

BEDROCK GEOLOGIC MAP OF NORTH DAKOTA

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North Dakota Geological Survey
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Miscellaneous Map No. 21

MAP COMPILATION

This geologic map shows the bedrock surface found beneath the mantle of Quaternary sediment in North Dakota. As it is used on this map, the term "bedrock" refers to materials of Tertiary age and older. Certain pre-glacial fluvial deposits, either late Tertiary or early Quaternary in age, present in the bottoms of some pre-glacial valleys and on some high-level erosion surfaces, are not shown on the map. Otherwise, all the stratigraphic units recognized in North Dakota (Bluemle, et al., 1980; Lerud, 1982) are shown if they outcrop or if they subcrop beneath the glacial cover. In those parts of North Dakota covered by thick glacial sediment, the geology shown on the map is interpreted from test-hole data. Throughout most of the area southwest of the Missouri River, where the glacial deposits are thin and discontinuous, the geology is based largely on surface exposures.

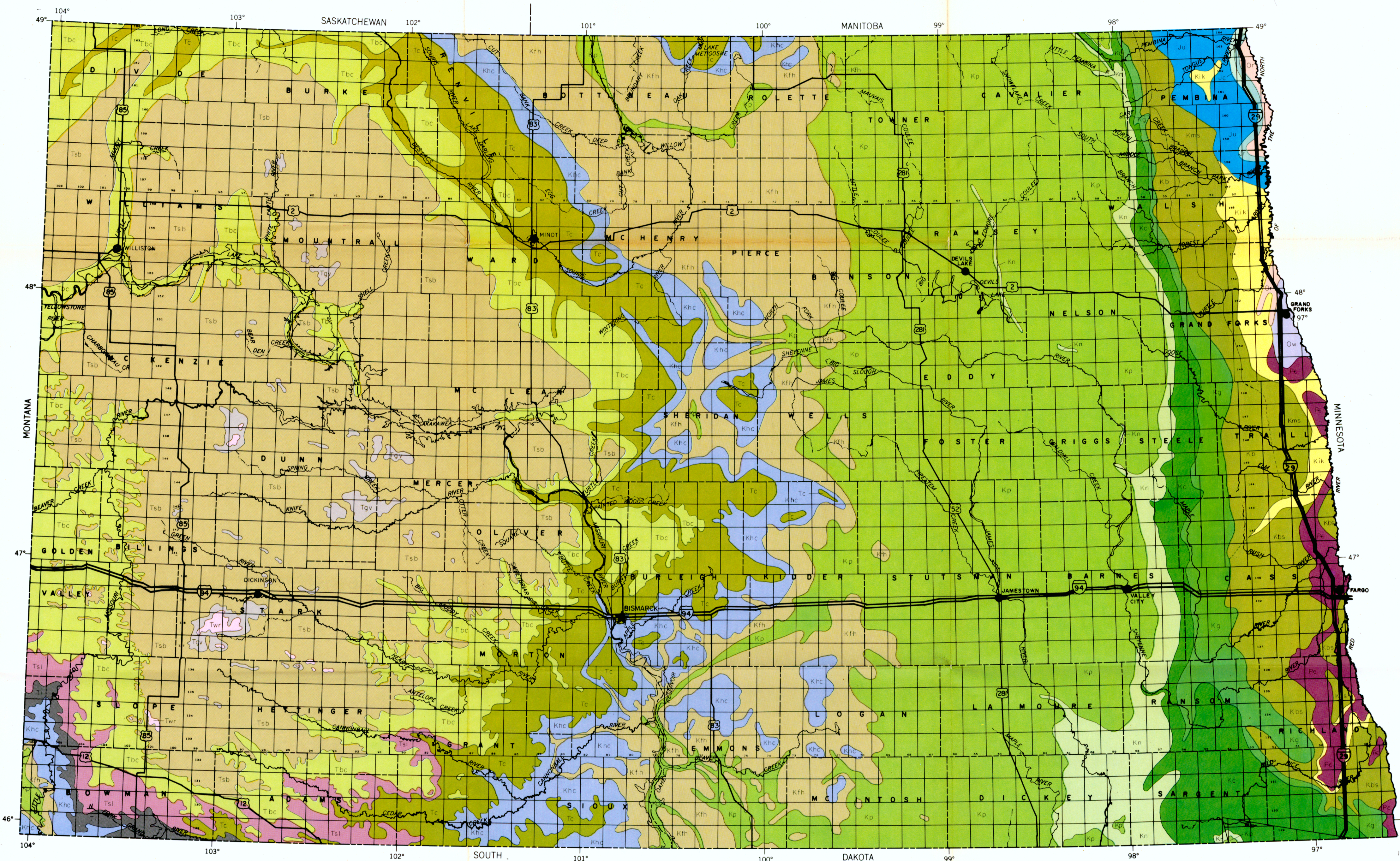
A map of North Dakota's bedrock geology was published by the North Dakota Geological Survey in 1969 (Carlson, 1969). Two geologic maps of North Dakota have been published since 1969 (Bluemle, 1977; Clayton, et al., 1980); but these maps portray only surficial materials, and the bedrock geology is not shown in glaciated parts of the state.

Much of the data used in compiling the present map was obtained as a result of drilling conducted under a county groundwater studies program, a mapping project that eventually will result in the geologic mapping of all 53 North Dakota counties at a 1:125,000 scale (one-half inch to a mile). The county groundwater studies, which were initiated in 1959, are conducted jointly by the North Dakota Geological Survey, the North Dakota State Water Commission, the Groundwater Branch of the Water Resources Division of the U.S. Geological Survey, and the counties involved. All or parts of the geologic or groundwater studies for 49 counties have now been published, and reports are in progress on the remaining four counties.

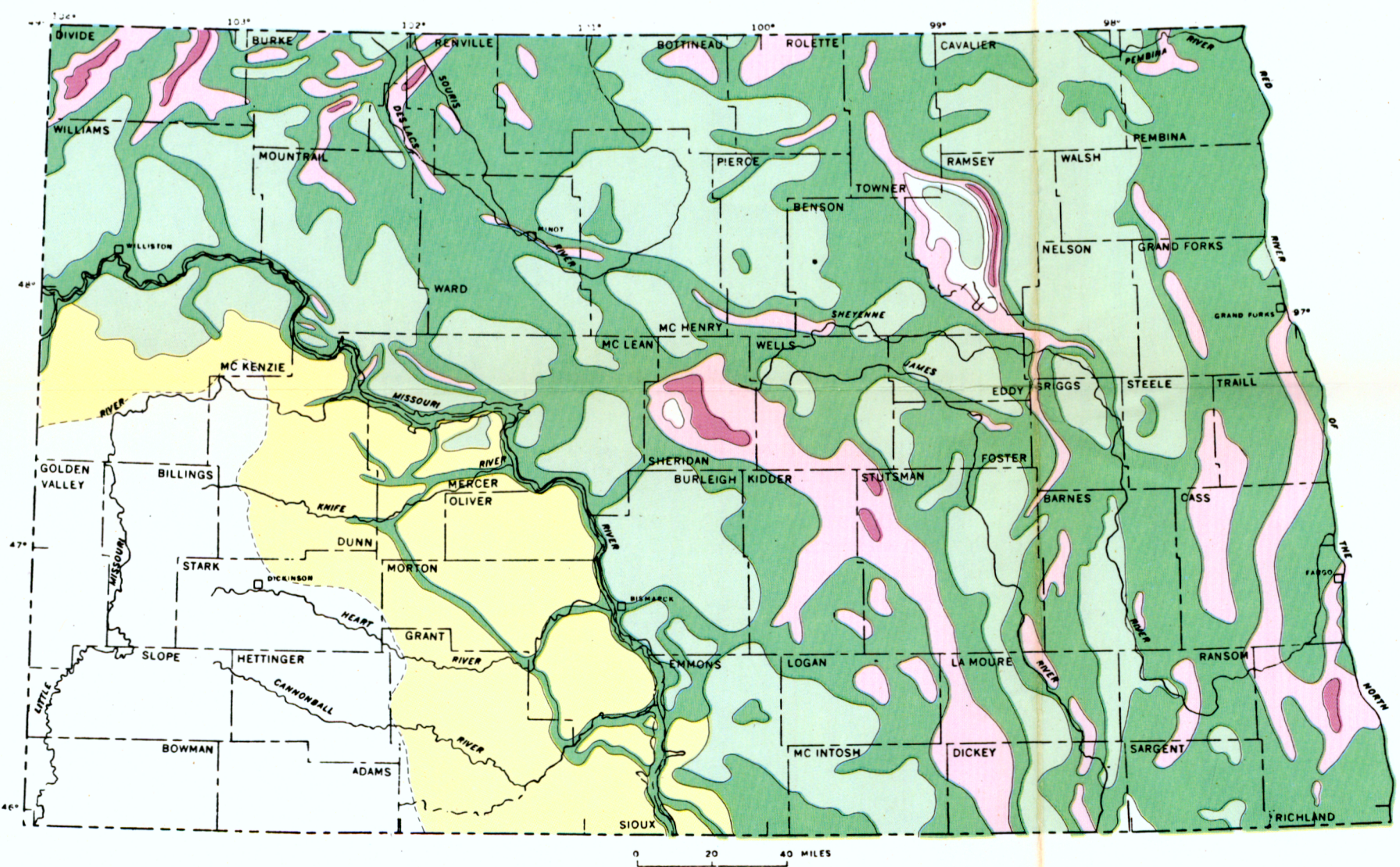
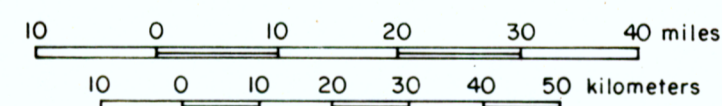
The map on the lower left shows the thickness of the glacial sediment overlying the preglacial surface (the depth to the bedrock surface) throughout North Dakota.

REFERENCES

- Bluemle, J. P., 1977, Geologic highway map of North Dakota: North Dakota Geological Survey Miscellaneous Map 19, 1:1,000,000.
Bluemle, J. P., Anderson, S. B., and Carlson, C. G., 1980, North Dakota stratigraphic column: North Dakota Geological Survey chart.
Carlson, C. G., 1969, Bedrock geologic map of North Dakota: North Dakota Geological Survey Miscellaneous Map 10, 1:1,000,000.
Clayton, Lee, assisted by Moran, S. R., Bluemle, J. P., and Carlson, C. G., 1980, Geologic map of North Dakota: U.S. Geological Survey, 1:500,000.
Lerud, Joanne, 1982, Lexicon of stratigraphic names of North Dakota: North Dakota Report of Investigation 71, 139 p.



DEPTH TO THE BEDROCK SURFACE
(Glacial Overburden Thickness)



- thicker than 500 feet
- 300 to 500 feet thick
- 100 to 300 feet thick
- 10 to 100 feet thick (bedrock exposed in places)
- 0 to 10 feet thick (bedrock surface with scattered boulders)
- Unglaciated area - bedrock surface

EXPLANATION

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| Tertiary Units | Jurassic Units |
| White River Group | Undifferentiated; Swift-Rierson Fms. equivalent |
| Golden Valley Formation | Carbonates; Piper equivalent |
| Sentinel Butte Formation | Red beds; may include some rocks of Triassic age |
| Bullion Creek Formation | Ordovician Units |
| Cannonball Formation | Red River Formation |
| Ludlow Formation | Winnipeg Group |
| Cretaceous Units | Precambrian |
| Hell Creek Formation | |
| Fox Hills Formation | |
| Pierre Formation | |
| Niobrara Formation | |
| Carlile Formation | |
| Greenhorn Formation | |
| Belle Fourche Formation | |
| Mowry through Skull Creek Fms., undifferentiated | |
| Belle Fourche through Skull Creek Fms., undifferentiated | |
| Inyan Kara Formation | |