

# Surface Geology

## Dahlen Quadrangle, North Dakota

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### EXPLANATION

- W Water
- f Fill

### QUATERNARY SYSTEM

#### HOLOCENE

##### OAHE FORMATION

Sand, silt, clay, gravel, and organic debris; all postglacial sediment deposited on the landscape; includes river sediment, windblown sediment, lake sediment, and slopewash.

##### Hor Alluvium And Overbank Sediment

Sand, silt, clay and disseminated organic debris; obscurely bedded; dark colored; in many places associated with sand and gravel of older river-channel sediment; commonly more than three feet (1 meter) thick.

##### Hop Pond and slough sediment

Organic debris, clay, and silt; obscurely bedded; dark colored; generally more than three feet (1 meter) thick; deposited in poorly drained depressions in the landscape.

#### HOLOCENE AND OLDER

##### Qs Sediment eroded by slope processes

Sand, silt and clay; unsorted; unbedded; often pebbly; steeply sloping and eroded by mass movement and slope wash; lithology reflects the up-slope material; colluvium commonly present at the base of steep slopes.

#### PLEISTOCENE

##### COLEHARBOR GROUP

The Coleharbor Group includes all sediments in North Dakota associated with deposition by Pleistocene glaciers.

##### GOOSE RIVER FORMATION (UNDIFFERENTIATED)

Sediment deposited by a glacier as a result of a readvance from the northwest (Riding Mountain provenance) of the generally retreating Late Wisconsin ice sheet into the Red River lowland.

##### Qgrm Clay-Loam, pebbly

Unsorted; unbedded; contains cobbles and boulders; shale pebbles abundant; as much as 80 feet (24 meters) thick; deposited by glacial ice on an ice-cored glaciated landscape; collapsed glacial sediment with less than 30 feet (10 meters) of relief.

##### Qgrp Clay-loam, pebbly

Unsorted; unbedded; contains cobbles and boulders; shale pebbles abundant; glacial sediment covering, but not obscuring, pre-existing topography; buried meltwater channels are the most common feature present; may include exposures of sand and gravel; draped (palimpsest) features are visible on aerial photographs "through" the collapsed glacial sediment; deposited on an ice-cored glaciated landscape.

##### Qgre Sand and gravel

Moderately well-sorted sand and gravel; crossbedded to flatbedded faults and soil-sediment deformation structures common; contains inclusions of well sorted silt, cobbles, boulders, and inclusions of till common; level to undulating ridges (eskers) and mounds (kames) with local relief up to 80 feet (24 meters); channel sediment deposited by streams flowing on, in, or under glacial ice.

##### Qgrf Sand and gravel, shaly

Moderately well-sorted, light to dark grayish brown, low-angle flatbedded to high-angle cross-bedded silt, sand, and gravel deposited as outwash by the ancestral Park River and other meltwater streams flowing off the Pembina Escarpment onto the Elk Valley delta; flat to gently undulating surface commonly with braided channel scars, oxbows, and other relict markings; up to 70 feet (21 meters) thick.

#### CRETACEOUS SYSTEM

##### Kp Pierre and Niobrara Formation, undifferentiated (Upper Cretaceous)

Shale; commonly obscured by a thin veneer of till; offshore marine deposits.

#### Geologic Symbols

— Known contact between two geologic units

- - - Approximate contact between two geologic units

#### Other Lineations

Established from aerial photographs; line marks the dimension of the feature; located in glacial sediment and thinly veneered glacial sediment; interpreted as disintegration trenches, streamlined bedforms associated with the movement of glacial ice, or lineations of unknown origin; generally difficult to discern on topographic maps and on the ground.

#### Palimpsest channel

Established from aerial photographs and LiDAR; lines indicate the crests of the scarps; half-circles indicate the down-slope direction; interpreted as a buried meltwater channel; generally apparent on topographic maps, may not be apparent on the ground.

#### Beach ridges, spits and offshore bars

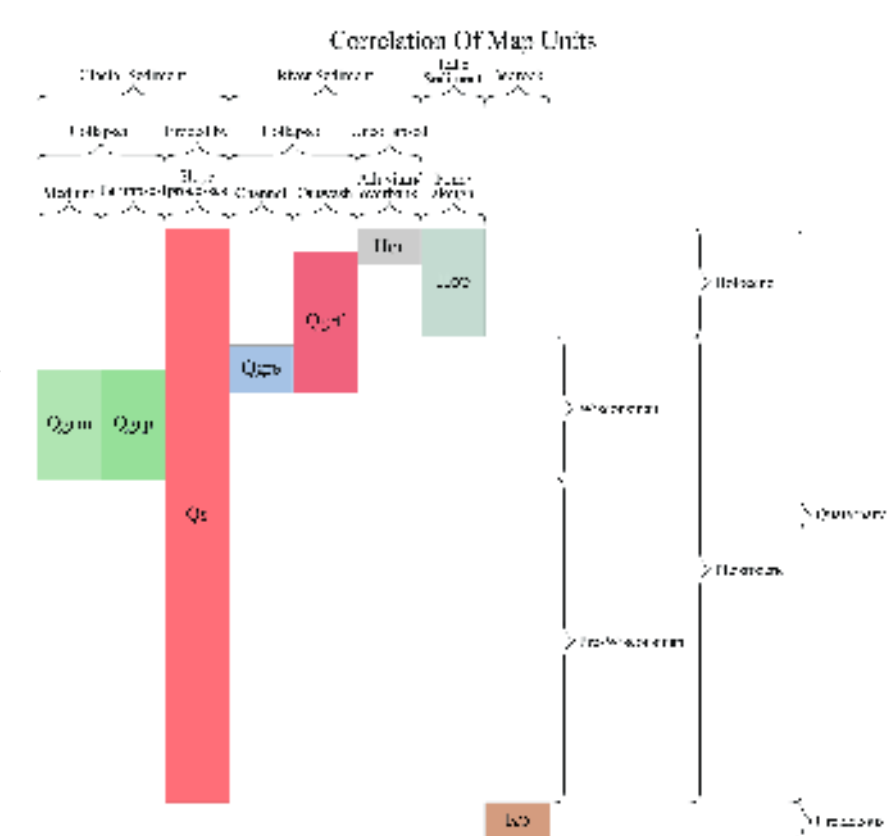
Established from aerial photographs; line indicates the crest of the ridge; interpreted as beach ridges or offshore bars deposited along the margin of Lake Agassiz; discernible on topographic maps and on the ground.

#### Sharp scarp

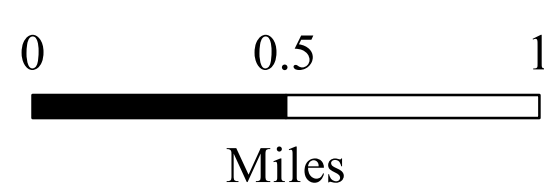
Established from aerial photographs and LiDAR; line indicates the crest of the scarp and the hachures point down-slope; easily discernible on topographic maps and on the ground.

#### Other Features

- Paved Road
- - - Unpaved Road

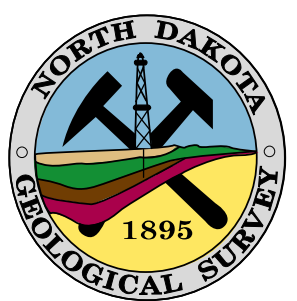
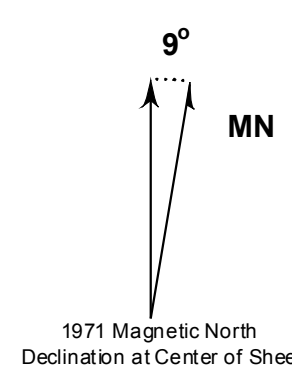


Scale 1:24,000



Miles

Lambert Conformal Conic Projection Standard Parallels 48° 07' 30" and 48° 15' 00"  
1927 North American Datum NGVD 1929  
USGS 7.5 Minute Topographic Map Contour Interval 10 Feet



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