

GROUND-WATER QUALITY

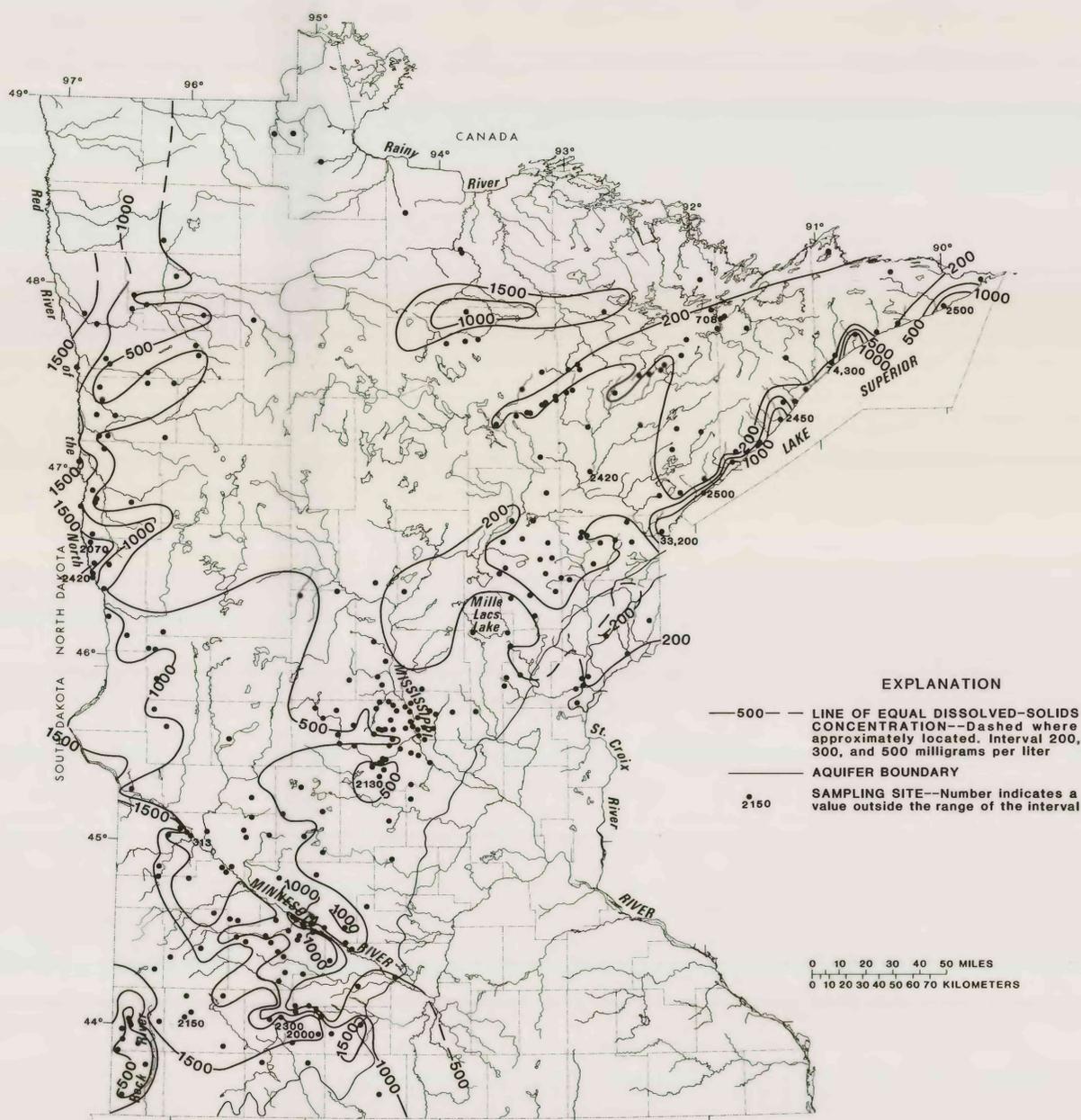


Figure 13.--Concentration of dissolved solids

Dissolved Solids

Dissolved-solids concentration is a measure of the dissolved mineral constituents in water and commonly is used as an indication of the suitability of water for drinking and other uses. Most water with less than 500 milligrams per liter (mg/L) dissolved solids is satisfactory for domestic and industrial uses (U.S. Environmental Protection Agency, 1979).

The median dissolved-solids concentrations range from 91 to 74,300 mg/L. Water in crystalline-rock aquifers of Archean and Proterozoic age (fig. 13) generally has a dissolved-solids concentration less than 500 mg/L in central, north-central, and northeastern Minnesota. Similar or even lower dissolved-solids concentrations are common in southwestern Minnesota except where the crystalline-rock aquifers are overlain by thick Cretaceous sedimentary rocks and Des Moines drift.

The concentration of dissolved solids generally is greater than 500 mg/L where the crystalline-rock aquifers are overlain by Cretaceous sedimentary rocks or thick Des Moines drift. The higher concentrations may result from leaching of soluble minerals from the Cretaceous sedimentary rocks or the drift, which has been derived largely from Cretaceous rocks in the Red River basin. Concentrations are greater than 1,000 mg/L near the western border of the State and in the area southwest of the Minnesota River (see map of dissolved solids, fig. 13). Dissolved-solids concentrations for crystalline-rock aquifers of Archean and Proterozoic age are summarized in table 13.

Table 13.--Dissolved-solids concentrations in water samples from crystalline-rock aquifers of Archean and Proterozoic age, 1960-81

[Concentrations in milligrams per liter]

Aquifer	Number of samples	Mean	Median	Minimum	Maximum
North Shore Volcanic	21	5,700	351	91	74,300
Sioux Quartzite	25	1,150	1,230	237	2,300
Proterozoic metasedimentary	30	310	251	126	2,420
Eisewik Iron-formation	14	230	219	157	368
Undifferentiated Precambrian	197	605	506	96	2,450
Central Minnesota	(69)	362	289	145	2,130
Southwestern Minnesota	(64)	915	843	244	1,980
Northeastern Minnesota	(29)	392	237	96	2,450
Northwestern Minnesota	(35)	695	539	333	2,060
All crystalline-rock aquifers	287	976	517	91	74,300

Dissolved-solids concentrations locally decreased with depth in samples from clusters of wells in parts of southwest and north-central Minnesota. This decrease with depth may result from downward movement of water with higher concentrations of dissolved solids from the overlying Cretaceous rocks or drift deposits.

EXPLANATION

- 500 — LINE OF EQUAL DISSOLVED-SOLIDS CONCENTRATION--Dashed where approximately located. Interval 200, 300, and 500 milligrams per liter
- — — AQUIFER BOUNDARY
- 2150 SAMPLING SITE--Number indicates a value outside the range of the interval

0 10 20 30 40 50 MILES
0 10 20 30 40 50 60 70 KILOMETERS

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CONVERSION FACTORS

For use by readers who prefer to use metric units, conversion factors for terms used in this report are listed below:

Multiply inch-pound unit	By	To obtain metric unit
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
foot per day (ft/d)	.3048	meter per day (m/d)
square foot per day (ft ² /d)	.09290	square meter per day (m ² /d)
gallon per minute (gal/min)	.06308	liter per second (L/s)

HYDROGEOLOGIC AND WATER-QUALITY CHARACTERISTICS OF CRYSTALLINE-ROCK
AQUIFERS OF ARCHEAN AND PROTEROZOIC AGE, MINNESOTA

BY
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