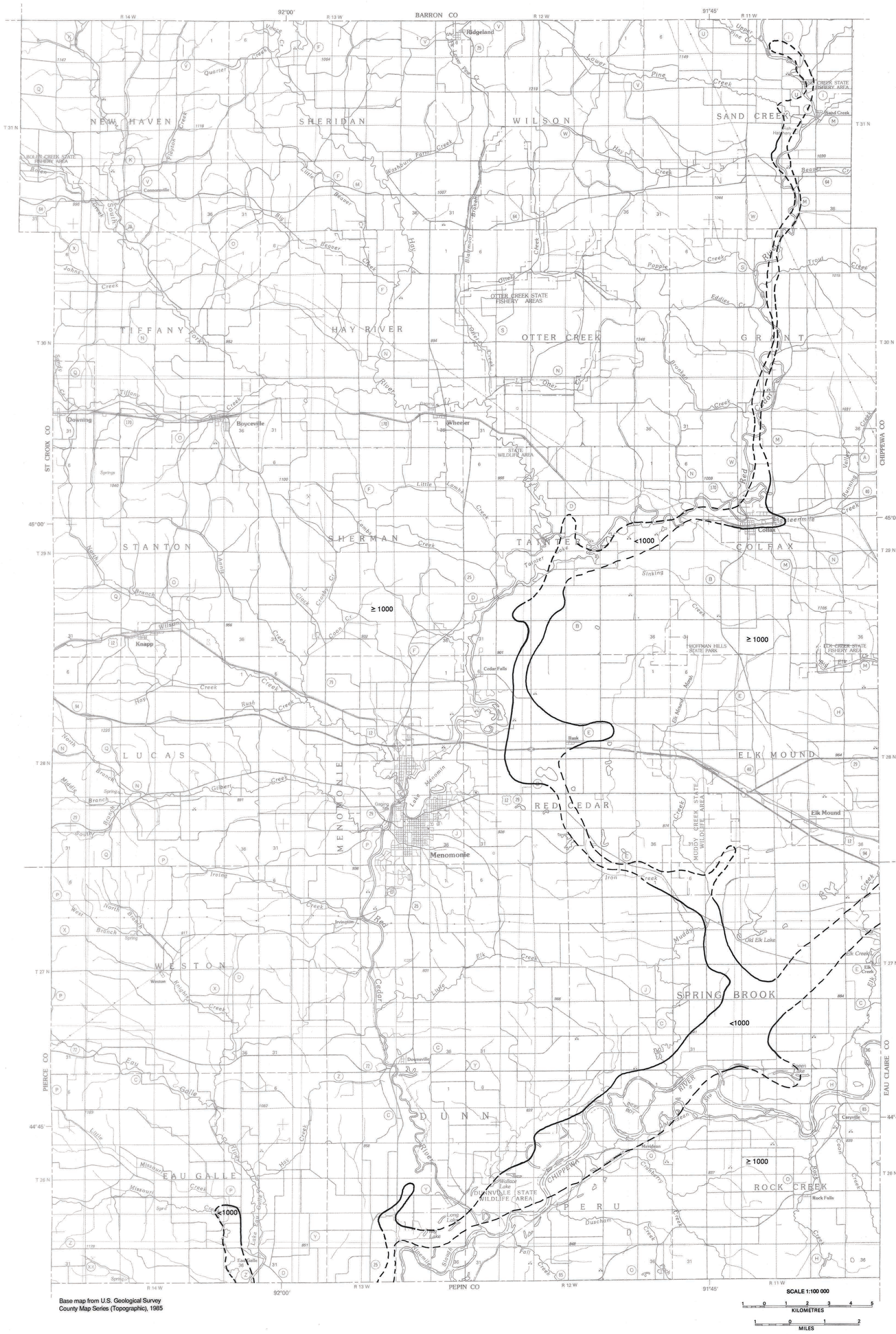
MISCELLANEOUS MAP SERIES

POTENTIAL YIELDS OF WELLS IN THE SANDSTONE AQUIFER OF DUNN COUNTY, WISCONSIN



I.D. LIPPELT

1988

This map of potential yields of wells in the sandstone aquifer is a part of the Dunn County Groundwater Resource Investigation, a joint project of the Wisconsin Geological and Natural History Survey and the Dunn County Board.

An abundant quantity of water, sufficient for household use and for many industrial and irrigation purposes, is available from the saturated bedrock almost everywhere in Dunn County. The bedrock in Dunn County consists of Cambrian and Ordovician dolomite and sandstone. The dolomite generally occurs at higher elevations and is not normally used as an aquifer. According to existing well records, saturated sandstone is present throughout the county, and is the most commonly used aquifer.

In some areas in Dunn 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 commonly report sand instead of rock 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 (in preparation).

Due to removal by erosion, the sandstone aquifer is usually thinner in river valleys. The thinnest known saturated thickness of sandstone is 45 feet, reported for an irrigation well in sec. 21, Township 27 N, Range 11 W, in the Town of Spring Brook. There may be localized areas within deep river valleys, especially the valley of the Chippewa River, where the sandstone could be thinner or even completely absent.

Fully developed, appropriately constructed wells in the sandstone aquifer should be capable of yielding 1,000 or more gallons of water per minute in most areas of Dunn County. The lower sandstone units, particularly the Mount Simon Formation, may locally contain increased concentrations of shale beds or zones of silica, carbonate, or iron-oxide cement. Any one of these conditions may cause a local reduction of potential yield. Where extensive portions of the sandstone have been removed by erosion, expected yields will be less than 1,000 gallons per minute, and may locally be even less than 500 gallons per minute. However, these areas usually contain the thickest portions of the sand-and- gravel aquifer. These 100 or 200 foot thicknesses of sand and gravel are usually capable of yielding 500 or more gallons of water per minute. During extended periods of drought, maximum obtainable yields may decrease due to a reduction in the thickness of saturated aquifer.

In areas where both the sand-and-gravel and the sandstone aquifers are present, 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 sandstone aquifer 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.

Explanation

line divides areas where potential yields of fully developed wells are 1,000 or more gallons of water per minute from areas where potential yields are less than 1,000 gallons per minute, and may be less than 500 gallons per minute. Line is dashed where approximately located.

Potential yields are based on saturated thickness of aquifer and on yields obtained from existing industrial and irrigation wells. Data have not been field checked.

This map is intended to be a general guide to the aquifer potential of the sandstone aquifer in Dunn 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 Dunn County, Wisconsin, by I.D. Lippelt and T.E. Fekete, 1988, Wisconsin Geological and Natural History Survey Miscellaneous Map Series, Map 88-4, scale 1:100,000.

* Potential Yields of Wells in the Sand-and-Gravel Aquifer of Dunn County, Wisconsin, by I.D. Lippelt, 1988, Wisconsin Geological and Natural History Survey Miscellaneous Map Series, Map 88-6, scale 1:100,000.

* United States Geological Survey quadrangles (7.5-minute series, topographic; 1972-75).

* 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, in preparation, Wisconsin Geological and Natural History Survey Regional Map Series, scale 1:250,000.

* Soils of Dunn County and Their Ability to Attenuate Contaminants, by A.W. Sutherland and F.W. Madison, 1987, Wisconsin Geological and Natural History Survey Map 87-4, scale 1:100,000.

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

Additional information

* Preliminary report on the irrigation potential of Dunn County, Wisconsin, by P.G. Olcott, F.D. Hole, and G.F. Hanson, 1967, Wisconsin Geological and Natural History Survey Special Report 1.

* Availability of ground water for irrigation in the Rice Lake-Eau Claire Area, Wisconsin, by E.A. Bell and S.M. Hindall, United States Geological Survey, 1975, Wisconsin Geological and Natural History Survey Information Circular 31.

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