

Preliminary geologic map of the
Ekalaka 1° x 2° quadrangle, southeastern Montana
and western North and South Dakota

by

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DESCRIPTION OF MAP UNITS

- Qal ALLUVIUM (HOLOCENE)--Stream-deposited clay, silt, sand, and gravel; color light gray to tan. May be as much as 10 m thick under larger floodplains but generally averages about 3 m thick. Generally limited to extent of meander stream pattern
- Qac ALLUVIUM-COLLUVIUM (HOLOCENE)--Pale yellowish-brown to gray slope-wash deposits on hillsides and in valleys; consists of locally derived silt, sand, and gravel. Includes: alluvial fan, small stream deposits, and windblown silt and sand. Estimated to be as much as 6 m thick but thickness probably averages about 2 m
- Qe EOLIUM¹ (HOLOCENE)--Light-brown to moderate-brown windblown sand and silt deposits as much as 5 m thick. Thickness generally less than 2 m. Mapped only where dunes were identified on aerial photographs or small contour interval topographic maps
- Qls LANDSLIDE DEPOSITS (HOLOCENE AND PLEISTOCENE(?))--Slumped parts of various formations but mostly around high buttes capped by Arikaree Formation (Ta). Thickness 0-20 m. Composition and color is that of parent material
- Qg STREAM TERRACE DEPOSITS (PLEISTOCENE?)--Silt, sand, and gravel deposits generally well stratified and well sorted. Generally 12 to 30 m above modern flood plain. Color, medium gray to moderate brown. Thickness 0-10 m
- Tg OLDER STREAM TERRACE DEPOSITS (PLIOCENE?)--Silt, sand, and gravel deposits generally well stratified and well sorted. Generally more than 30 m above modern flood plain. Color, light brown. Thickness 0-10 m
- Ta ARIKAREE FORMATION (MIOCENE)--Massive greenish-white to light-gray tuffaceous sandstone and siltstone and a few thin beds of quartzite, dolomite, and volcanic ash. Thickness 8 m
- Tls PRE-ARIKAREE LANDSLIDE DEPOSITS (MIOCENE? OR OLIGOCENE?)--Landslide blocks contain rocks of Hell Creek (Khc), Fort Union (Tfu), Chadron (Tc), and Brule (Tb) Formations
- Tb BRULE FORMATION (OLIGOCENE)--Massive pale-orange to pinkish-brown tuffaceous siltstone, nodular claystone, and channel sandstone. Contains abundant vertebrate remains. Poorly represented in Ekalaka quadrangle. As much as 68 m thick
- Tc CHADRON FORMATION (OLIGOCENE)--Dark-gray bentonite and light-gray tuffaceous claystone, siltstone, sandstone, conglomerate interbedded with thin lenticular beds of limestone; sandstone is arkosic in many places. Locally, lower part weathers bright yellow. As much as 60 m thick

¹ Eolium is a collective term for deposits of windblown silt (loess) and wind-drifted sand (dunes), granules, pebbles, and gradations between.

Tfu FORT UNION FORMATION (PALEOCENE)--Gray shale, coal, and sandstone

ps Pseudoscoria--Combustion metamorphosed strata; clinker

Tfut Tongue River(?) Member--Light-colored sandstone and gray shale with thin coal beds (180-350 m thick)

Tful Ludlow(?) Member--Massive sandstone, shale, and coal

Khc HELL CREEK FORMATION (UPPER CRETACEOUS)--Yellowish-gray sandstone and gray shale with a few thin beds of carbonaceous shale; 155-489 m thick

Kfh FOX HILLS FORMATION (UPPER CRETACEOUS)--Brownish-gray sandy shale, siltstone, and sandstone; 38-62 m thick. Consists of an upper massive very light gray sandstone member and a lower member which consists of brownish-gray sandy shale and sandstone. Colgate Member not identified in Ekalaka quadrangle

Kp PIERRE SHALE UNDIVIDED (UPPER CRETACEOUS)--Gray and black shale with some gray and yellowish-gray siltstone and sandstone and numerous beds of bentonite

Kpu Upper part--Dark-gray and black shale except for lower third which is light-gray silty shale; 245-465 m thick

Kph Monument Hill Bentonitic Member--Light-gray bentonitic shale and bentonite; 46-64 m thick

Kps Mitten Member--Dark-gray to black shale with yellowish-brown weathering limestone concretions in upper part; 44-310 m thick

Kpf Gammon Ferruginous Member--Light-gray claystone and shale with abundant ferruginous concretions and lenses of siderite; 0-310 m thick

Kpg Groat Sandstone Bed of Gammon Ferruginous Member--Gray fine-grained glauconitic ferruginous sandstone; 11-38 m thick

Kn NIOBRARA FORMATION (UPPER CRETACEOUS)--Marl and calcareous shale; weathers pale yellow; 50-70 m thick

Kc CARLILE SHALE UNDIVIDED (UPPER CRETACEOUS)--Medium-gray shale; sandy in middle part



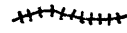


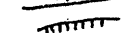


Kcs Sage Breaks Member--Medium-gray shale with numerous beds of light-gray weathering septarian limestone concretions; 60-100 m thick

Kct Turner Sandy Member--Medium-gray sandy shale and siltstone with numerous beds of light-yellow or reddish-brown weathering silty and ferruginous limestone concretions; 50-80 m thick

Kcl Pool Creek Member--Medium-gray shale with a few light-gray and reddish-brown weathering limestone concretions; 15-40 m thick

Kgm GREENHORN FORMATION (UPPER CRETACEOUS) Marl facies--Gray calcareous shale and marl with light-gray thin-bedded limestone; found in southeastern and northeastern parts of area; as much as 120 m thick

- Kgc Concretionary facies--Medium-gray shale with zones containing light-gray weathering septarian concretions; found in central part of area; thins to 25 m westward
- Kbf BELLE FOURCHE SHALE (UPPER CRETACEOUS)--Dark-gray shale with numerous purplish-red weathering siderite concretions in lower part, and light-gray and yellowish-gray weathering limestone concretions in middle and upper parts; 120-280 m thick. Reddish-gray bentonite bed in upper part
- Km MOWRY SHALE (LOWER CRETACEOUS)--Gray siliceous shale with numerous fish scales along partings; Clay Spur Bentonite Bed at top; 60-70 m thick
- Knc NEWCASTLE SANDSTONE (LOWER CRETACEOUS)--Lenticular beds of light-gray sandstone and dark-gray siltstone, shale, and claystone, with some bentonite and moderate-brown carbonaceous shale; 0-30 m thick; thickness varies within short distances

-  CONTACT--Dashed where approximately located
-  FAULT--Dashed where approximately located. Where known, bar and ball on downthrown side
-  RIDGE OF SANDSTONE--Inferred to have been a stream channel
-  SYNCLINE--Showing plunge
-  ANTICLINE--Showing plunge
-  LINEAMENT--colinear aligned drainage or vegetation patterns
-  SCARP
-  WATER

Colton Ekalaka
1° x 2°
May 9, 1975

CORRELATION OF MAP UNITS

