

Surface Geology

Sterling Quadrangle, North Dakota

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2021

QUATERNARY SYSTEM

HOLOCENE

OAHE FORMATION

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

Qow

Windblown silt and sand

Moderately to well sorted grayish brown to tan, silt and sand; deposited as a thin mantle draped over, and only slightly modifying, the pre-existing glacial and non-glacial topography; generally less than 10 feet (3 meters) thick.

Qop

Pond and slough sediment

Organic debris, clay, and silt; obscurely bedded; dark colored; generally more than 3 feet (1 meter) thick; deposited in poorly drained depressions in the landscape.

Qor

Alluvium and overbank sediment

Sand, silt, clay, and disseminated organic debris; obscurely bedded, dark colored; locally abundant gastropod and pelecypod shells including *Valvata tricarinata*, *Sphaerium* sp., and *Platidium* sp.; commonly more than 3 feet (1 meter) thick.

PLEISTOCENE

COLEHARBOR GROUP

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

Qcoh

Collapsed lake sediment

Flat-bedded to gently folded, light olive-brown to olive-brown laminated clay, clayey silt, silty clay, silt and sand; non to moderately calcareous; iron-stained in places; small (generally less than pebble-sized) carbonate nodules and masses of gypsum, and sand-sized organic fragments common; subtle, flat to gently undulating hummocky surface, pitted by steep-sided, bowl-shaped depressions (kettle holes) formed by the melting of detached blocks of buried ice; offshore sediment deposited in a proglacial, ice-dammed lake. May be covered by a patchy, thin veneer of windblown sediment.

Qcrf

Collapsed outwash

Moderately well-sorted, light to dark olive brown, low-angle flat-bedded to high-angle cross-bedded silt, sand, and gravel; calcareous; shaly; bouldery in places; gently undulating to rolling surface, pitted by steep-sided, bowl-shaped depressions (kettle holes) formed by the melting of detached blocks of buried ice; deposited as outwash by meltwater flowing through the Apple Creek and Random Creek meltwater channels. May be covered by a patchy, thin veneer of windblown sediment.

Qccl

Collapsed glacial sediment

Light olive-brown to olive-brown; unsorted; unbedded; calcareous; very shaly; lignite fragments common; contains abundant cobbles and surface boulders of mostly crystalline lithologies, with minor amounts of limestone, dolostone, and, more rarely, local bedrock types; undulating to rolling, hummocky surface; deposited as end moraine on a predominantly non-glacial surface by an early Late Wisconsinian glacier (Long Lake Advance).

Qces

Slopewash-eroded glacial sediment

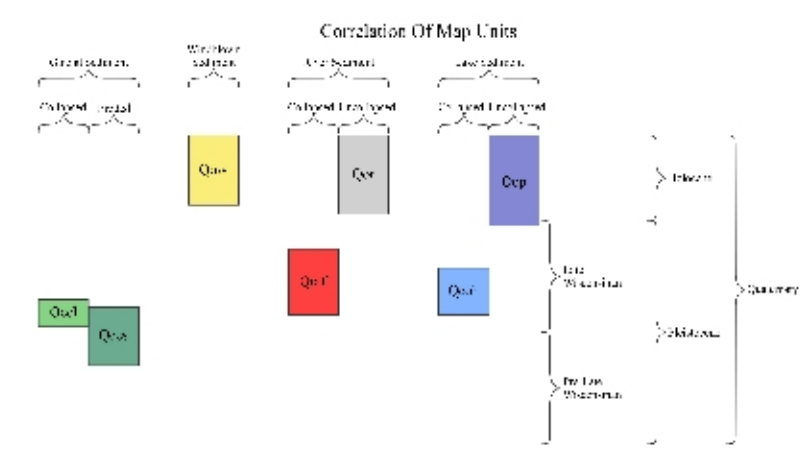
Light olive-brown to olive-brown; unsorted; unbedded; contains cobbles and boulders; shale pebbles abundant; flat to gently sloping surface; glacial sediment on the sides of small, modern streams eroded by running water.

Geologic Symbols

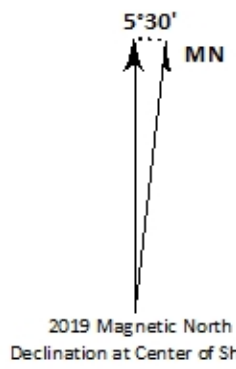
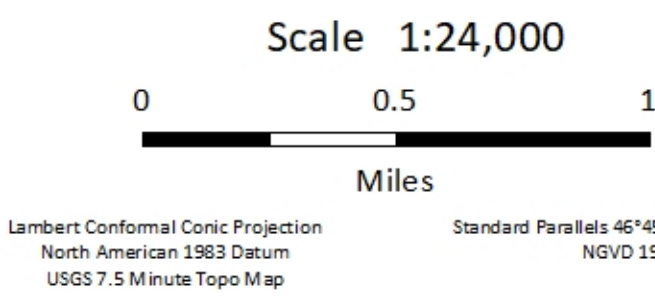
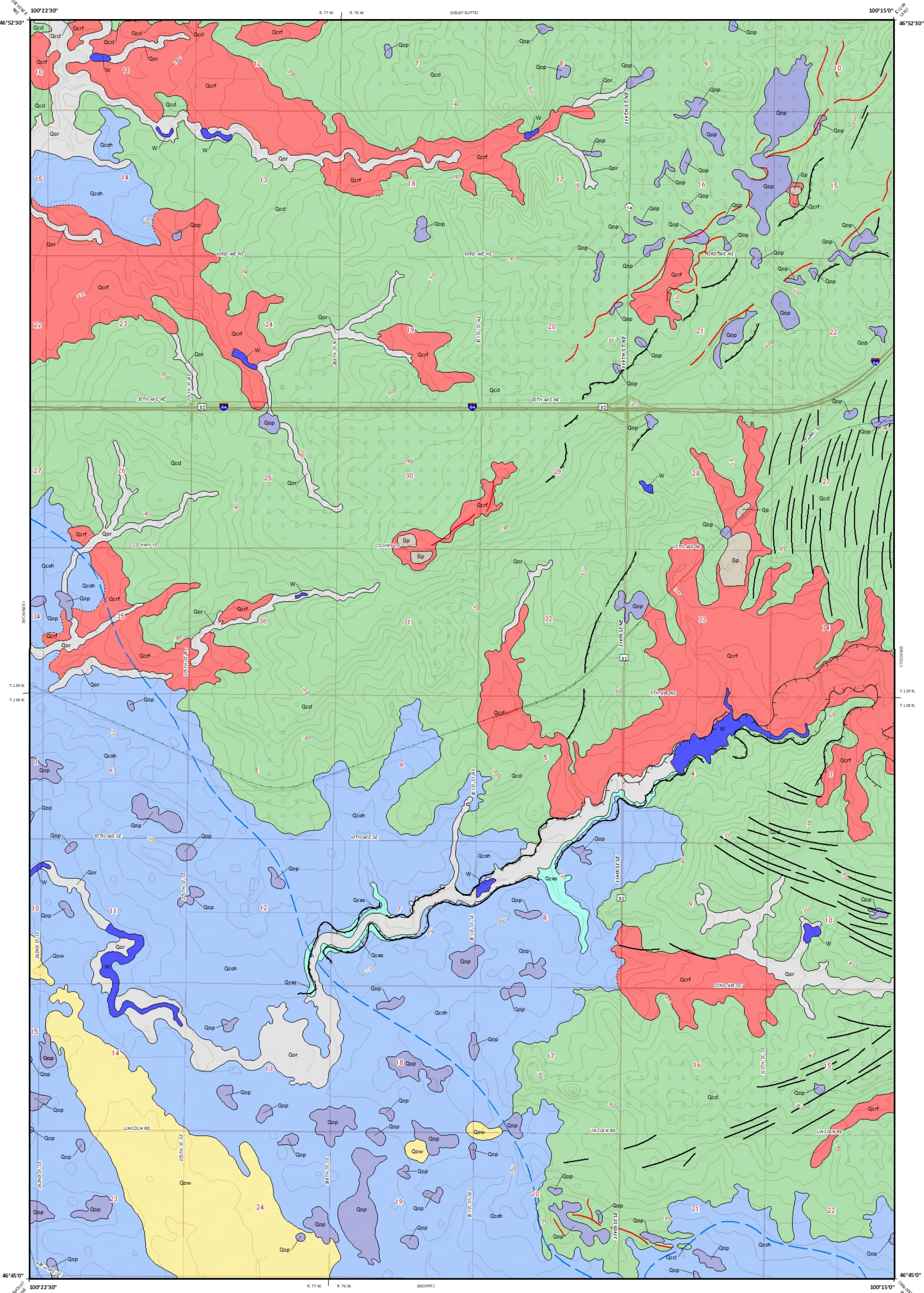
- Geologic contact
- Geologic contact (inferred)
- Hummocky topography** – Established from aerial photographs and LIDAR; the circular pattern indicates areas of subdued ring-shaped hummocks in collapsed supraglacial glacial sediment; interpreted as circular disintegration ridges formed by the subsidence of supraglacial sediment (commonly till) during wastage of the underlying ice; generally difficult to discern on topographic maps and on the ground.
- Sharp-walled channel** – Established from aerial photographs and LIDAR; paired sharp scarps; lines indicate the crests of the scarps and hachures point downslope; interpreted as a meltwater channel; apparent on topographic maps and on the ground.
- Partly buried channel** – Established from aerial photographs and LIDAR; lines indicate the crests of the scarps; half-circles indicate the downslope direction; interpreted as a partly buried meltwater channel; generally apparent on topographic maps, may not be apparent on the ground.
- Ice margin** – Established from aerial photographs, LIDAR, and soil survey maps; marks the approximate limit of the early Late Wisconsinian Long Lake glaciation.
- Elongate hummocks** – Established from aerial photographs and LIDAR; line indicates the crest of a conspicuous sinuous ridge, located in collapsed supraglacial glacial sediment; interpreted as single or coalesced disintegration ridges formed by the subsidence of supraglacial sediment (commonly till) during wastage of the underlying ice; may be apparent on topographic maps and on the ground.
- Other lineations** – Established from aerial photographs and LIDAR; line marks the long dimension of the feature; located in glacial sediment; interpreted as 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.

ROAD CLASSIFICATION

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|------------------|-----------------|-------------|
| Expressway | Local Connector | |
| Secondary Hwy | Local Road | |
| Ramp | 4WD | |
| Interstate Route | US Route | State Route |



Cartographic Compilation: Noah Thapa



W Water
Gp Gravel Pit