



Land not compiled from Bureau of Land Management township plats with minor adjustment; drainage and culture from AAA-PPA aerial photographs of 1941, with culture revised in part in field.

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GEOLOGIC MAP OF THE YANKTON AREA, SOUTH DAKOTA AND NEBRASKA

Scale 1:48 000
1 0 1 2 Miles

EXPLANATION

- Quaternary**
- Q₁** Flood-plain alluvium
Fine-grained sand and silt, with a little clay and medium-grained sand; grayish black to yellowish gray
 - Q₂** Eolian sand
Fine to medium-grained sand; very pale orange. Characterized by dune topography
 - Q₃** Alluvial fan deposits
Silt, sand, and clay, which locally contain scattered small cobbles; grayish black to yellowish orange
 - Q₄** Tributary alluvium
Gravel, sand, silt, and some clay; grayish black to yellowish orange. Gravel is terraced alluvium in the Missouri River valley and numbered correspondingly: Q₄₋₁ to Q₄₋₁₀ and Q₄₋₁₁ to Q₄₋₁₂; 1-12 numbered where not directly correlated
 - Q₅** Terrace alluvium
Q₅₋₁ silt, sand, and clay, with some gravelly sand; grayish orange. Q₅₋₂ to Q₅₋₁₀ gravelly sand and fine gravel; grayish black to yellowish gray
 - Q₆** Swale deposits
Clay with some silt; grayish black to grayish green
 - Q₇** Alluvium and colluvium
Silt, clay, and fine-grained sand; grayish orange. Q₇₋₁ to Q₇₋₁₀ sand and fine gravel; black to grayish orange
 - Q₈** Landslide deposits
Dolomite and black shale consisting of strata from the upper and middle members of the Pierre shale; locally some covering Pleistocene deposits
 - Q₉** Ice-contact stratified drift
Sand and fine to medium gravel; moderately yellowish brown, with moderately strong iron oxide stains
 - Q₁₀** Outwash
Boulder gravel to medium-grained sand; very pale orange, with some iron oxide stains. Substratum is outwash terraces
 - Q₁₁** End moraine of Mankato and of Cary age
Till, containing some scattered lenses of sand and gravel; medium gray to pale grayish orange; characterized by hummocky or ridge-like form
 - Q₁₂** Outwash
Cobble gravel to medium-grained sand; light brown, with moderate iron oxide stains
 - Q₁₃** Kame-terrace deposits of Cary age
Coarse gravel to medium-grained sand; light brown, with moderate iron oxide stains
 - Q₁₄** Ground moraine of Mankato, Cary, Iowan, and Illinoian ages
Till, with scattered lenses of sand and gravel; medium gray to medium yellowish orange
 - Q₁₅** Ice-contact stratified drift
Gravel to coarse-grained sand; light brown, with moderate iron oxide and manganese oxide stains
 - Q₁₆** Ice-contact stratified drift
Cobble gravel to coarse-grained sand; pale yellowish gray, with some iron oxide stains
 - Q₁₇** Loveland loess
Silt, with some clay and fine-grained sand; pale reddish brown to yellowish brown; loesslike
 - Q₁₈** Outwash
Fine gravel and coarse-grained sand, with lenses of silt and clay; pale brown to medium yellowish orange, with moderate iron oxide stains
 - Q₁₉** Grand Island formation
Fine to medium-grained sand; grayish black to yellowish gray, chiefly of quartz and orthoclase feldspar; generally well cross-bedded
 - Q₂₀** Ogallala formation
Silty clay, sand, fine gravel, and locally thin lenses of massive orthoquartzite; pale grayish green to white
 - Q₂₁** Pierre shale
Shale, claystone, calcareous mudstone, and sand; medium dark gray to yellowish orange. Contains numerous bentonite layers, and horizons characterized by phosphate concretions
 - Q₂₂** Niobrara formation
Argillaceous limestone; medium black gray to dark yellowish orange. Contains coarsely crystalline limestone in beds and along bedding planes
 - Q₂₃** Sage Breaks(?) member of Carlisle shale
Shale, medium gray
- Tertiary**
- T₁** Contact
Dashed where approximately located
 - T₂** Gradational contact
 - T₃** Horizontal beds
 - T₄** Meltwater channel
- Cretaceous**
- C₁** Inner Mankato drift border
Dashed where indefinite
 - C₂** Outer Mankato drift border
 - C₃** Cary drift border
Dashed where indefinite
 - C₄** Approximate axis, axis of Niobrara River valley
Short dashes where indefinite
 - C₅** Gravel pit
 - C₆** Abandoned quarry
 - C₇** Dry hole