Natural Resources

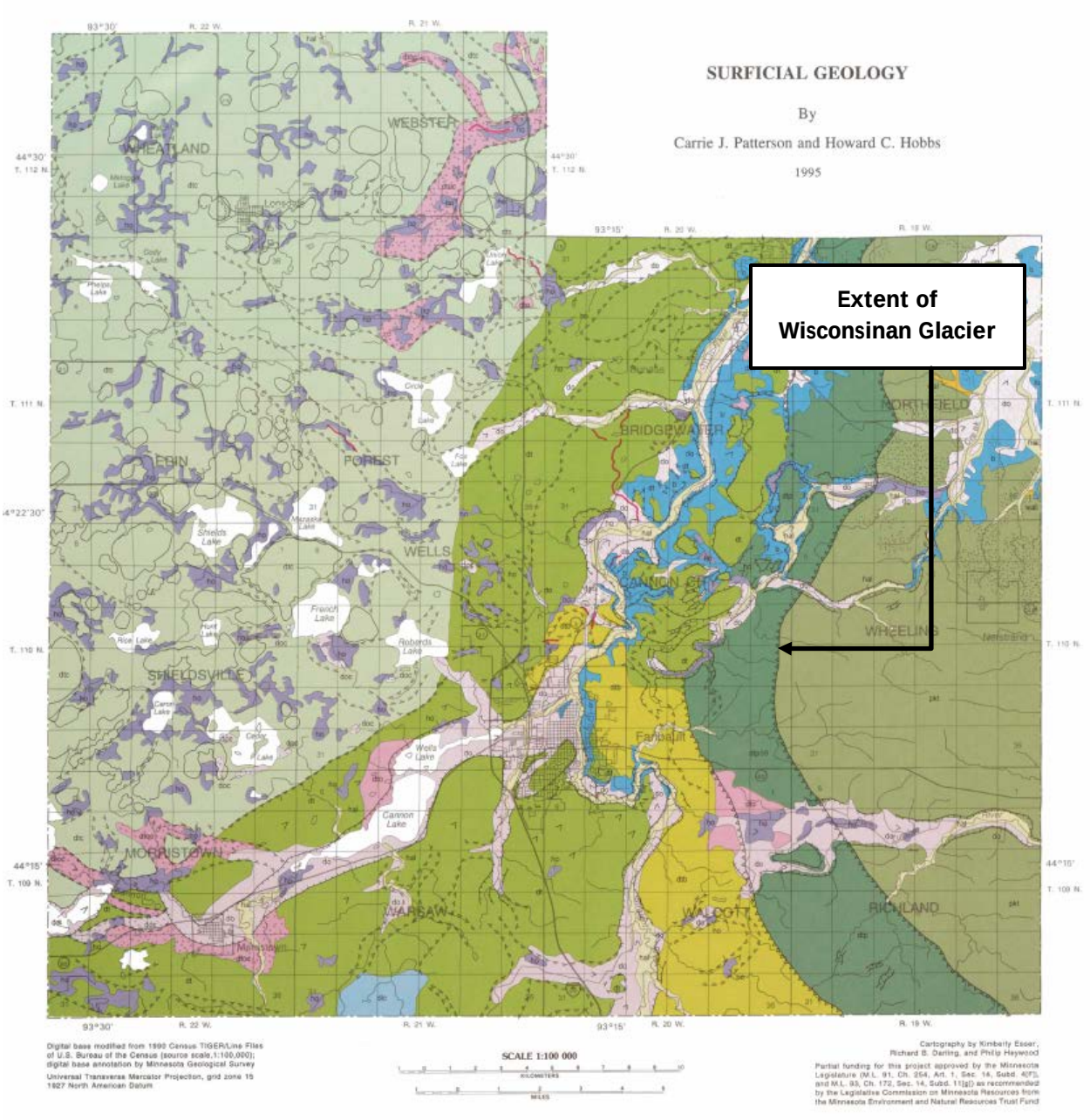
Geology

Rice County's geology can be described at the Quaternary (surficial), Paleozoic (bedrock); and Proterzoic (basement) geology levels. Surficial and bedrock geology have directly influenced the topographic and soil characteristics throughout Rice County. Geologic conditions can indirectly influence agricultural practices and land uses.

Surficial Geology

Rice County was greatly affected by the early glaciations. Glacial events can be well understood because of the well-preserved surficial sediments and glacial landforms found in three-fourths of the county. The current landscape of Rice County results largely from glacial activity during the Quaternary Period. This period includes the Pleistocene Epoch (2 million to 10,000 years ago) and the Holocene, or Recent, Epoch (10,000 years ago to the present). The entire county was glaciated during the early Pleistocene Epoch (the Great Ice Age). Glacial ice and melt-water from this period deposited most of the unconsolidated surficial materials in the county. During the Wisconsinan stage, the most recent glaciation (about 20,000 years ago) covered the entire county except the eastern quarter (see figure).

The first advance of the late Wisconsinan stage reached the small town of Moland in southeastern Rice County. The meltwater at the Moland margin drained east into the channels now occupied by the north fork of the Zumbro River and by Prairie Creek and its tributaries. The Des Moines lobe that advanced across Minnesota and into Iowa near the end of the Wisconsinan stage created the current landscape of Rice County. Fine-textured fragments of limestone, shale, and granite from the glaciation later became the fine prairie soils of the area.



Source: Minnesota Geological Survey

Bedrock Geology

The bedrock in Rice County is largely concealed by a thick mantle of unconsolidated glacial and postglacial deposits that range to more than 400 feet in thickness in some of the deepest buried valleys. Exceptions are the bluffs and banks along the Cannon River from Faribault to Northfield, stream cuts and bedrock terraces on Falls Creek and the Straight River near Faribault, stream cuts in Nerstrand State Park, and some mesas in the northeastern portion of the county, where bedrock is also exposed at the surface.

The bedrock formations in Rice County are mainly marine sedimentary rocks consisting of sandstone, shale, dolomitic limestone, and dolostone. In the early Paleozoic Age, when shallow seas covered southeastern Minnesota, sand accumulated on the beaches, silt and clay formed mudflats further from shore, and carbonate from the remains of invertebrate shells and algae accumulated in reefs on the sea floor. These sediments later solidified to form the marine sedimentary rocks found today. During the Early Paleozoic, marine waters withdrew from the region, and erosion of the sediments took place. This erosion can be seen in the unconformities or erosional surfaces in the rock column. Other erosion activities occurred after deposition of Lower Paleozoic rocks ceased. As a result of the erosion events, formations including the Galena Group and the Dubuque and Maquoketa Formations that can be seen south of Rice County were eroded away.

Rice County overlies part of the Mid-Continent Rift, an elongate geological terrain extending from Lake Superior into southern Kansas. It consists of thick lava flows overlain by red clastic sedimentary rocks, and formed in the Middle Proterozoic time. The rocks in the rift are crossed by several large faults. Movement along these faults has warped and faulted the Paleozoic rocks. The overall regional dip in the Paleozoic sedimentary rocks in Rice County is toward the south and east, but local geologic structures complicate regional trends.

The bedrock topography has been greatly affected by the development of preglacial, interglacial, and postglacial stream drainages. Development of the drainage patterns has been influenced by the pattern of rock formations, since bedrock topography affects the pattern of outcropping and subcropping bedrock geological formations.

Rice County Geologic Atlas Part A

http://conservancy.umn.edu/handle/11299/58514

Rice County Geologic Atlas Part B
http://www.dnr.state.mn.us/waters/programs/gw_section/mapping/platesum/ricecga.html