

# Surface Geology

## Dickinson North Quadrangle, North Dakota

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### EXPLANATION

#### QUATERNARY SYSTEM

##### RECENT

###### Manmade Features or Deposits

##### Qf Artificial Deposits

Fill used to create level building sites, reclaim mined land and to build dams, retaining ponds, and other structures. Consists of engineered fill, construction and demolition debris, and general borrow material. Although only selected deposits have been mapped, fill should be anticipated in all built-up areas.

##### Qlf Landfill Deposits

Engineered landfill deposits and common dumps.

##### QAHE FORMATION

##### Qa1 Modern Alluvial Deposits

Sand, silt, and clay deposited by modern streams and rivers. Gravelly where derived from coarse, older alluvial deposits. Includes river channel and floodplain sediments. Contains numerous truncated meanders and minor terraces. Local similarity to the Sentinel Butte Formation makes thickness determinations difficult; generally less than 20 feet thick.

##### RECENT/PLEISTOCENE

##### Qa2 Alluvial Deposits

Poorly sorted sand, silt, clay, and gravel. Forms planar terrace deposits, elevated relative to modern streams, that are dissected by modern alluvial deposits. Fluvial (channel and floodplain) sediment generally less than 30 feet thick.

#### QUATERNARY/TERTIARY SYSTEM

##### QTa Sand and Gravel Deposits

Poorly sorted, iron stained, locally iron cemented sand and gravel. Contains pebbles and cobbles of locally derived material (mudstone, sandstone, concretions, silicified wood, flint, silcrete, chalcedony), recycled glacial erratics, and lesser quartzite and porphyry (derived from the Black Hills or Rocky Mountains). Occasional small to medium boulders or local sandstone and mudstone. Occurs as esker-like ridges, a veneer that caps hilltops, and deeply eroded deposits with no distinctive topographic expression. Fluvial (channel) sediment up to 60 feet thick.

#### TERTIARY SYSTEM

##### EOCENE/PALEOCENE

##### Tgv GOLDEN VALLEY FORMATION

###### Camels Butte Member

Yellowish brown, micaceous, illitic and montmorillonitic siltstone, claystone, and sandstone.

###### Bear Den Member

Light gray to bright white kaolinic strata often divisible into 3 stratigraphic units: basal gray zone, middle orange zone, and a thin upper carbonaceous zone. Often capped by a silicious bed (Taylor Bed) in this area.

##### PALEOCENE

##### FORT UNION GROUP

##### Tsb SENTINEL BUTTE FORMATION

Gray to brown, variably lithified siltstone, mudstone, claystone, sandstone, and lignite. Calcite-cemented sandstone and mudstone concretions are common, as are siderite nodules. In this area, the contact with the Golden Valley Formation appears conformable and gradational. Fluvial, lacustrine, and swamp sediment that form gentle, vegetated slopes. Only the upper 200 feet of the formation is exposed.

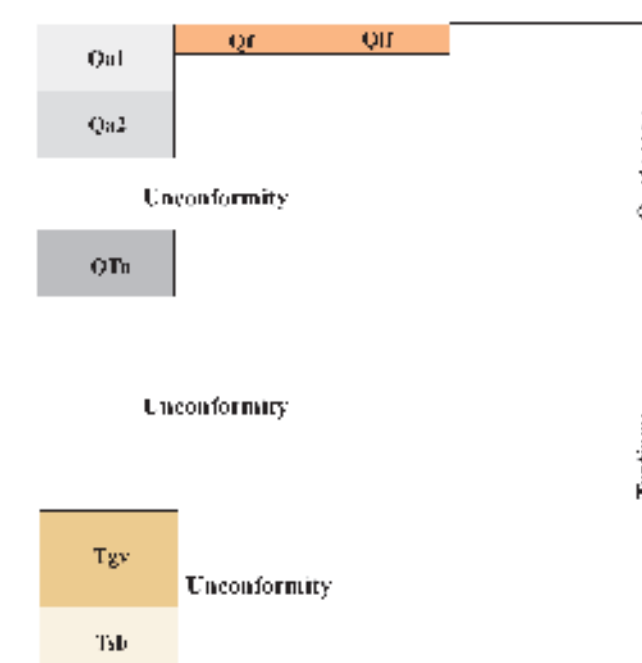
#### Geologic Symbols

- Known contact between two geologic units
- - - - Approximate contact between two geologic units
- Taylor Bed: Solid dot indicates small exposure.
- Taylor Bed: Open circle indicates lag deposit of Taylor Bed silcrete let down by erosion of underlying beds.

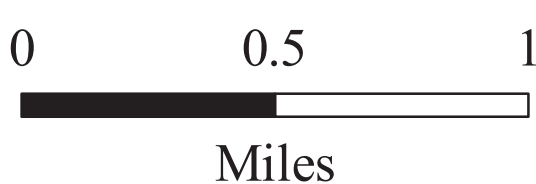
#### Other Features

- Water
- Interstate Highway
- State Highway
- Paved Road
- Unpaved Road

#### Correlation of Map Units

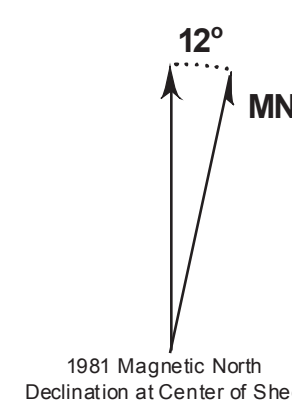


Scale 1:24,000

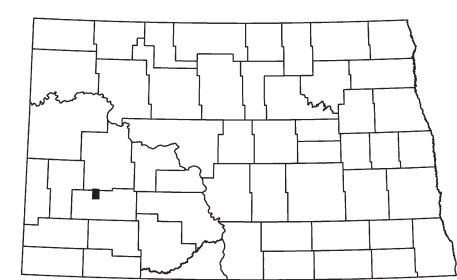


Miles

Lambert Conformal Conic Projection Standard Parallels 46° 52' 30" and 47° 00' 00"  
1927 North American Datum NGVD 1929  
USGS 7.5 Minute Topographic Map Contour Interval 10 Feet  
Road and Hydrologic Layers Rectified to 2003 NAIP Digital Orthophoto



1981 Magnetic North  
Declination at Center of Sheet



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