NORTH DAKOTA GEOLOGICAL SURVEY
Sidney B. Anderson, Acting State Geologist
AS-15-A1

SURFACE GEOLOGY OF THE SHEYENNE RIVER MAP AREA

by Kenneth L. Harris

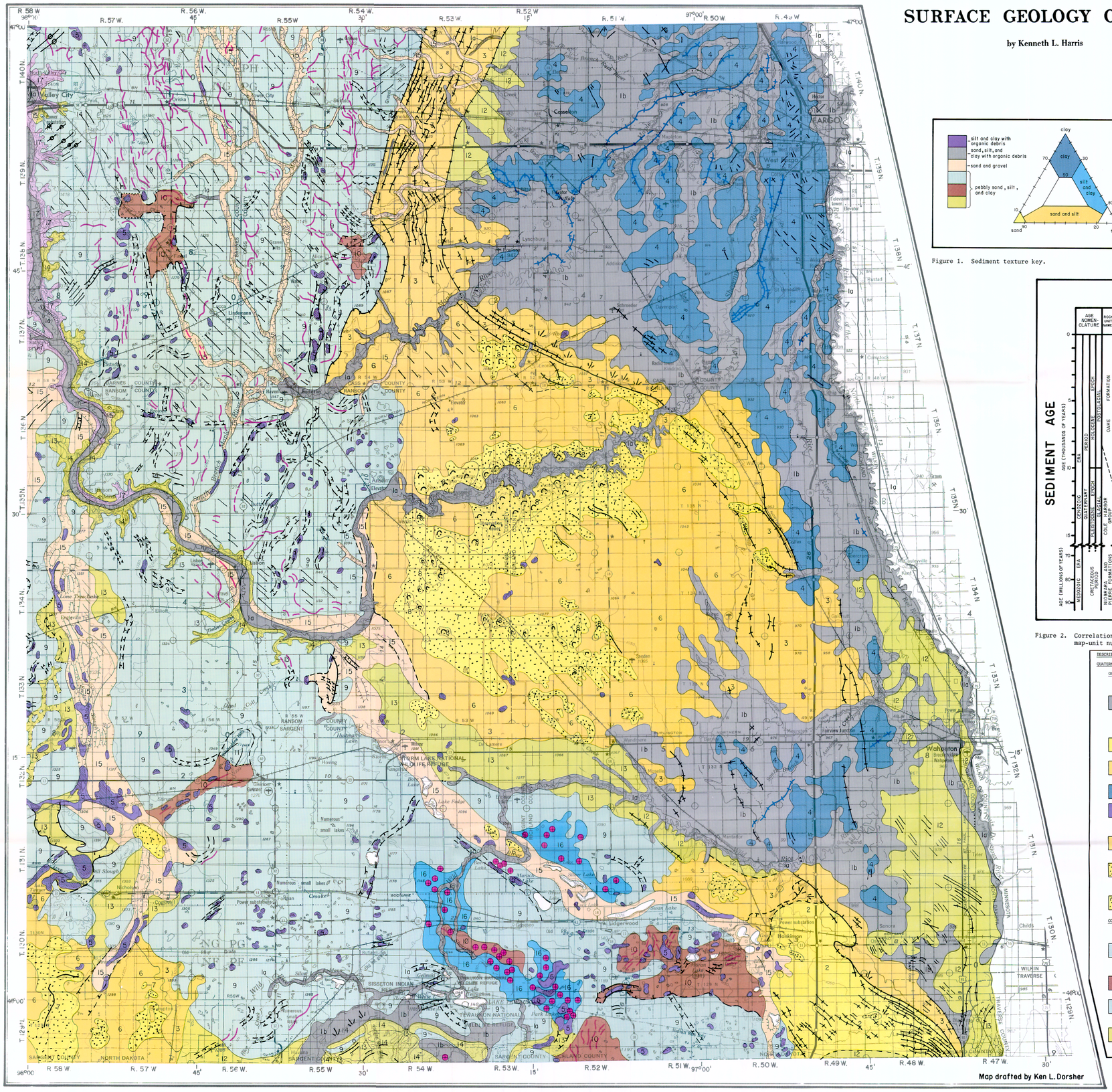


Figure 1. Sediment texture key.

MAP EXPLANATION

This map displays four elements of the surface geology of the Sheyenne River Map Area: (1) a description of the lithologies present, (2) an interpretation of the age of the sediment present, (3) an interpretation of the origin of the sediment present, and (4) a description of the topography of the map area.

The lithology of the sediment in the map area is shown by the use of color. All Quaternary sediment of the same lithology is represented by map units of the same color, regardless of its age or origin. For example, sand is shown as a yellow map unit no matter what its interpreted age or depositional history might be. This map emphasizes sediment lithology, a descriptive map element. Figure 1 is the sediment texture key.

The age and origin of the sediment (interpretive elements) are shown by the use of map-unit numbers. For example, a lithology described as sand (yellow map unit) may be interpreted to be lake, river, or windblown sediment of a specific age. These interpretations would be indicated by different map-unit numbers. Figure 2 shows the correlation diagram relating sediment age, origin, and lithology with map-unit number.

A detailed description of the map units and line symbols used on this map is given in Figure 3.

The Sheyenne River Map Area can be divided into five areas based on the occurrence of similar or genetically related landforms. These areas include the Lake Agassiz Basin, the Sheyenne "delta," the Lake Dakota Basin, the Glaciated Plains, and the Prairie Coteau. Each of these areas contains a unique set of landforms determined by the geological processes responsible for depositing, or modifying the sediment in that area. Figure 4 shows the major landform areas and typical landforms in each area.

This map is the result of a compilation of previous work, an interpretation of the geology based on aerial photographs, and field studies. The aerial photographs used were taken in 1952 by the Army Map Service and printed at a scale of 1:63,400 (1 inch:1 mile). Field studies were conducted during the 1985 and 1986 field seasons.

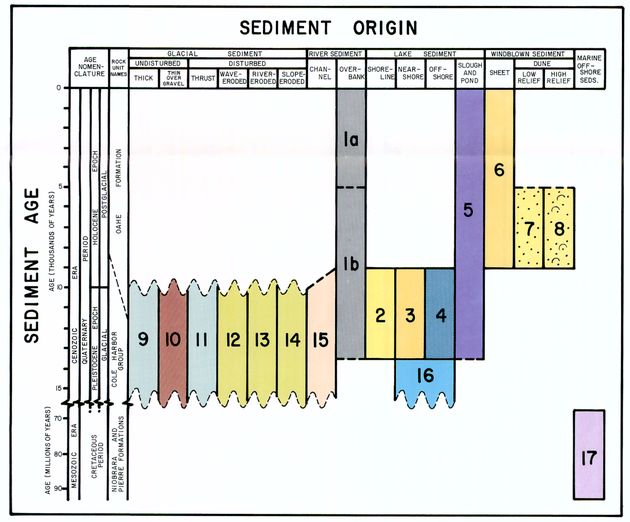
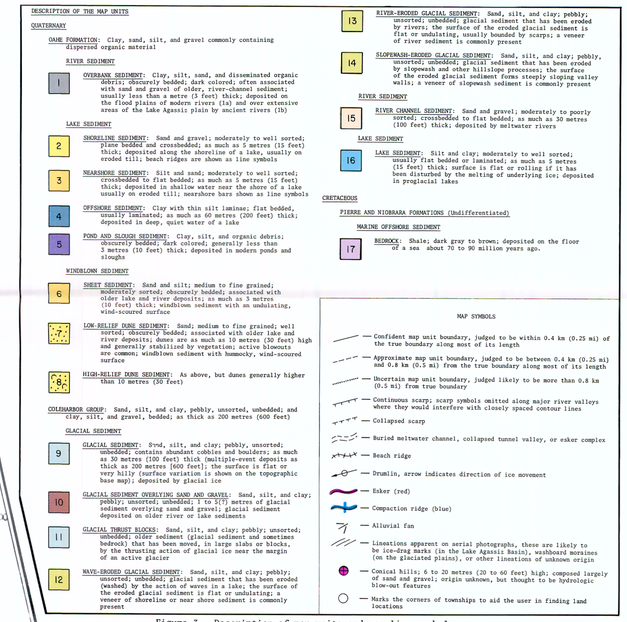


Figure 2. Correlation diagram relating sediment age, sediment origin, lithology and map-unit number.



DESCRIPTION OF THE MAP UNITS

QUATERNARY

OAHE FORMATION: Clay, sand, silt, and gravel commonly containing dispersed organic material

RIVER SEDIMENT

1 OVERBANK SEDIMENT: Clay, silt, sand, and disseminated organic debris; obscurely bedded; dark colored; often associated with sand and gravel of older, river-channel sediment; usually less than a metre (3 feet) thick; deposited on the flood plains of modern rivers (1a) and over extensive areas of the Lake Agassiz plain by ancient rivers (1b)

LAKE SEDIMENT

2 SHORELINE SEDIMENT: Sand and gravel; moderately to well sorted; plane bedded and crossbedded; as much as 5 metres (15 feet) thick; deposited along the shoreline of a lake, usually on eroded till; beach ridges are shown as line symbols

3 NEARSHORE SEDIMENT: Silt and sand; moderately to well sorted; crossbedded to flat bedded; as much as 5 metres (15 feet) thick; deposited in shallow water near the shore of a lake usually on eroded till; nearshore bars shown as line symbols

4 OFFSHORE SEDIMENT: Clay with thin silt laminae; flat bedded, usually laminated; as much as 60 metres (200 feet) thick; deposited in deep, quiet water of a lake

5 POND AND SLOUGH SEDIMENT: Clay, silt, and organic debris; obscurely bedded; dark colored; generally less than 3 metres (10 feet) thick; deposited in modern ponds and sloughs

WINDBLOWN SEDIMENT

6 SHEET SEDIMENT: Sand and silt; medium to fine grained; moderately sorted; obscurely bedded; associated with older lake and river deposits; as much as 3 metres (10 feet) thick; windblown sediment with an undulating, wind-scoured surface

7 LOW-RELIEF DUNE SEDIMENT: Sand; medium to fine grained; well sorted; obscurely bedded; associated with older lake and river deposits; dunes are as much as 10 metres (30 feet) high and generally stabilized by vegetation; active blowouts are common; windblown sediment with hummocky, wind-scoured surface

8 HIGH-RELIEF DUNE SEDIMENT: As above, but dunes generally higher than 10 metres (30 feet)

COLEHARBOR GROUP: Sand, silt, and clay, pebbly, unsorted, unbedded; and clay, silt, and gravel, bedded; as thick as 200 metres (600 feet)

GLACIAL SEDIMENT

9 GLACIAL SEDIMENT: Stvd, silt, and clay; pebbly, unsorted; unbedded; contains abundant cobbles and boulders; as much as 30 metres (100 feet) thick (multiple-event deposits as thick as 200 metres [600 feet]; the surface is flat or very hilly (surface variation is shown on the topographic base map); deposited by glacial ice

10 GLACIAL SEDIMENT OVERLYING SAND AND GRAVEL: Sand, silt, and clay; pebbly; unsorted; unbedded; 1 to 3(?) metres of glacial sediment overlying sand and gravel; glacial sediment deposited on older river or lake sediments

11 GLACIAL THRUST BLOCKS: Sand, silt, and clay; pebbly; unsorted; unbedded; older sediment (glacial sediment and sometimes bedrock) that has been moved, in large slabs or blocks, by the thrusting action of glacial ice near the margin of the glaciated plains

12 WAVE-ERODED GLACIAL SEDIMENT: Sand, silt, and clay; pebbly; unsorted; unbedded; glacial sediment that has been eroded (washed) by the action of waves in a lake; the surface of the eroded glacial sediment is flat or undulating; a veneer of shoreline or near shore sediment is commonly present

13 RIVER-ERODED GLACIAL SEDIMENT: Sand, silt, and clay; pebbly; unsorted; unbedded; glacial sediment that has been eroded by rivers; the surface of the eroded glacial sediment is flat or undulating, usually bounded by scarps; a veneer of river sediment is commonly present

14 SLOPEWASH-ERODED GLACIAL SEDIMENT: Sand, silt, and clay; pebbly, unsorted; unbedded; glacial sediment that has been eroded by slopewash and other hillslope processes; the surface of the eroded glacial sediment forms steeply sloping valley walls; a veneer of slopewash sediment is commonly present

RIVER SEDIMENT

15 RIVER CHANNEL SEDIMENT: Sand and gravel; moderately to poorly sorted; crossbedded to flat bedded; as much as 30 metres (100 feet) thick; deposited by meltwater rivers

LAKE SEDIMENT

16 LAKE SEDIMENT: Silt and clay; moderately to well sorted; usually flat bedded or laminated; as much as 5 metres (15 feet) thick; surface is flat or rolling if it has been disturbed by the melting of underlying ice; deposited in proglacial lakes

CRETACEOUS

PIERRE AND NIOBRARA FORMATIONS (Undifferentiated)

MARINE OFFSHORE SEDIMENT

17 BEDROCK: Shale; dark gray to brown; deposited on the floor of a sea about 70 to 90 million years ago.

MAP SYMBOLS

- Confident map unit boundary, judged to be within 0.4 km (0.25 mi) of the true boundary along most of its length
- Approximate map unit boundary, judged to be between 0.4 km (0.25 mi) and 0.8 km (0.5 mi) from the true boundary along most of its length
- Uncertain map unit boundary, judged likely to be more than 0.8 km (0.5 mi) from true boundary
- Continuous scarp; scarp symbols omitted along major river valleys where they would interfere with closely spaced contour lines
- Collapsed scarp
- Buried meltwater channel, collapsed tunnel valley, or esker complex
- Beach ridge
- Drumlin, arrow indicates direction of ice movement
- Esker (red)
- Compaction ridge (blue)
- Alluvial fan
- Lineations apparent on aerial photographs, these are likely to be ice-drag marks (in the Lake Agassiz Basin), washboard moraines (on the glaciated plains), or other lineations of unknown origin
- Conical hills; 6 to 20 metres (20 to 60 feet) high; composed largely of sand and gravel; origin unknown, but thought to be hydrologic blow-out features
- Marks the corners of townships to aid the user in finding land locations

Figure 3. Description of map units and map line symbols.

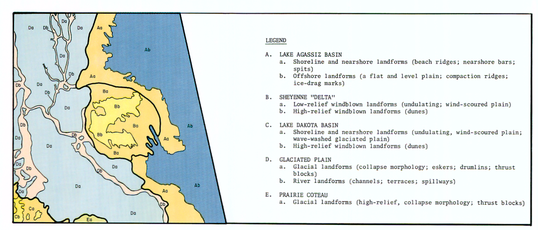


Figure 4. Major landform areas (uppercase letters) and typical landforms (lowercase letters).

LEGEND

POPULATED PLACES: 25,000 to 100,000 — FARGO; 5,000 to 25,000 — Jamestown; 1,000 to 5,000 — Rugby; Less than 1,000 — Towner

RAILROADS: Standard gauge — Single track; Double or Multiple

BOUNDARIES: International; State; County; Park or reservation

Landplane airport; Landing area

ROADS: Primary, all-weather, hard surface; Secondary, all-weather, hard surface; Light-duty, all-weather, hard or improved; Fair or dry weather, unimproved; Trail; Interchange; Route markers: Interstate, U.S., State; Landmark: School, Church, Other; Mine; Spot elevation in feet; Marsh or swamp; Intermittent or dry stream; Power line

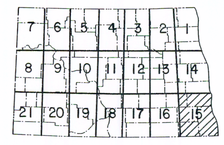
BASE MAP SUPPLIED BY U.S. GEOLOGICAL SURVEY

Map scale 1:250,000

5 0 5 10 MILES
5 0 5 10 KILOMETERS

TRUE NORTH
MAGNETIC NORTH
9°
APPROXIMATE MEAN DECLINATION, 1961

SECTIONIZED TOWNSHIP



ATLAS SERIES MAP AREAS

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Map drafted by Ken L. Dorsher