

# Surface Geology

## Hanks Gully, North Dakota Quadrangle

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2004

### UNIT DESCRIPTIONS

#### ARTIFICIAL DEPOSITS

**Qef** **Engineered Fill**  
Fill used in the construction of roadways and dams.

#### QUATERNARY SYSTEM

##### RECENT

##### OAHE FORMATION

#### **Qal** **Modern Alluvial Deposits**

Sand, silt, clay, and gravel deposited in modern stream channels, flood plains, and beneath low stream terraces. Sediments comprise cross-stratified and coarse planar-stratified channel deposits of sand and gravel, grading upward to ripple cross-stratified and finely planar-stratified overbank deposits of sand, silt, and clay. Sediments are moderately to moderately-well sorted. Locally includes small alluvial-fan and valley-margin colluvial deposits.

#### **Qoa** **Older Alluvial Deposits**

Sand, silt, clay, and gravel deposited beneath Holocene-age terraces. Sediments typically display an upward-fining sequence: crudely cross-stratified gravel and sand predominate in the lower section and finely planar-stratified and ripple cross-stratified sand, silt, and clay in the upper section. Buried soil profiles are common. Locally includes small alluvial-fan and valley-margin colluvial deposits.

#### **Qf** **Fan Deposits**

Active and incised alluvial deposits of sand, silt, clay, and gravel deposited at the mouths of canyons and at confluences where low-order streams empty into higher-order streams. Sediments are poorly stratified and poorly to moderately sorted. Deposits contain thin layers of transported soil and weak profiles of soils formed in situ. Gravel may be clast- or matrix-supported. Some beds have massive or reverse bedding. Locally includes colluvium deposited by slope wash at the base of steep hillsides.

#### **Qmp** **Mantled Pediment Deposits**

Complex assemblage of active and incised alluvial deposits of sand, silt, and clay deposited over pediments. Sediments represent alluvium (weakly stratified, poorly sorted) washed from superjacent hillslopes and a combination of reworked (weakly stratified, well-sorted) and in situ (massive, well-sorted) eolian material. Deposits contain thin layers of transported soil and weak profiles of soil formed in situ. Some surface soils are well developed. Deposits are typically less than 3 feet (1 meter) thick and locally 6 feet (2 meters) thick.

##### RECENT/PLEISTOCENE

#### **Qs** **Landslide Deposits**

Variable mixture of strata and deposits that have slid or slumped to the base of steep slopes principally by gravity. Ground surface of many landslide deposits is characterized by hummocky topography, numerous arcuate scarps, and chaotic bedding. Locally includes hillslopes affected by creep and hilllope material transported by debris flows.

##### PLEISTOCENE

##### COLEHARBOR GROUP

#### **Qsg** **Alluvium beneath Pleistocene Terraces**

Poorly to moderately sorted sand and sub-rounded to sub-angular gravel of mixed lithologies (sandstone, mudstone, iron nodules, siltified wood, flint, clinker, chalcocopy, quartzite, granite, and volcanic porphyry) beneath broad, flat to gently sloping axial-stream terraces along the Little Missouri River. Sand and gravel deposits are typically 3 to 10 feet (1 to 3 meters) thick. Deposits of Qsg are subdivided locally on the basis of their height above the modern stream grade into Qsg1, 160 feet (50 meters) above grade, Qsg2, 220 feet (60 meters), Qsg3, 240 feet (70 meters), and Qsg4, 260-270 feet (80 meters).

#### TERTIARY SYSTEM

##### PALEOCENE




#### **Tsb** **SENTINEL BUTTE FORMATION**

Alternating beds of gray to grayish brown, variably lithified sandstone, siltstone, mudstone, claystone, clinker, and lignite. Calcite-cemented sandstone concretions, siderite nodules, and petrified wood are common. Sediments deposited in river, lake, and swamp environments. Typically forms sparsely vegetated, steep, rilled slopes and badlands topography. About 750 feet (230 meters) thick.




#### **Tbc** **BULLION CREEK FORMATION**

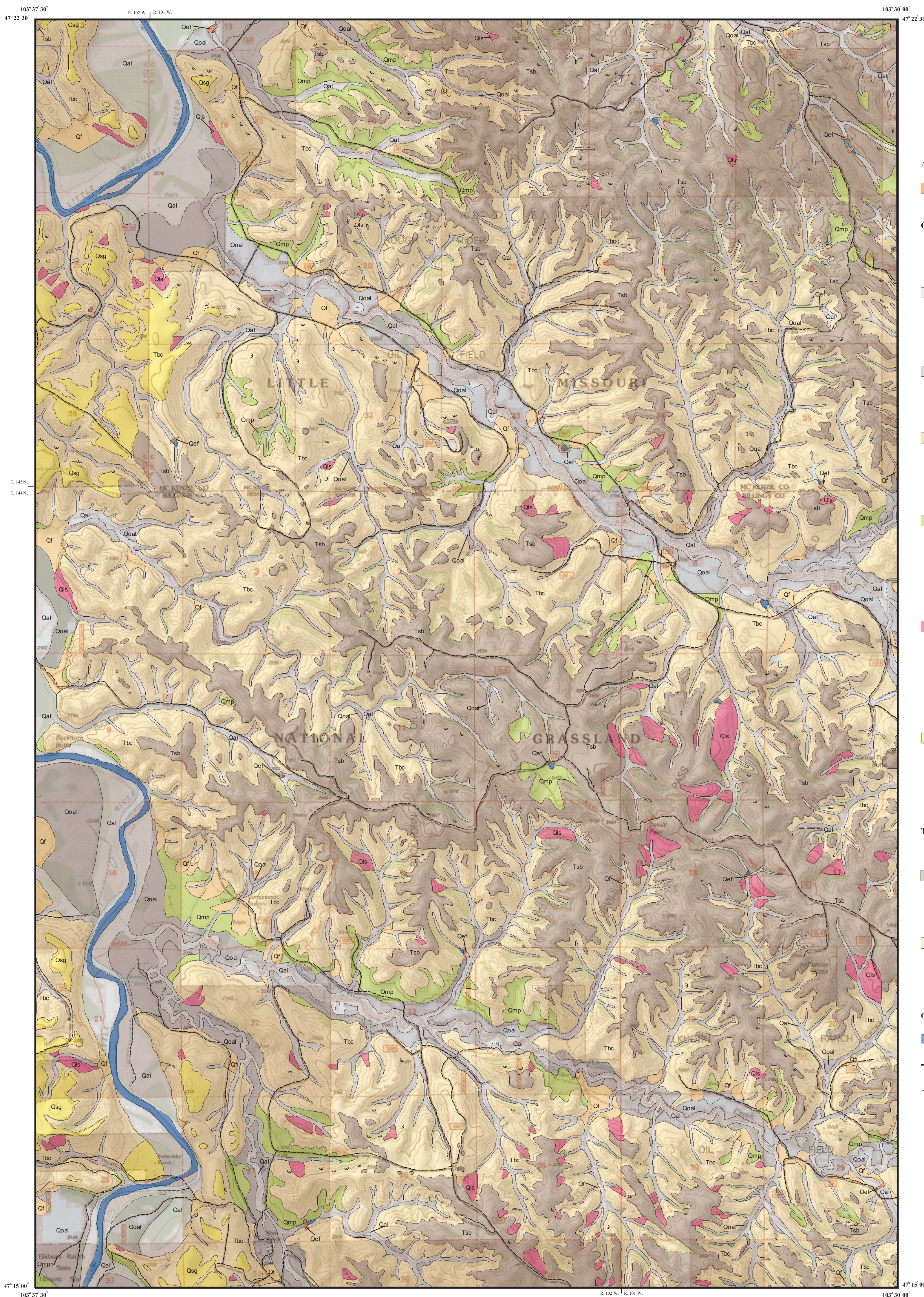
Alternating beds of yellow to yellowish-brown, variably lithified sandstone, siltstone, mudstone, claystone, clinker, and lignite. Sediments deposited in river, lake, and swamp environments. Only the upper 300 feet (80 meters) are exposed in the map area.

#### Other Features

-  Water
-  Paved Road
-  Unpaved Road

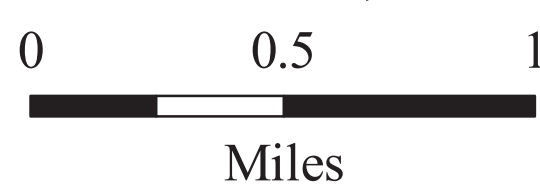
#### Geologic Symbols

-  Known contact between two geologic units
-  Approximate contact between two geologic units
-  Small, shallow landslides and hillslopes affected by creep



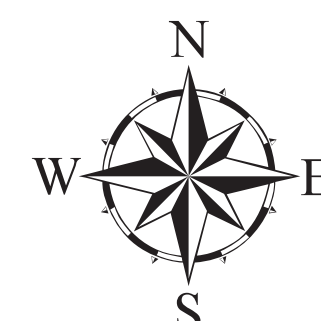
Hanks Gully, North Dakota Quadrangle

Scale 1:24,000



Miles

Lambert Conformal Conic Projection  
1927 North American Datum  
Standard Parallels 47° 15' 00" and 47° 22' 30"



This geologic map was funded in part by the  
USGS National Cooperative Geologic Mapping Program.