POTENTIAL YIELDS OF WELLS IN THE BEDROCK AQUIFERS OF CHIPPEWA COUNTY, WISCONSIN

MISCELLANEOUS MAP SERIES

I.D. LIPPELT
1988

This map of potential yields of wells in the bedrock aquifers is a part of the Chippewa County Groundwater Resource Investigation, a joint project of the Wisconsin Geological and Natural History Survey and the Chippewa County Board of Supervisors.

The bedrock aquifers in Chippewa County consist of Precambrian crystalline rock and Cambrian sandstone. The Precambrian crystalline rock aquifer is present in all of Chippewa County. This aquifer is usually overlain by sandstone or sand and gravel or both, but crystalline rock does crop out in some areas, especially along the banks of the Chippewa River. The boundary between crystalline rock and sandstone or sand and gravel is irregular and may be marked by residual clay from weathering of the crystalline rock. The Cambrian sandstone aquifer is commonly more than 200 feet thick near the western edge of Chippewa County and thins eastward. This aquifer is absent in most of the eastern half of the county, except for scattered outliers. Some of these outliers are too small to be shown at the scale of this map. Sand and gravel commonly overlies the sandstone aquifer.

Potential yields of crystalline rock wells are generally less than 25 gallons of water per minute, and yields of less than 5 gallons of water per minute are not uncommon. Potential yields of sandstone wells are generally much higher, and range from less than 100 to more than 1,000 gallons of water per minute. The sandstone outliers are generally capable of yielding more water than the surrounding crystalline rock but usually yield less than 100 gallons of water per minute.

In some areas of Chippewa County, the sandstone bedrock is deeply weathered and is poorly lithified. This weathered material is considered bedrock for the purpose of this map, although well drillers may report sand when drilling this material. Therefore, some of the well constructor's reports have been reinterpreted, primarily on the basis of the geologic interpretations of the area north of latitude 45°N by Mudrey and others (1987) and south of latitude 45°N by Brown (1988).

In areas where the sandstone and/or the sand-and-gravel aquifers are present in addition to the crystalline rock aquifer, well owners may wish to consider water quality when choosing which aquifer to use. Natural water quality usually varies from one aquifer to another. Water from the bedrock aquifers may be harder or may contain more iron than water from the sand-and-gravel aquifer. However, the sand-and-gravel aquifer, particularly in river valleys, is usually more susceptible to contamination from the surface. Wisconsin Geological and Natural History Survey Map 88-9, *Potential Yields of Wells in the Sand-and-Gravel Aquifer of Chippewa County, Wisconsin*, by I.D. Lippelt, 1988, scale 1:100,000, may prove helpful during aquifer selection.

Explanation

potential yield (in gallons of water per minute) of wells that are appropriately constructed and fully developed; dashed where approximately located

bedrock is within 10 ft of the surface, taken from WGNHS Map 88-3

Potential yields are based on saturated thickness of the aquifer and on yields obtained from existing irrigation, industrial, and domestic wells.

Data have not been field checked.

Aquifer potential categories, in gallons of water per minute

<25	crystalline rock aquifer is usually the only bedrock aquifer available; the sandstone aquifer is generally absent, except for sparsely scattered small thin outliers
25-100	sandstone aquifer is commonly less than 20 ft thick
100-500	sandstone aquifer is commonly more than 20 ft thick and has sufficient recharge
500-1000	sandstone aquifer is commonly more than 100 ft thick and has sufficient recharge. Yields of more than 1,000 gallons per minute should be possible along the western edge of R. 10. W. (near the western boundary of Chippewa County), but data are insufficient to delineate this area

This map is intended to be a general guide to the aquifer potential of bedrock in Chippewa County. Where detailed site-specific information is required, users are advised to verify potential yields with test borings and pumping tests.

Sources of data

* Wisconsin Department of Natural Resources well constructor's reports (1936-86).

* Wisconsin Geological and Natural History Survey published and unpublished geologic logs (1896-1986).

* Depth to Bedrock of Chippewa County, Wisconsin, by I.D. Lippelt, 1988, Wisconsin Geological and Natural History Survey Miscellaneous Map Series, Map 88-3, scale 1:100,000.

* United States Geological Survey quadrangles (7.5-minute series, topographic; 1971-79).

* Generalized Water-Table Elevation of Chippewa County, Wisconsin by I.D. Lippelt, 1988, Wisconsin Geological and Natural History Survey Miscellaneous Map Series, Map 88-1, scale 1:100,000.

* Bedrock Geology of Wisconsin, Northwest Sheet, by M.G. Mudrey, Jr., G.L. LaBerge, P.E. Myers, and W.S. Cordua, 1987, Wisconsin Geological and Natural History Survey Regional Map Series, Map 87-11, scale 1:250,000.

* Bedrock Geology of Wisconsin, West-Central Sheet, by B.A. Brown, 1988, Wisconsin Geological and Natural History Survey Regional Map Series, Map 88-7, scale 1:250,000.

* Soils of Chippewa County and Their Ability to Attenuate Contaminants, by A.W. Sutherland and F.W. Madison, 1987, Wisconsin Geological and Natural History Survey Map 87-3, scale 1:100,000.

* Wisconsin Geological and Natural History Survey Geology of Wisconsin Outcrop Descriptions.

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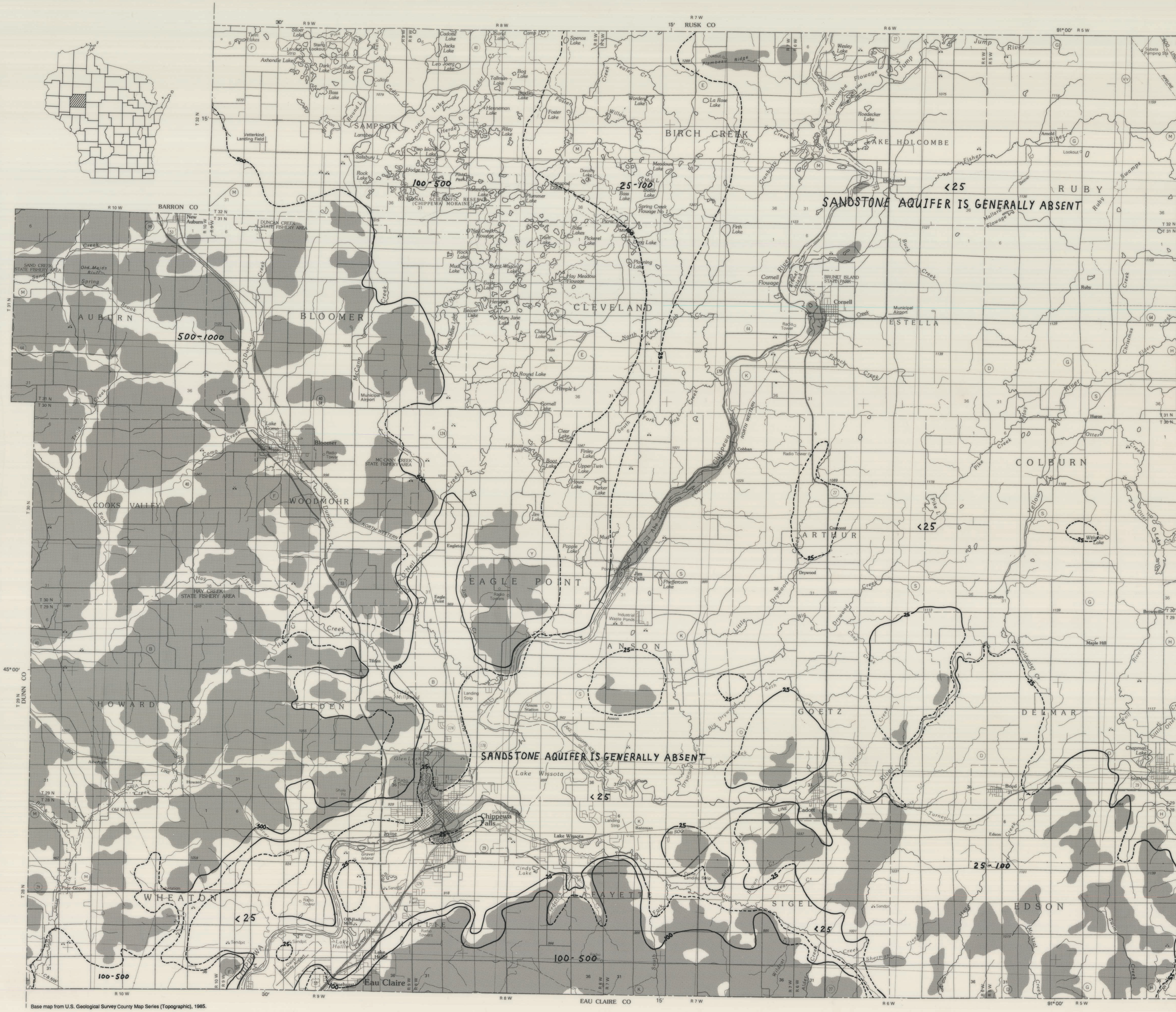
Wisconsin Geological and Natural History Survey Map 88-10

SCALE 1:100 000

1 0 1 2 3 4 5 6 7 8 9 10 KILOMETRES

1 0 1 2 3 4 5 MILES



Base map from U.S. Geological Survey County Map Series (Topographic), 1985.