

# Surface Geology

## Balfour NW Quadrangle, North Dakota

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### EXPLANATION

#### QUATERNARY SYSTEM

##### RECENT

##### OLHE 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.

**Qod** Windblown Sediment

Well-sorted, fine sand and black silt with obscure bedding and weak palaeosols; undulating to rolling dunes with up to 20 feet of local relief.

##### PLEISTOCENE

##### COLEHARBOR GROUP

##### Silt/Clay Facies

Laminated silt and clay of glacier-dammed lakes.

**Qes** Shoreline Sediment

Well-sorted sand and gravel of beach-ridge complexes; as thick as 10 feet.

##### Sand and Gravel Facies

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

**Qerf** Uncollapsed Flat Fluvial Plains

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. Mainly along minor valleys.

**Qerfl** Uncollapsed Flat Fluvial Plains (lower)

A lower level of Qerf, the lower level was formed after the upper level.

**Qerfu** Uncollapsed Flat Fluvial Plains (upper)

An upper level of Qerf. This upper level formed before the lower level.

**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.

**Qcdg** Thin Layer of Till

Veneer of till draped over and only slightly modifying the pre-existing topography (pre-glacial bedrock, older till, or gravel surface); relief up to 75 feet locally.

**Qccu** Collapsed Glacial Sediment-Undulating

Gently undulating to undulating surface with poorly integrated drainage; local relief generally less than 10 feet.

**Qcer** River-Eroded Glacial Sediment

Deeply eroded glacial sediment, mainly along the north slope of the Winterring River Valley.

**Qccr** Collapsed Glacial Sediment-Rolling

Rolling surface with kettles, partially to nonintegrated drainage, and numerous ice-disintegration features; slopes mainly to the southwest (toward the Missouri Coteau Escarpment).

**Qech** Hilly Surface -Kettles

Nonintegrated drainage, and abundant ice-disintegration features; local relief commonly more than 100 feet.

**Qclr** Longitudinal Ridges

Drumlins - some of the narrower of these are shown by lines; trend of all longitudinal ridges in this area is from NW to SE. The ridges are composed of varying amounts of till, and re-worked (molded) fluvial or lake sediment. They range from a few hundred feet to several miles long.

**Qcm** Ice Sculpted

Molded surface with abundant longitudinal ridges; local relief up to 40 feet.

#### Geologic Symbols

— Known contact between two geologic units

— Ridge-Transverse

— Ridge-Longitudinal (runs from NW to SE)

#### Other features

Water

Water - Intermittent

Marsh or Wetland-Intermittent

US Highway

Paved Road

Unpaved Road

