

# Surface Geology

## Manfred Quadrangle, North Dakota

**John P. Bluemle**  
2007

### EXPLANATION

#### QUATERNARY SYSTEM

##### RECENT

##### OAHE FORMATION

###### Qor Alluvium

River and stream sediment. Dark obscurely bedded clay and silt (mainly overbank sediment); generally overlying cross-bedded sand (channel sediment); on plains of modern streams.

###### Qos Pond and Slough Sediment

Dark, obscurely bedded clay and silt; in modern ephemeral ponds.

##### PLEISTOCENE

##### COLEHARBOR GROUP

###### Silt Facies

(Insignificant amounts of this facies on this quadrangle)

###### Sand and Gravel Facies

River sediment. Moderately well-sorted, cross bedded sand and plane-bedded gravel, including sediment of meltwater rivers.

###### Qcrfu Uncollapsed Flat Fluvial Plains (upper)

Flat-bedded sediment of nearly level plains and river terraces, commonly with braided channel scars, oxbows, and other relict markings; relief of 1 to 10 feet. Qcrf(u) is slightly higher and older than Qcrf(l).

###### Qcrfl Uncollapsed Flat Fluvial Plains (lower)

Flat-bedded sediment of nearly level plains and river terraces, commonly with braided channel scars, oxbows, and other relict markings; relief of 1 to 10 feet. Qcrf(l) is slightly lower and newer than Qcrf(u).

###### Qcic Ice-Contact Deposits

Mainly gravel and sand with cobbles and boulders common; inclusions of glacial sediment common; local relief up to 50 feet; eskers and kames.

###### Till Facies

Glacial sediment. Unsorted, unbedded mixture of angular, subangular, and rounded blocks of rock, gravel, and sand, generally in a stiff matrix of silt and clay; yellowish-brown to olive-gray in exposures depending on weathering intensity; contains discontinuous lenses of gravel and sand.

###### Qcgg Collapsed Glacial-Gently Undulating

Spunglacial sediment with hummocky topography; areas of linear topography and ice-thrust topography interspersed; gently undulating with 1 to 2 degree maximum slopes. Abundant transverse ridges ("washboards").

###### Qct Ice-Thrust Masses

Glacial sediment draped over glacial or preglacial sediment or rock that has been sheared up into thrust slabs or folds near the ice margin; hilly areas with intense internal linearity; local concentrations of gravel and boulders; local relief may exceed 150 feet.

###### Qcer River-Eroded Glacial Sediment

Glacial sediment with flat to undulating topography resulting from stream erosion in the bottom of large meltwater trenches or over broad areas of till that have been washed by running water; overlain by a thin layer of fluvial sediment of the Cole Harbor Group or Oahe Formation in places.

#### Geologic Symbols

— Known contact between two geologic units

— Ridge-Transverse

#### Other Features

Water

Water - Intermittent

US Highway

Paved Road

Unpaved Road

