

Preliminary bedrock geology of Dane County, Wisconsin

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PLATE 1 ■ 2013

GEOLOGIC UNITS

The northeastern two-thirds of Dane County is covered by glacial sediment of the Horicon Member of the Holy Hill Formation. Sediment thickness ranges from 0 to over 300 feet (90 m). The southwestern corner of the county is part of the Driftless Area and is dominated by alluvial cover. The Wisconsin River valley and its tributaries contain sand and gravel outwash deposits, with thicknesses of more than 200 feet (60 m) under the Wisconsin River.

Ordovician

Maquoketa Formation
Dolomitic shale and shaly dolomite, gray to very dark gray. No complete section of the formation is known in Dane County; an eroded section caps East Blue Mound and it has been tentatively identified in an isolated area of complex faulting southeast of Madison. A complete 240-foot (73 m) section is preserved on West Blue Mound in adjacent Iowa County. The formation does not outcrop at the surface because of deep weathering.

Sinnipee Group

Three formations make up the Sinnipee group: Galena, Decorah, and Platteville. They are described separately because they are easily distinguishable in outcrops and in subsurface samples such as core and drill cuttings, but the limited exposures and the thin Decorah interval makes mapping three rock units impractical at this map scale.

Galena Formation
Dolomite and cherty dolomite. Massive medium-bedded crystalline dolomite with distinctive mottled weathering pattern. Yellow-brown to buff, except for the lower 20 feet (6 m) which are more shaly and light gray. Discontinuous beds of nodular chert are common. The Galena Formation reaches a known maximum thickness of 220 feet (67 m) in west-central Dane County.

Decorah Formation
Shaly dolomite. The Decorah reaches a maximum thickness of 10 feet (3 m) in west-central Dane County.

Platteville Formation
Dolomite and shaly dolomite, gray to buff, fine to medium texture. Gray weathering is typical of shaly intervals. Pure carbonate units are thick to medium bedded. Shaly units typically have thin, wavy to nodular bedding. Minor white chert is present in discontinuous isolated beds. In Dane County, the maximum thickness of the formation is approximately 80 feet (24 m).

Ancell Group

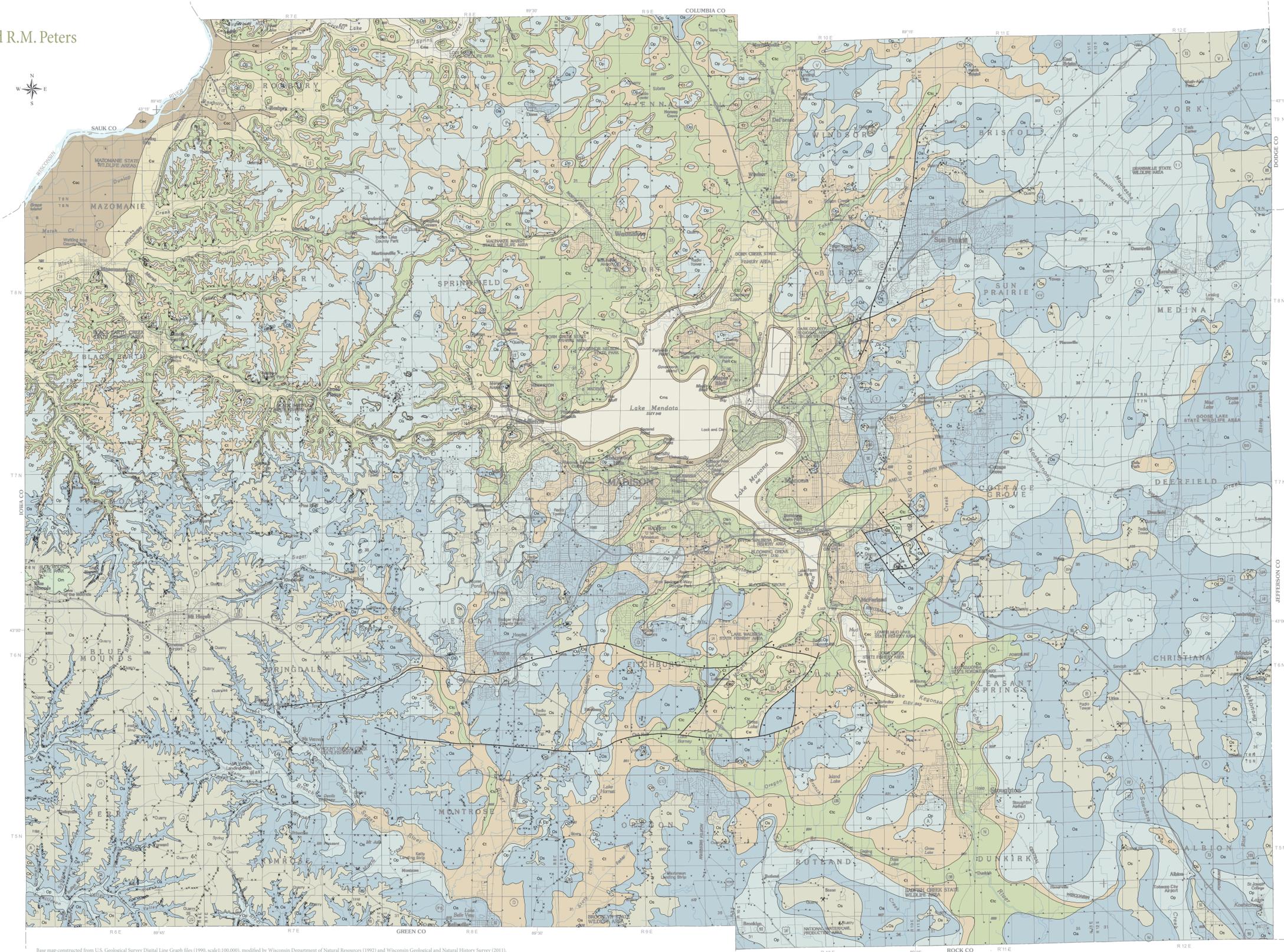
The Ancell Group is not divided on the map, but the following formations and members can be recognized in outcrops and in the subsurface.

Glenwood Formation
Sandstone, siltstone, and/or shale; yellow-brown to green; discontinuous and variable in lithology, texture, and thickness. Commonly 1 to 2 feet (0.3 to 0.6 m) thick in outcrops, but reported as thicker in the subsurface.

St. Peter Formation
Subdivided into an upper mature quartz sandstone (Tonti Member) and a basal shale (Readstown Member). Occupies channels eroded in the underlying rocks; varies widely in thickness across Dane County, from absent to greater than 200 feet (61 m). Members are not mapped separately. Tonti Member: Consists of poorly cemented, clean, medium-grained quartz sandstone with typical well-rounded and frosted grains; commonly cross-bedded. Light buff to white on fresh surfaces except where cemented by iron oxide; often case hardens to brownish gray. Forms steep cliffs and ledges. Readstown Member: Red brown to purple to green shale and shaly sandstone. May contain clasts of chert and blocks of dolomite derived from weathering of the underlying Prairie du Chien Group. Easily eroded and generally not exposed at the surface.

Prairie du Chien Group

Consists of the Shakopee Formation and Oneota Formation which are not separated at this map scale. The Prairie du Chien is composed of massive- to medium-bedded dolomite that is light brown to gray in color. The New Richmond Member, a sandstone forming the bottom part of the Shakopee, is thin to absent in Dane County. The Prairie du Chien is vuggy, sandy, and oolitic; orange to pink to gray nodular chert is common. It forms bluffs and caps ridges in northwestern Dane County. It varies in thickness from 145 feet (44 m) in eastern Dane County to 220 feet (67 m) in western Dane County. In central Dane County, Prairie du Chien rocks have been entirely removed by erosion.



Cambrian

Trempealeau Group

Cl Quartz sandstone, dolomitic siltstone, silty dolomite, and sandy dolomite. Consists of two formations which were combined as one mapping unit. The Jordan Formation, a white to yellow-brown quartz sandstone, overlies the St. Lawrence Formation, a silty dolomite to dolomitic siltstone. The Jordan Formation can be divided into an upper, coarse-grained Van Oser Member, and the lower, fine-grained Norwalk Member. The St. Lawrence Formation can be divided into the Lodi Member, a dolomitic siltstone, and the Black Earth Member, a silty dolomite with a trace of silt-sized glauconite. The Trempealeau Group is about 75 feet (23 m) thick where not eroded.

Tunnel City Group

Ctc Medium to very fine-grained quartz sandstone, locally very glauconitic. Two formations have been defined in outcrop and subsurface based on distinct textural differences, but are not mapped separately. The Lone Rock Formation consists of very fine shaly and glauconitic, feldspathic sandstone, thin bedded and commonly green where highly glauconitic. The Mazomanie Formation is more massive, fine to medium grained, and not glauconitic. The Tunnel City Group commonly forms vegetated slopes. Maximum thickness in Dane County is about 150 feet (46 m).

Elk Mound Group

Consists of the Wonewoc Formation, Eau Claire Formation, and Mount Simon Formation. Except for limited exposure of Wonewoc Formation sandstone, the Elk Mound Group is known only in the subsurface in Dane County.

Cw **Wonewoc Formation**
Quartz sandstone, medium grained, brownish yellow to white, with medium- to large-scale cross bedding commonly seen in outcrop. Reaches a maximum thickness of 165 feet (50 m) in the subsurface. Exposed in outcrop in northwestern Dane County along the Wisconsin River valley.

Ccl **Eau Claire Formation**
Fine to very fine, silty, shaly, and/or dolomitic quartz sandstone. It is shown schematically as rimming the Madison lakes, but is nowhere exposed above water. Thickness varies from absent in northern Dane County to about 80 feet (24 m) in western Dane County. Dolomitic medium- to coarse-sandstone layers, formerly assigned to the Eau Claire Formation, have been reassigned to the Mount Simon Formation; these layers are primarily found in the Madison area.

Cms **Mount Simon Formation**
Primarily medium- to coarse-grained quartz sandstone, with a pebble conglomerate near the basal contact with the Precambrian. Generally cemented by carbonate, iron oxide, and locally, silica. Shaly layers present. The upper part may be locally dolomitic, especially in the Madison area, and may grade gradually upward into the overlying Eau Claire Formation. Thickness in Dane County ranges from about 300 feet (90 m) to over 600 feet (180 m). Like the overlying Eau Claire Formation, the Mount Simon is shown schematically as lining the bottoms of a greater portion of the Madison lakes.

SYMBOLS

- geologic contact (formation boundaries)
- fault, inferred, bar and ball on downthrown side
- outcrop
- quarry
- Subsurface control point (WDNR well construction report, WGNHS geologic log, or other drillhole records)

The map and sections are based on field work and analysis of subsurface data by the authors between 1955 and 1996, and on earlier field mapping by R.G. Olcott (1972).

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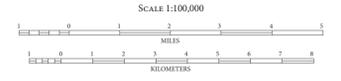
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Cartography by K.C. Roushar

Base map constructed from U.S. Geological Survey Digital Line Graph files (1990, scale:1:100,000), modified by Wisconsin Department of Natural Resources (1992) and Wisconsin Geological and Natural History Survey (2011).



Wisconsin Transverse Mercator Projection 1991 adjustment to the North American Datum of 1983 (NAD 83/91).