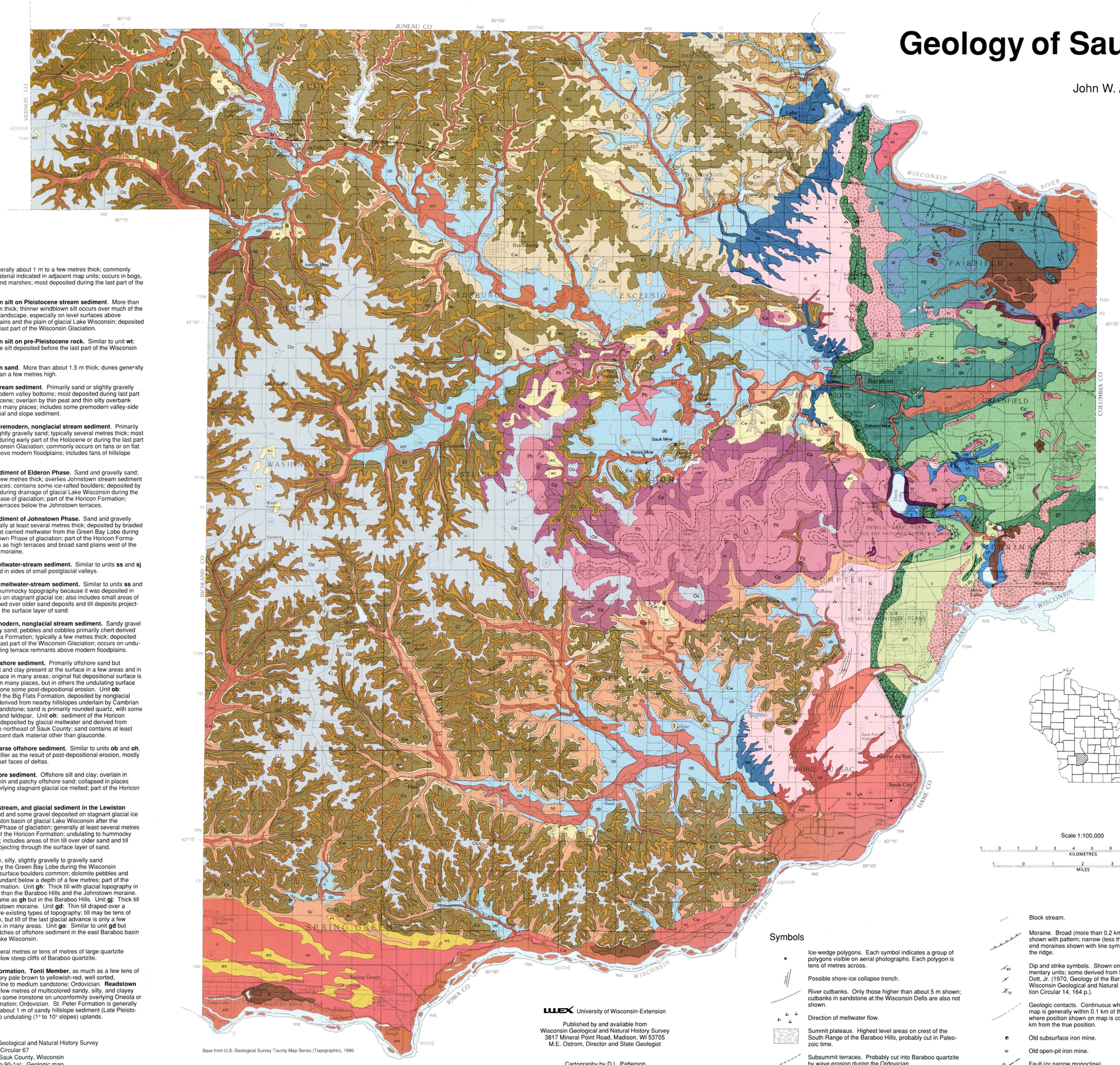
Geology of Sauk County, Wisconsin

John W. Attig and Lee Clayton, 1990



Explanation

Peat. Generally about 1 m to a few metres thick; commonly overlies material indicated in adjacent map units; occurs in bogs, swamps, and marshes; most deposited during the last part of the Holocene.

wt **Windblown silt on Pleistocene stream sediment**. More than about 1.5 m thick; thinner windblown silt occurs over much of the rest of the landscape, especially on level surfaces above outwash plains and the plain of glacial Lake Wisconsin; deposited during the last part of the Wisconsin Glaciation.

wc **Windblown silt on pre-Pleistocene rock.** Similar to unit **wt**; may include silt deposited before the last part of the Wisconsin Glaciation.

ws **Windblown sand**. More than about 1.5 m thick; dunes generally no more than a few metres high.

sm **Modern stream sediment**. Primarily sand or slightly gravelly sand on modern valley bottoms; most deposited during last part of the Holocene; overlain by thin peat and thin silty overbank sediment in many places; includes some premodern valley-side fans of fluvial and slope sediment.

sp **Younger premodern, nonglacial stream sediment**. Primarily sand or slightly gravelly sand; typically several metres thick; most deposited during early part of the Holocene or during the last part of the Wisconsin Glaciation; commonly occurs on fans or on flat terraces above modern floodplains; includes fans of hillslope sediment.

ss **Stream sediment of Elderon Phase.** Sand and gravelly sand; typically a few metres thick; overlies Johnstown stream sediment in many places; contains some ice-rafted boulders; deposited by floodwater during drainage of glacial Lake Wisconsin during the Elderon Phase of glaciation; part of the Horicon Formation; occurs on terraces below the Johnstown terraces.

sj **Stream sediment of Johnstown Phase.** Sand and gravelly sand; typically at least several metres thick; deposited by braided streams that carried meltwater from the Green Bay Lobe during the Johnstown Phase of glaciation; part of the Horicon Formation; occurs as high terraces and broad sand plains west of the Johnstown moraine.

se **Eroded meltwater-stream sediment.** Similar to units **ss** and **sj** but exposed in sides of small postglacial valleys.

sc **Collapsed meltwater-stream sediment.** Similar to units **ss** and **sj** but has hummocky topography because it was deposited in some areas on stagnant glacial ice; also includes small areas of thin till draped over older sand deposits and till deposits projecting through the surface layer of sand.

sg **Older premodern, nonglacial stream sediment.** Sandy gravel and gravelly sand; pebbles and cobbles primarily chert derived from Oneota Formation; typically a few metres thick; deposited before the last part of the Wisconsin Glaciation; occurs on undulating to rolling terrace remnants above modern floodplains.

ob **oh** **Coarse offshore sediment.** Primarily offshore sand but offshore silt and clay present at the surface in a few areas and in the subsurface in many areas; original flat depositional surface is preserved in many places, but in others the undulating surface has undergone some post-depositional erosion. Unit **ob**: sediment of the Big Flats Formation, deposited by nonglacial water and derived from nearby hillslopes underlain by Cambrian sand and sandstone; sand is primarily rounded quartz, with some glauconite and feldspar. Unit **oh**: sediment of the Horicon Formation, deposited by glacial meltwater and derived from areas to the northeast of Sauk County; sand contains at least several percent dark material other than glauconite.

oe **Eroded coarse offshore sediment.** Similar to units **ob** and **oh**, but much hillier as the result of post-depositional erosion, mostly on the foreset faces of deltas.

ot **Fine offshore sediment.** Offshore silt and clay; overlain in places by thin and patchy offshore sand; collapsed in places where underlying stagnant glacial ice melted; part of the Horicon Formation.

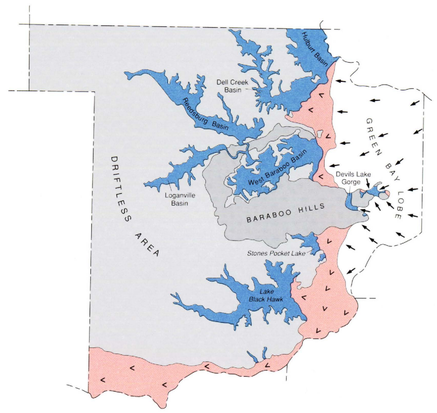
og **Offshore, stream, and glacial sediment in the Lewiston basin.** Sand and some gravel deposited on stagnant glacial ice in the Lewiston basin of glacial Lake Wisconsin after the Johnstown Phase of glaciation; generally at least several metres thick; part of the Horicon Formation; undulating to hummocky topography; includes areas of thin till over older sand and till deposits projecting through the surface layer of sand.

gh **gb** **gj** **gd** **go** **Till.** Clayey, silty, slightly gravelly to gravelly sand deposited by the Green Bay Lobe during the Wisconsin Glaciation; surface boulders common; dolomite pebbles and cobbles abundant below a depth of a few metres; part of the Horicon Formation. Unit **gh**: Thick till with glacial topography in areas other than the Baraboo Hills and the Johnstown moraine. Unit **gb**: Same as **gh** but in the Baraboo Hills. Unit **gj**: Thick till of the Johnstown moraine. Unit **gd**: Thin till draped over a variety of pre-existing types of topography; till may be tens of metres thick, but till of the last glacial advance is only a few metres thick in many areas. Unit **go**: Similar to unit **gd** but includes patches of offshore sediment in the east Baraboo basin of glacial Lake Wisconsin.

Talus. Several metres or tens of metres of large quartzite boulders below steep cliffs of Baraboo quartzite.

Os **St. Peter Formation. Tonti Member**, as much as a few tens of metres of very pale brown to yellowish-red, well sorted, quartzose, fine to medium sandstone; Ordovician. **Readstown Member**, a few metres of multicolored sandy, silty, and clayey breccia with some ironstone on unconformity overlying Oneota or Jordan Formation; Ordovician. St. Peter Formation is generally overlain by about 1 m of sandy hillslope sediment (Late Pleistocene); flat to undulating (1° to 10° slopes) uplands.

Wisconsin Geological and Natural History Survey
Information Circular 67
Geology of Sauk County, Wisconsin
Plate 1 (Map 90-1a): Geologic map



Major geologic features of Sauk County during the maximum late Wisconsin extent of the Green Bay Lobe. The map shows the location of the western edge of the Green Bay Lobe (arrows show direction of ice flow), outwash plains (red), and lakes (blue). The Baraboo Hills and the remainder of the Driftless Area in Sauk County are shown in shades of gray.

Scale 1:100,000

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

MILES 1 0 1 2 3 4 5

Symbols

- Ice-wedge polygons. Each symbol indicates a group of polygons visible on aerial photographs. Each polygon is tens of metres across.
- Possible shore-ice collapse trench.
- River cutbanks. Only those higher than about 5 m shown; cutbanks in sandstone at the Wisconsin Dells are also not shown.
- Direction of meltwater flow.
- Summit plateaus. Highest level areas on crest of the South Range of the Baraboo Hills, probably cut in Paleozoic time.
- Subsummit terraces. Probably cut into Baraboo quartzite by wave erosion during the Ordovician.
- Block stream.
- Moraine. Broad (more than 0.2 km wide) end moraines shown with pattern; narrow (less than 0.2 km wide) end moraines shown with line symbol marking the crest of the ridge.
- Dip and strike symbols. Shown on Precambrian metasedimentary units; some derived from I.W. Dalziel and R.H. Dott, Jr. (1970, Geology of the Baraboo District, Wisconsin: Wisconsin Geological and Natural History Survey Information Circular 14, 164 p.).
- Geologic contacts. Continuous where position shown on map is generally within 0.1 km of the true position; dashed where position shown on map is commonly more than 0.1 km from the true position.
- Old subsurface iron mine.
- Gravel pit.
- Old open-pit iron mine.
- Rock quarry.
- Fault (or narrow monocline). U D
- Anticline.

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Cartography by D.L. Patterson

Base from U.S. Geological Survey County Map Series (Topographic), 1986.

Oo **Oneota and Rountree Formations. Oneota Formation**–up to 20 m of very pale brown to light brownish-gray dolomite, commonly algal, with chert nodules; some sandstone near base of formation; some caverns and cavities, mostly filled with red clay; Ordovician; flat to undulating (1° to 10° slopes) upland plateaus; unit includes some unmappable small areas of St. Peter Formation; scattered residual boulders of St. Peter sandstone are present in many places on the Oneota plateau. **Rountree Formation**–several metres of clay, sandy clay, and clayey sand, typically with red hues, with cobbles and pebbles of chert; includes hillslope sediment derived from residuum from the underlying Oneota dolomite; late Cenozoic.

Cj **Jordan Formation.** About 20 m of white to brown, quartzose, fine to coarse sandstone, coarsening upward; silicified zone at top; Cambrian; generally overlain by about 1 m of sandy hillslope sediment (Late Pleistocene); outcrops at edge of Oneota plateaus; upper slope is a sandstone cliff in many places, especially in the northwestern part of county; below the cliff is a tree-covered slope of about 15° to 30°.

Cs **St. Lawrence Formation. Lodi Member**, about 10 to 20 m of pale yellow, thin-bedded, siltstone, and very fine to fine sandstone with some gray shale; Cambrian. **Black Earth Member**, as much as a few metres of dolomite at base of the formation; Cambrian. St. Lawrence Formation is generally overlain by less than 1 m of sandy hillslope sediment (Late Pleistocene); upper part of the St. Lawrence slope is a continuation of the Jordan escarpment (10° to 25°), which flattens into an undulating (5° to 10°) bench near the base of the unit.

Ct **Tunnel City Formation.** 30 to 45 m thick. **Lone Rock Member**, thin-bedded, quartzose, glauconitic, fine sand and sandstone; shaley near base; Cambrian. **Mazomanie Member**, slightly glauconitic sandstone near middle of the formation; thickens eastward; Cambrian. Tunnel City Formation is generally overlain by less than 1 m of hillslope sediment (Late Pleistocene); commonly a series of billowy hills or a rounded bench (2° to 10°, with slopes of 10° to 15° above and below) occurs near the middle of the formation; flat bench (1° to 7°) occurs near the base of formation in the northwestern part of the county.

Cw **Wonewoc and Eau Claire Formations. Ironton Member**, at the top of the Wonewoc Formation, a few metres of brown, burrowed, quartzose, fine to medium sandstone; Cambrian; forms a low cliff in most places, especially in the northwestern part of the county. **Galesville Member**, at the bottom of the Wonewoc Formation, 15 to more than 20 m of white, quartzose, medium sandstone; Cambrian; generally a steep (10° to 30°) tree-covered slope, but in some places steeper or flatter; commonly overlain by about 1 m of sandy hillslope sediment (Late Pleistocene). **Eau Claire Formation**–a few metres of poorly sorted, variably colored, quartzose sandstone; commonly silty and bioturbated; Cambrian; forms a low undulating (1° to 5°) bench; overlain by thin (generally less than 1 m) sandy hillslope or shoreline sediment (Late Pleistocene).

Cm **Mount Simon Formation**. More than 30 m of white, quartzose, fine to medium sand and sandstone; Cambrian; commonly overlain by a few metres of hillslope, shoreline, offshore, or windblown sand (Late Pleistocene); flat to undulating (1° to 3°) in most areas but steeper in some places, with vertical cliffs in the Wisconsin Dells.

Cp **Parfreys Glen Formation**. Mostly quartz sandstone; parts conglomeratic; locally contains angular talus blocks several metres across, adjacent to the Baraboo Formation; some zones glauconitic; commonly very hard (silica cement); generally unfossiliferous; generally occurs within several hundred metres of the Baraboo Hills; bedding generally slopes a few degrees away from the Baraboo Hills; chronologic equivalent of the Mount Simon, Eau Claire, Wonewoc, Tunnel City, St. Lawrence, and Jordan Formations, and perhaps also of the Oneota, St. Peter, and younger formations; contact with the Baraboo Formation is imprecisely located in most areas.

Pk **"Dake formation"?** Similar to the Baraboo quartzite; Early Proterozoic.

Pb **Baraboo Formation.** About 1.5 km of gray to pink quartzite; very well cemented in most places; Early Proterozoic; generally overlain by hillslope debris consisting of quartzose sand and gravel on steep slopes and finer material on gentle slopes (Late Pleistocene).

Rg **Granite in Baxter Hollow**. Pink to red granite and quartz diorite beneath the Baraboo Formation; Early Proterozoic.

Rd **Diorite near Denzer**. Gray to red diorite or granodiorite; Early Proterozoic.

Rr **Rhyolite near the Lower Narrows**, **Denzer, and Devils Nose**. Metamorphosed red to black tuffaceous rock and lava flows; Early Proterozoic.