Preliminary Geologic Map of the Buried Bedrock Surface, Brown County, Wisconsin

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Wisconsin Geological and Natural History Survey
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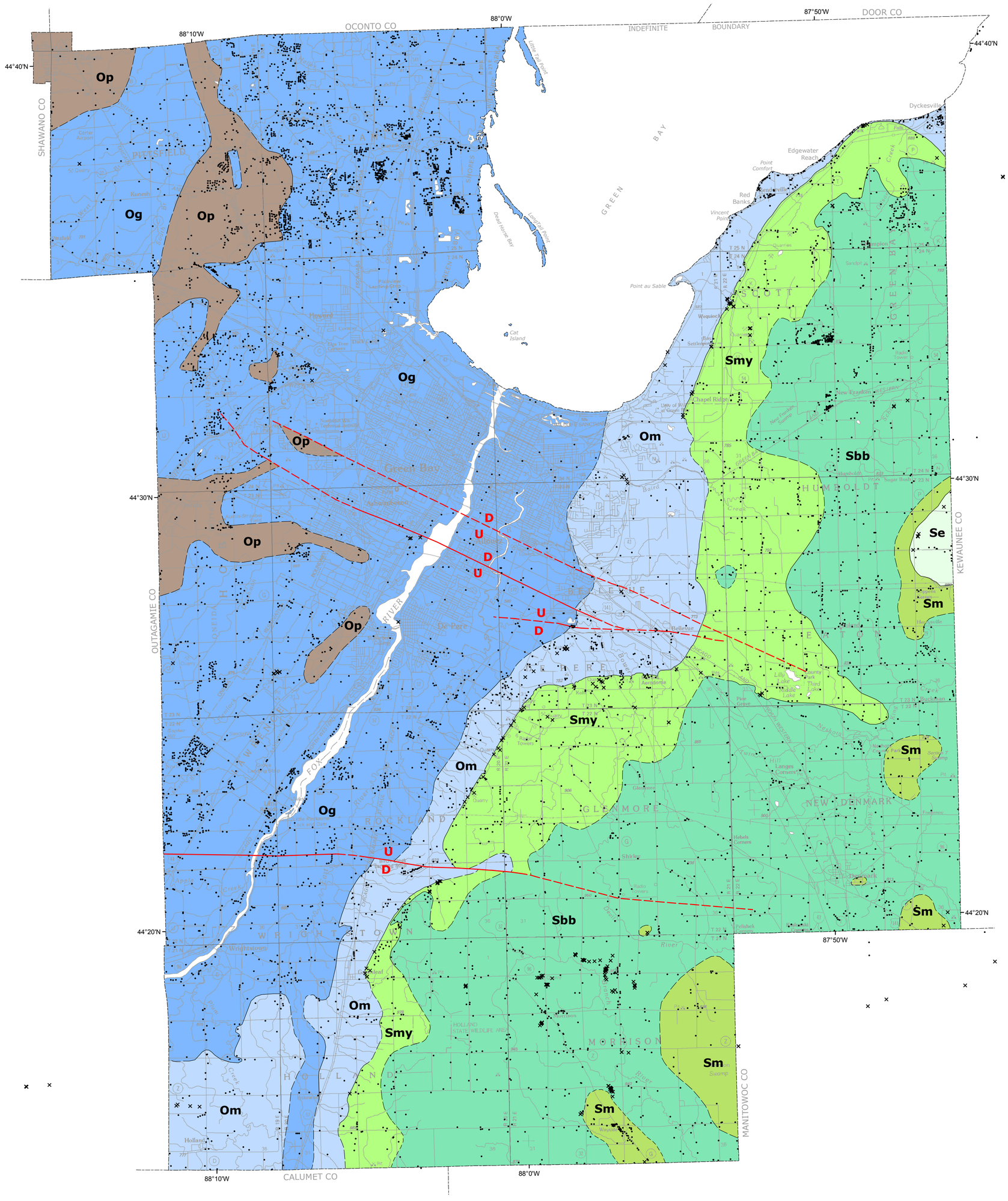

SYMBOLS

× **Outcrop data point**

· **Subsurface data point**

Geologic contacts

Definite
Position confident to +/- 100 meters horizontal distance on base map.

Approximate
Position confident to +/- 500 meters horizontal distance on base map.

Inferred
Position less confident due to limited data.

Faults
"U" (upthrown) and "D" (downthrown) indicate relative offset along fault.

Definite
Position confident to +/- 250 meters horizontal distance on base map.

Approximate
Position less confident due to limited data.

N
W E
S

SCALE 1:100,000

0 2 4 6 8
Miles
0 2 4 6 8
Kilometers

Wisconsin Transverse Mercator Projection
1991 Adjustment to the North American Datum of 1983

Base map 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 (2000).

Brown County, Wisconsin

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The bedrock surface in Brown County is typically overlain by Quaternary glacial sediment, ranging in thickness from 0 to 300 feet. These deposits include Pleistocene glacial till, outwash, and glaciolacustrine sediments from tens of feet to at least 300 feet in thickness in preglacial river valleys. Bedrock is best exposed along the Niagara Escarpment, which is produced by the resistant eastward-dipping Silurian Mayville Formation that overlies the weaker Ordovician Maquoketa Shale.

EXPLANATION

SILURIAN

Se — **Engadine Formation**
Light to dark gray, fine-grained, burrowed and mottled dolostone; discolored buff to tan along joints, fractures, and bedding planes; little to no chert, except near base; contains a limited fauna with both silicified and non-silicified tabulate corals and stromatoporoids present as thin plate-like growths; abundant dark brown stylolites. The Engadine Formation is at least 30 feet in thickness and is present only in extreme eastern Brown County.

Sm — **Manistique Formation**
White to buff, coarse-grained dolostone; very cherty in upper two-thirds of unit; bedding is typically wedge-shaped; contains abundant large, white chert nodules and diverse open marine fauna particularly in upper two-thirds of unit with both silicified and non-silicified tabulate corals (mainly Favosites and Halysites); other fossils include common stromatoporoids, gastropods, pentamerid brachiopods, and rugose corals, with some stromatoporoids and corals as large as 10 to 15 inches; some red/maroon and green stylolites. The Manistique Formation is 90 to 100 feet thick in Brown County and is present at or near bedrock surface only in the eastern and southeastern portions of the county; unit is mostly known from subsurface.

Sbb — **Burnt Bluff Group**
The Burnt Bluff Group consists of two formations: the Byron Formation and the overlying Hendricks Formation. To the north in Door County, these formations are better exposed and have a somewhat different lithologic character. In Brown County, these formations are not easy to distinguish, even in a continuous drill core, and are mapped together here. The Burnt Bluff Group is entirely dolostone and is dominated by two alternating lithologies. One lithology consists of medium to dark gray carbonate-rich mudstones and dense pellet packstones; the base of the unit is a distinctive medium gray, burrowed and mottled carbonate mudstone unconformable with the Mayville Formation below and grading upward into laminated mudstones. The other lithology is predominantly buff to light brown, coarse-grained, laminated to massively bedded intervals with maroon stylolites. Both lithologies have limited fauna with minor tabulate and rugose corals, gastropods, and brachiopods; mud cracks and other evidence of a peritidal environment are present; chert is not common; upper contact of unit is tentatively placed at the top of the uppermost mudstone unit. Burnt Bluff Group is up to 240 feet thick, is heavily fractured, and tends to be karstic.

Smy — **Mayville Formation**
Light brown, burrowed and mottled, crinoidal packstones and wackestones; abundant wispy, dark brown to black stylolites occur throughout the unit; abundant large, white chert nodules occur in the lower 30 feet of unit and near top of unit; very small, white, silicified crinoid stem columnals are common throughout, with few large silicified tabulate corals and stromatoporoids in lower 20 feet of unit; hydrocarbon odor is sometimes observed upon breakage. The thickness of the Mayville Formation varies regionally, but is typically 115 feet thick in southern Brown County.

ORDOVICIAN

Neda Formation
Dark brown to red-brown, oolitic hematite, with minor interbedded thin maroon shale beds; Neda Formation is a thin, discontinuous unit known only from exposures and some quarries along the Niagara Escarpment in the central and southwestern part of the county; abundant sulfide mineralization present in upper portions of unit, which reaches a maximum known thickness of 5.5 feet at Kittell Falls. Unit not shown on map due to its thinness and a limited understanding of its discontinuous distribution. Neda Formation is mapped with Maquoketa Formation.

Om — **Maquoketa Formation**
Consists of three members in descending order: the Brainard Shale, Fort Atkinson Dolostone, and Scales Shale. The Maquoketa Formation is approximately 330 to 350 feet thick in the southern and central portions of Brown County, and thickens to as much as 500 feet in the northeast part of the county.

Brainard Member
Light greenish-gray shale, dolomitic; moderately abundant fossils, including brachiopods, bryozoans, and rugose corals. In the northeastern portion of the county, the upper Brainard contains abundant dolostone and chert cross bedding, burrows, and wave ripple marks. Pyrite is common in the upper portion of the unit regionally. The Brainard Member is occasionally exposed in quarry floors and at the base of the Niagara Escarpment, and is typically 90 to 100 feet thick.

Fort Atkinson Member
Light gray to greenish-gray dolostone and shaly dolostone, contains abundant large brachiopods and branching bryozoans. It is a locally important ledge-forming unit that is exposed at various locations in the northern half of the county, and can be easily identified on subsurface geophysical logs. Thickness of the Fort Atkinson Member increases from 40 feet in the south to at least 60 feet in the northeast.

Scales Member
Very dark, greenish-brown shale, fissile with low carbonate content, except for rare, thin crinoidal grainstone layers in the middle and upper portion. Abundant small burrows are present in places. Known only from subsurface investigations. Basal contact with the Galena formation is sharp. The Scales Member is approximately 200 feet thick throughout Brown County.

Sinnipee Group
Consists of two formations: The Platteville Formation and the overlying Galena Formation. Both formations are exposed in quarries and limited outcrops, but the upper portion of the Galena is only observed in the subsurface. Occasionally observed in riverbeds, especially in the Fox River and Duck Creek. Thickness of the Sinnipee Group is generally consistent, ranging between about 190 and 210 feet thick.

Og — **Galena Formation**
Gray to tan, fine- to medium-grained crystalline dolostone; crinoid debris and *Fisherites* present, along with trace sulfide mineralization in vugs and fractures. Contains interbedded green shaly intervals, especially near base of unit. The Galena Formation is 150 feet thick.

Op — **Platteville Formation**
Gray to tan, dolostone, burrowed with minor white cherty intervals; sandy near base; distinctive well-developed carbonate hardgrounds, trace sulfide mineralization, and occasional cephalopods. The Platteville Formation is 50 feet thick.

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