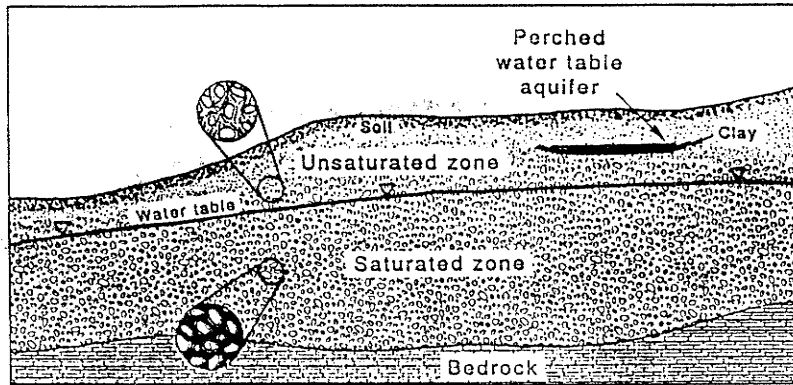
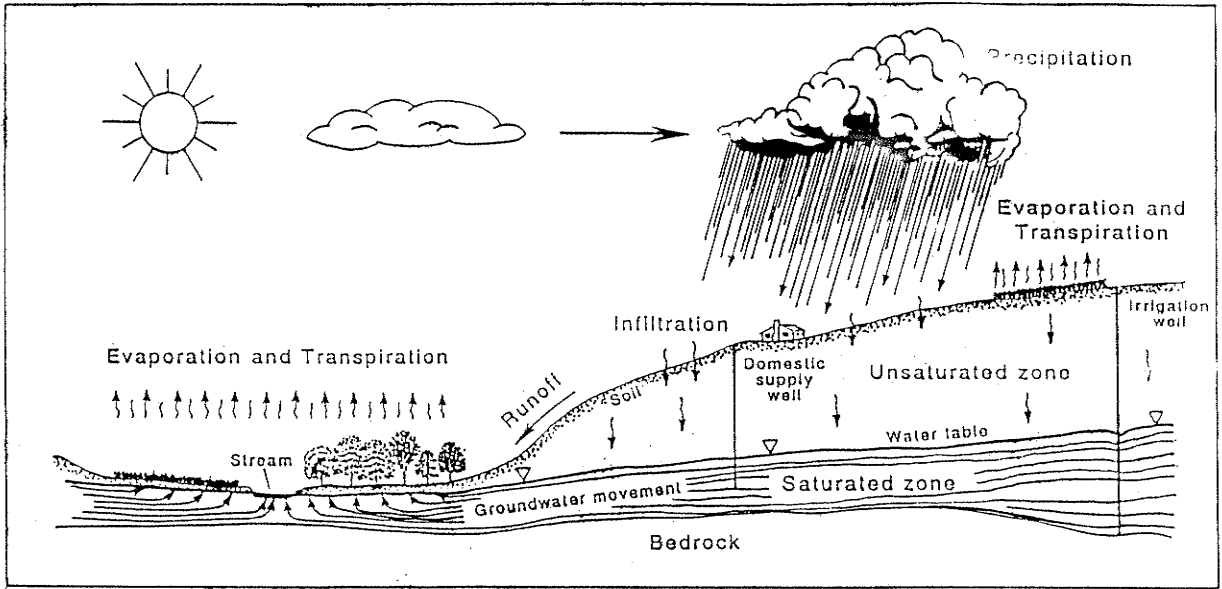


Fig. 2—Groundwater cycle and idealized cross section