Depth to bedrock map of Fond du Lac County, Wisconsin

Bedrock Geology
of Fond du Lac County,
Wisconsin
M505 • Plate 2
2018

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Explanation

Depth in feet

- 0–20 (includes quarries)
- 20–50
- 50–100
- 100–200
- 200–300
- >300

Areas where soils classifications developed by the Natural Resources Conservation Service (NRCS) suggest that depth to bedrock could be shallower than shown on this map. It was beyond the scope of this study to perform site-verification.

Well construction report. Cuttings described by driller

FL-2469 — Drill core hole and identifier

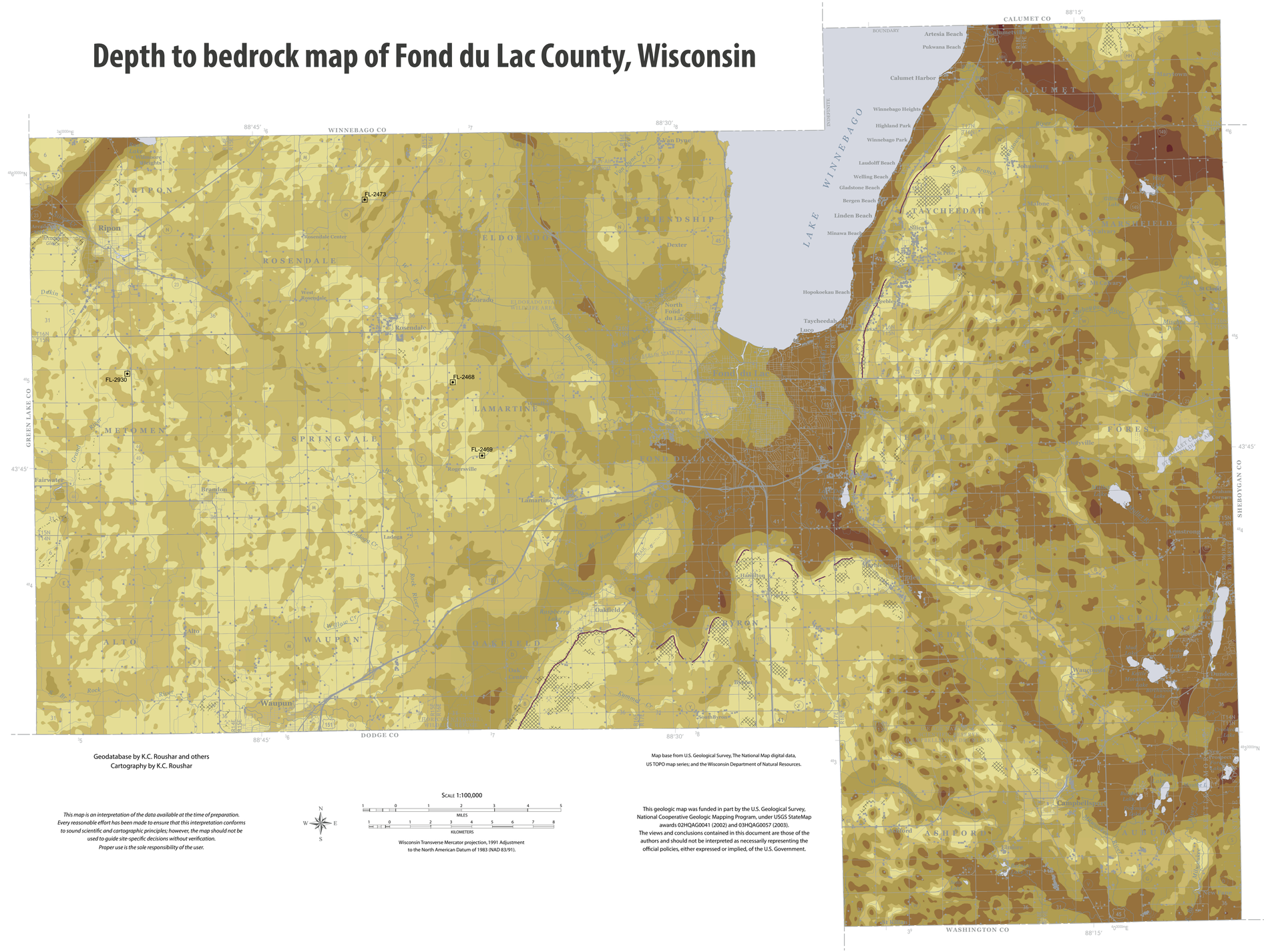
Niagara Escarpment, approximately located

What the map shows

The depth-to-bedrock map shows how far below land surface solid bedrock is encountered. The map can also be considered as showing the combined thickness of unconsolidated glacial sediments and soil overlying bedrock. There is a general correlation between the thickness of glacial deposits and the amount of relief on the buried bedrock surface. The topography of the bedrock surface is shown on the *Bedrock Geology Map of Fond du Lac County, Wisconsin* (M505, plate 1). Areas with relatively low relief on the bedrock surface are generally areas of thin glacial cover, whereas areas of comparatively high relief, such as deeply eroded preglacial bedrock valleys, are filled with significant thicknesses of glacial deposits.

Depth to bedrock changes markedly across the county. The western half is characterized by predominately shallow dolostone bedrock. Bedrock is within 50 feet (ft) of land surface over about 75 percent of that area. In about a third of that area, bedrock can be found within 20 ft of land surface. Bedrock is somewhat deeper (50–100 ft) beneath northwest–southeast trending glacial moraine ridges near the center of the county. In the extreme northwestern corner of the county, near the city of Ripon, depth to bedrock is more than 200 ft within a narrow bedrock valley. Depth to bedrock is well over 100 ft in the center of the county around the city of Fond du Lac where thick deposits of glacial till and glacial-meltwater lake clays overlie Maquoketa shale.

In the eastern half of the county, depth to bedrock is more variable. Immediately east of the Niagara Escarpment, depth to the top of bedrock is less than 20 ft. Major quarry operations for commercial stone and lime production are concentrated in these areas. East-central Fond du Lac County is dotted with drumlins. These slightly elongated hills were formed by glaciers and consist of sand, silt, gravel, and boulders. Beneath the drumlins, depth to bedrock changes abruptly, from less than 50 ft to almost 200 ft. Moving eastward, depth to bedrock generally increases. In southeastern Fond du Lac County, preglacial bedrock valleys were eroded into the Silurian dolostone. Beneath these linear areas, depth to the top of bedrock approaches 300 ft; the greatest depth to bedrock is found in the northeast corner of the county, where more than 300 ft of sediment fill a preglacial bedrock valley.



Geodatabase by K.C. Roushar and others
Cartography by K.C. Roushar

This map is an interpretation of the data available at the time of preparation. Every reasonable effort has been made to ensure that this interpretation conforms to sound scientific and cartographic principles; however, the map should not be used to guide site-specific decisions without verification. Proper use is the sole responsibility of the user.

Scale 1:100,000

1 0 1 2 3 4 5
MILES
1 0 1 2 3 4 5 6 7 8
KILOMETERS

Wisconsin Transverse Mercator projection, 1991 Adjustment
to the North American Datum of 1983 (NAD 83/91).

Map base from U.S. Geological Survey, The National Map digital data, US TOPO map series; and the Wisconsin Department of Natural Resources.

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The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government.

Uses of the map

Areas where the depth to dolostone bedrock is less than 20 ft are of particular importance for the construction stone industry and for groundwater protection. Dolostone bedrock tends to be highly fractured, allowing rain and runoff to infiltrate quickly, particularly where soils or glacial deposits are thin. Rainwater, being slightly acidic, dissolves the carbonate minerals in the dolostone. This natural process can create an extensive network of fractures over time, allowing water (and contaminants) to rapidly move from the surface into the groundwater. For this reason, water wells in areas of shallow fractured dolostone bedrock are susceptible to groundwater contamination from infiltration of septic-system effluent and from land application of nutrients and pesticides for agricultural purposes. This is an important consideration for Fond du Lac County because dolostone is the uppermost bedrock unit in about 90 percent of the county and is the sole source of drinking water for most rural residents.

Compiling the map

This map is based primarily on depth-to-bedrock information from approximately 6,050 drillers' water well construction reports (WCRs). Well locations are shown on the map; the reports are on fi le at the Wisconsin Geological and Natural History Survey and at the Wisconsin Department of Natural Resources. Accurate land-surface elevations for each well were extracted from the U.S. Geological Survey's National Elevation Dataset 10-ft digital elevation model (DEM). Depth to the top of solid bedrock was calculated for each geologic log. Elevations were then hand-contoured at a 20-ft contour interval to create a topographic map. Contours are shown on the companion bedrock geology map.

Depth to bedrock was generated by hand-contouring the bedrock-surface elevation. The surface was interpolated from a 20-ft contour dataset that was converted to a raster dataset, in feet above mean sea level, for each 10-meter by 10-meter cell for the entire county. Bedrock-surface elevation values were then subtracted from land-surface elevation values in the U.S. Geological Survey's National Elevation Dataset digital elevation model. The result was a raster dataset of depth-to-bedrock (or thickness of unconsolidated material) values for the county. Ranges of values were then classified as shown in the map explanation.

Data from the U.S. Department of Agriculture Natural Resources Conservation Service was reviewed for soils that typically develop on bedrock less than 3 ft below land surface. WCR data was compared against this data and map contours were adjusted to match where there was agreement. Where WCR data indicated considerably greater depth to bedrock than indicated by the soils data, contours were based on WCR data only.

Limitations of the map

Accuracy of the contoured buried bedrock surface, used in generating this map, is directly related to the availability and quality of well construction reports in any given area of the county. The higher the density of WCRs, such as in suburban subdivisions, the more reliable the data. By contrast, when there are only one or two well records for a 2- to 3-square-mile area, there is less confidence in the accuracy of mapped values in this area. As new well or other subsurface information become available, this new data can be used to refine and improve this map.

Although some discretion in its use is necessary, this map provides a reasonably accurate map of best-available data at the countywide scale. It clearly shows where dolostone bedrock is shallow and best suited for locating quarries. The map also identifies areas where groundwater-protection measures should be considered.

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