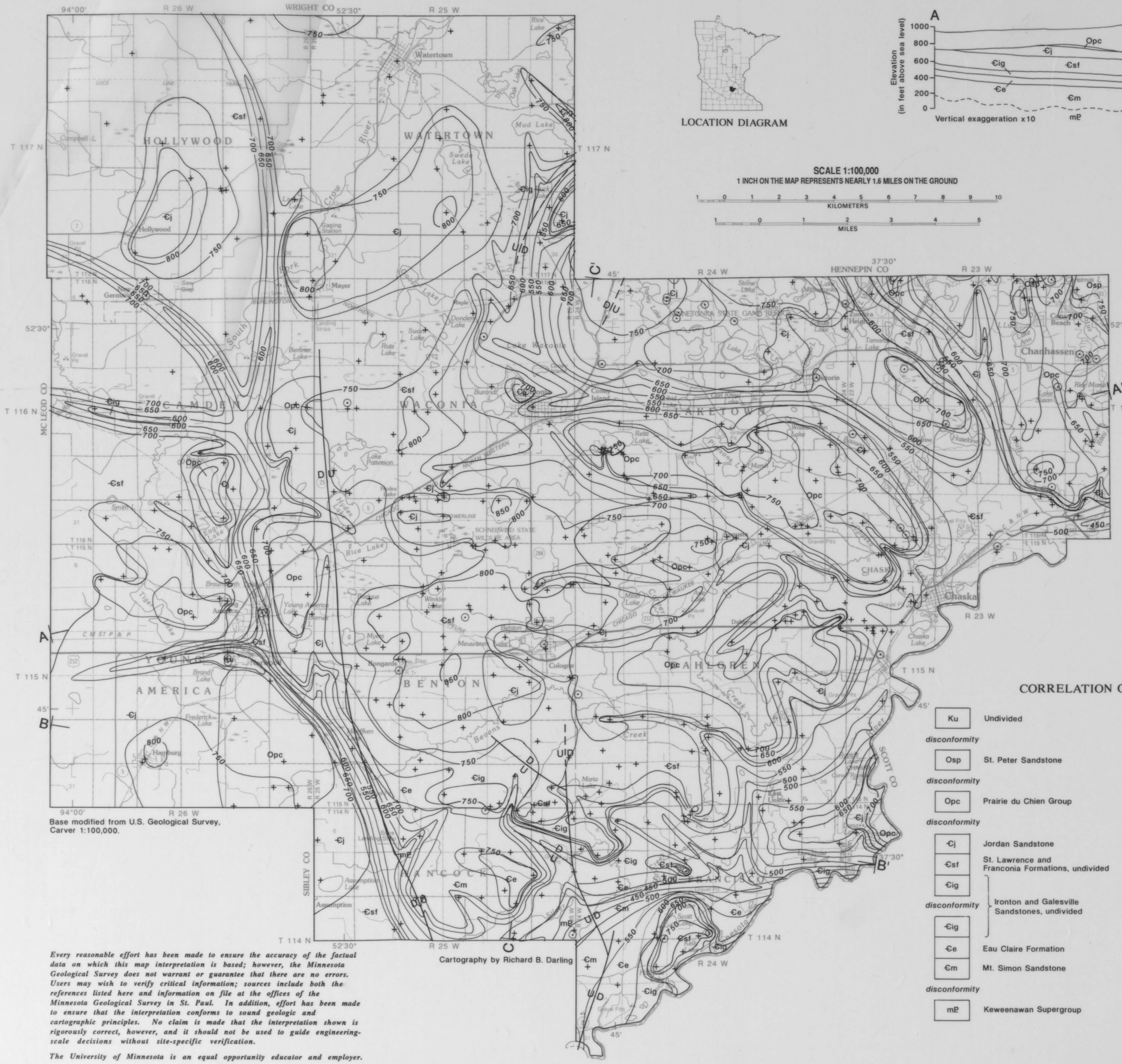
UNIVERSITY OF MINNESOTA
MINNESOTA GEOLOGICAL SURVEY
D.L. Southwick, Interim Director

PREPARED WITH SUPPORT FROM CARVER COUNTY AND
THE MINNESOTA BOARD OF WATER AND SOIL RESOURCES

MINNESOTA GEOLOGICAL SURVEY
OPEN-FILE MAP 93-4

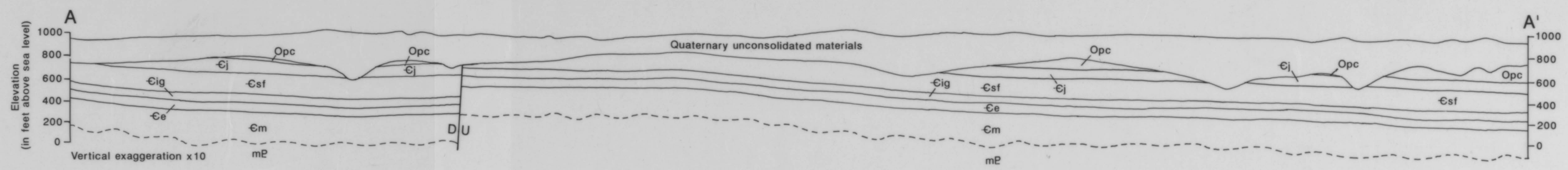


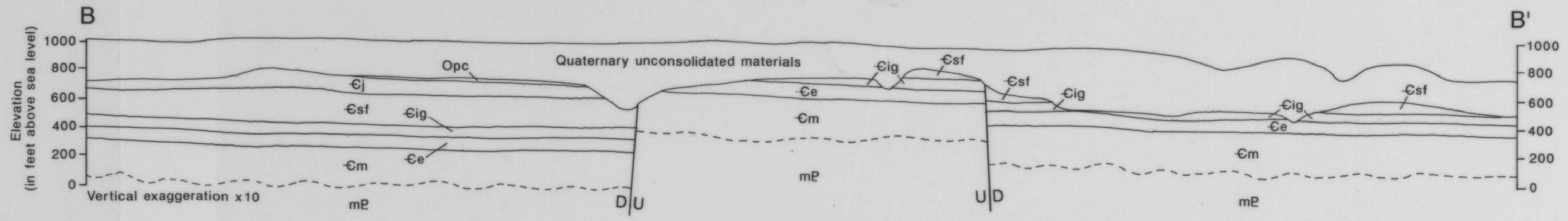
Base modified from U.S. Geological Survey,
Carver 1:100,000.

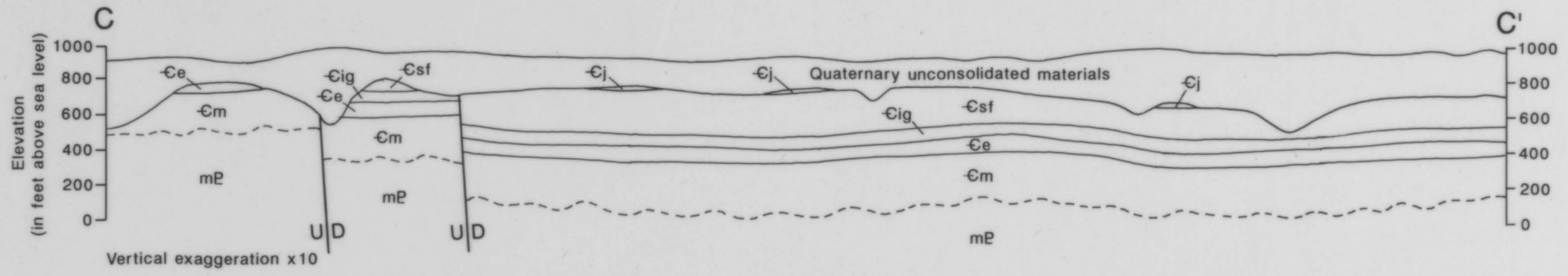
Cartography by Richard B. Darling

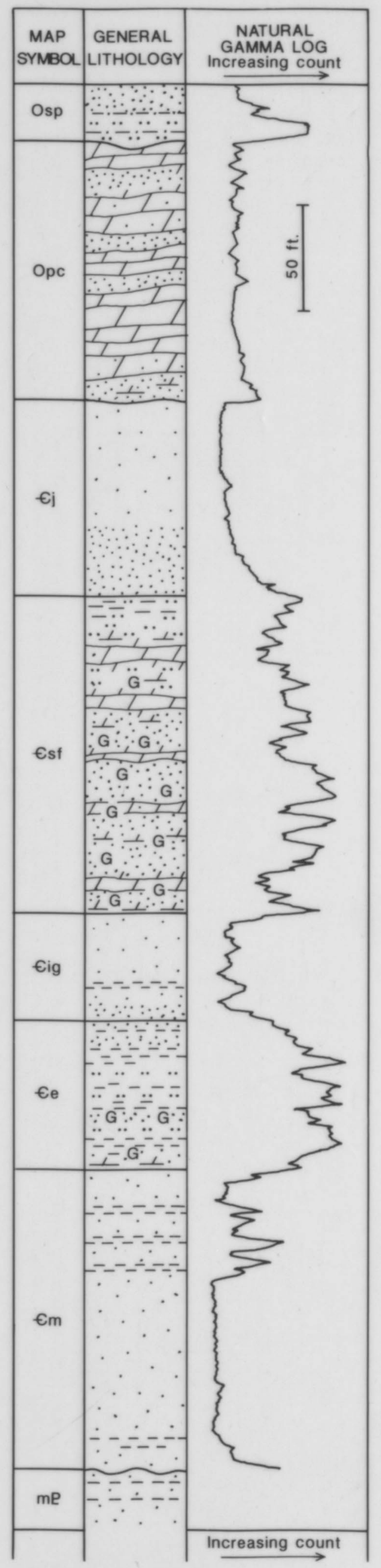
LOCATION DIAGRAM

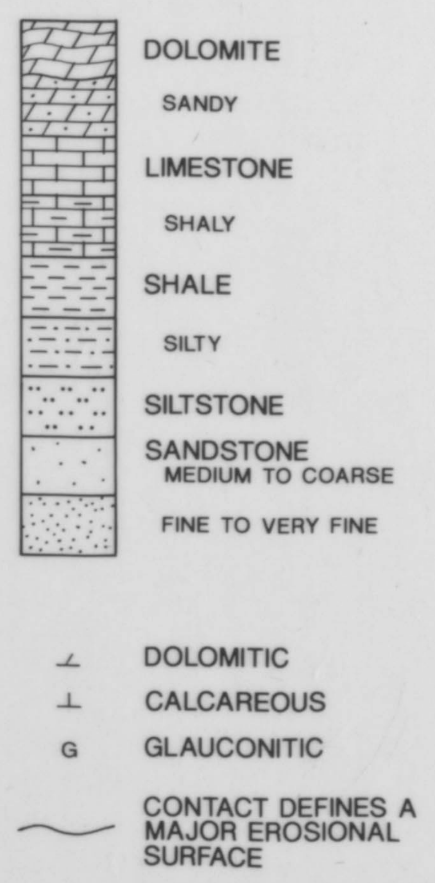
SCALE 1:100,000
1 INCH ON THE MAP REPRESENTS NEARLY 1.6 MILES ON THE GROUND











DESCRIPTION OF MAP UNITS

Ku	Cretaceous rocks undivided—Sandstone, very fine to fine-grained and interbeds of white to gray shale.
Osp	St. Peter Sandstone—Fine- to medium-grained, quartz-rich sandstone; lower 10 to 30 feet contains thin to thick beds of multicolored siltstone and shale. Occurs as thin (<50 feet) erosional remnants in the extreme northeastern part of the county.
Opc	Prairie du Chien Group, undivided—Dolostone, very fine to coarse-grained, tan, buff, or pink; intercalated with sandy dolostone where sand-size detritus comprises as much as 50 percent of the rock. Beds of brown and white very fine to coarse-grained sandstone and green, brown, and white shale are intercalated throughout, but especially in the lower 10 feet of the group. Unit is as much as 150 feet thick.
€j	Jordan Sandstone—Very fine grained sandstone, coarsening upward to coarse-grained; yellow to white, friable. Very fine grained component is rich in feldspar, whereas the fine- to coarse-grained components are quartz-rich. Formation is as much as 100 feet thick.
€sf	St. Lawrence and Franconia Formations, undivided—St. Lawrence Formation, 60 to 75 feet thick, consists mostly of silty, microcrystalline, tan to pink dolostone, intercalated with intervals of siltstone ranging in thickness to 20 feet and rare (generally <10 percent) beds of very fine grained, glauconitic sandstone. Beds of green and maroon shale dominate the uppermost 5 to 10 feet. The Franconia Formation is as much as 140 feet thick, consists mostly of very fine grained, glauconitic and feldspathic sandstone, intercalated with thin to thick beds of green shale and microcrystalline, pink, tan, or red, and locally glauconitic dolostone. In many places the contact between the St. Lawrence and Franconia Formations is gradational over several tens of feet and consequently cannot be mapped with certainty across the county.
€ig	Ironton and Galesville Sandstones, undivided—Fine-grained sandstone, coarsening upward to very coarse grained, quartz-rich, sandstone. Scattered beds of maroon and green shale and very fine grained, feldspathic sandstone. White, brown, and black fossil shell fragments are locally abundant especially in the uppermost part of the Ironton. Although the Ironton and Galesville Sandstones are separated by a disconformity of considerable temporal duration, the two cannot be mapped separately where only water-well cuttings are available. The combined interval is as much as 75 feet thick.
€e	Eau Claire Formation—Shale, maroon, green, and red, intercalated with thin to medium beds of tan and pink siltstone, and very fine to fine-grained sandstone. Beds of tan, pink, and red dolostone are locally abundant in the lowermost part, whereas beds of siltstone and very fine grained sandstone are abundant in the uppermost part of the formation. Some sandstone contains appreciable glauconite; fossil shell fragments are common throughout. Formation is as much as 75 feet thick.
€m	Mt. Simon Sandstone—Fine- to coarse-grained, white to yellow, quartz-rich, and friable sandstone. The uppermost 10 feet are marked by a "rusty" interval where thin hematite rims cover grains of fine to coarse sand. The upper third of the formation contains thick units of fine- to medium-grained sandstone intercalated with thin to thick beds of siltstone and variegated shale. The middle third consists mostly of fine- to coarse-grained, quartz-rich and friable sandstone, intercalated with a few scattered beds of variegated shale. The lower third is marked by thin beds of conglomerate or conglomeratic sandstone, both having pebble-size clasts of yellowish-white vein quartz. The lower part also contains thin to thick intervals of shale and siltstone characterized by a pale red to very light pinkish gray color. Unit varies considerably in thickness across the county, ranging in thickness from 10 to more than 300 feet.
mP	Keweenawan Supergroup, undivided—Intercalated units of red, maroon, or brown shale and fine- to coarse-grained, quartz-rich and feldspathic sandstone. The unit contains locally abundant layers of conglomerate having clasts of mafic igneous derivation.

CORRELATION OF MAP UNITS

Ku	Undivided	Cretaceous System	Mesozoic Era
disconformity			
Osp	St. Peter Sandstone	Ordovician System	Paleozoic Era
disconformity			
Opc	Prairie du Chien Group		
disconformity			
€j	Jordan Sandstone	Cambrian System	
€sf	St. Lawrence and Franconia Formations, undivided		
€ig	Ironton and Galesville Sandstones, undivided		
disconformity			
€ig			
€e	Eau Claire Formation		
€m	Mt. Simon Sandstone		
disconformity			
mP	Keweenawan Supergroup		Middle Proterozoic

MAP SYMBOLS

~	Geologic contact; approximately located
U/D	Fault; U, upthrown side; D, downthrown side
—850—	Bedrock topographic contours in feet above sea level; contour interval 50 ft.
+	Water well or test boring
⊙	Water well or test boring for which downhole geophysical data and/or cuttings exist

Every reasonable effort has been made to ensure the accuracy of the factual data on which this map interpretation is based; however, the Minnesota Geological Survey does not warrant or guarantee that there are no errors. Users may wish to verify critical information; sources include both the references listed here and information on file at the offices of the Minnesota Geological Survey in St. Paul. In addition, effort has been made to ensure that the interpretation conforms to sound geologic and cartographic principles. No claim is made that the interpretation shown is rigorously correct, however, and it should not be used to guide engineering-scale decisions without site-specific verification.

BEDROCK GEOLOGIC MAP OF CARVER COUNTY, MINNESOTA

By

Anthony C. Runkel

1993