

GEOLOGIC MAP OF THE RAPID CITY 1° x 2° QUADRANGLE, SOUTH DAKOTA

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Map base digitized from U.S. Geological Survey 1:250,000 Rapid City quadrangle 1953 (Revised 1978) Digital Raster Graphic. South Dakota road base modified from South Dakota Department of Transportation data. Projection: Universal Transverse Mercator, Zone 12N.

- 1) Bayley, R.W., 1970. Structure and mineralization of Precambrian rocks of the Black Hills area, South Dakota and Wyoming. U.S. Geological Survey Bulletin 1312-E, 75 p., scale 1:250,000.
2) Black, D.F.B., 1964. Geology of the Big Horn area, westernmost South Dakota. South Dakota Geological Survey Report of Investigations 92, 17 p., scale 1:125,000.
3) Caterline, J.M., 1969. Geologic map of the Rapid City West quadrangle, Pennington County, South Dakota. U.S. Geological Survey Geologic Quadrangle Map G2-628, scale 1:24,000.

- 4) Cox, E.J., Montgomery, J.K., Agnew, A.F., Sevon, W.D., Steele, F.V., Pettibohn, W.A., and Collins, S.G., 1962. Geology of selected highway strips in South Dakota. South Dakota Geological Survey Report of Investigations 93, 184 p., scale 1:250,000.
5) Darton, N.H., 1919. Description of the Newell quadrangle (South Dakota). U.S. Geological Survey Folio 209, 17 p., scale 1:125,000.
6) Darton, N.H. and O'Hara, C.C., 1900. Description of the Belle Fourche quadrangle, South Dakota. U.S. Geological Survey Folio 164, p. 19.

- 7) Fagnon, B.A. and Lienbee, A.L., 2014. Geologic map of the Telford quadrangle, South Dakota. South Dakota Geological Survey 7.5 Minute Series Geologic Quadrangle Map 27, scale 1:24,000.
8) Fagnon, B.A. and Lienbee, A.L., 2017. Geologic map of the Sturgis quadrangle, South Dakota. South Dakota Geological Survey 7.5 Minute Series Geologic Quadrangle Map 29, scale 1:24,000.
9) Fahrenbach, M.D., 2022. Geologic map of the Deerfield quadrangle, South Dakota. South Dakota Geological Survey 7.5 Minute Series Geologic Quadrangle Map 33, scale 1:24,000.

- 10) Fahrenbach, M.D., 2022. Geologic map of the Minnesota Ridge quadrangle, South Dakota. South Dakota Geological Survey 7.5 Minute Series Geologic Quadrangle Map 35, scale 1:24,000.
11) Fahrenbach, M.D., 2022. Geologic map of the Minnesota Ridge quadrangle, South Dakota. South Dakota Geological Survey 7.5 Minute Series Geologic Quadrangle Map 37, scale 1:24,000.
12) Fahrenbach, M.D., 2016. Geologic map of the Rapid City East quadrangle, South Dakota. South Dakota Geological Survey 7.5 Minute Series Geologic Quadrangle Map 28, scale 1:24,000.

- 13) Fahrenbach, M.D. and Lienbee, A.L., 2022. Geologic map of the Deadman Mountain quadrangle, South Dakota. South Dakota Geological Survey 7.5 Minute Series Geologic Quadrangle Map 36, scale 1:24,000.
14) Knechtel, M.M. and Patterson, S.H., 1982. Bentonite deposits of the northern Black Hills district, Wyoming, Montana, and South Dakota. U.S. Geological Survey Bulletin 1022-A, p. 169-193, scale 1:63,000.
15) Lienbee, A.L. and Hargrave, R.G., 2005. Geologic map of the Blackhawk quadrangle, South Dakota. South Dakota Geological Survey 7.5 Minute Series Geologic Quadrangle Map 32, scale 1:24,000.

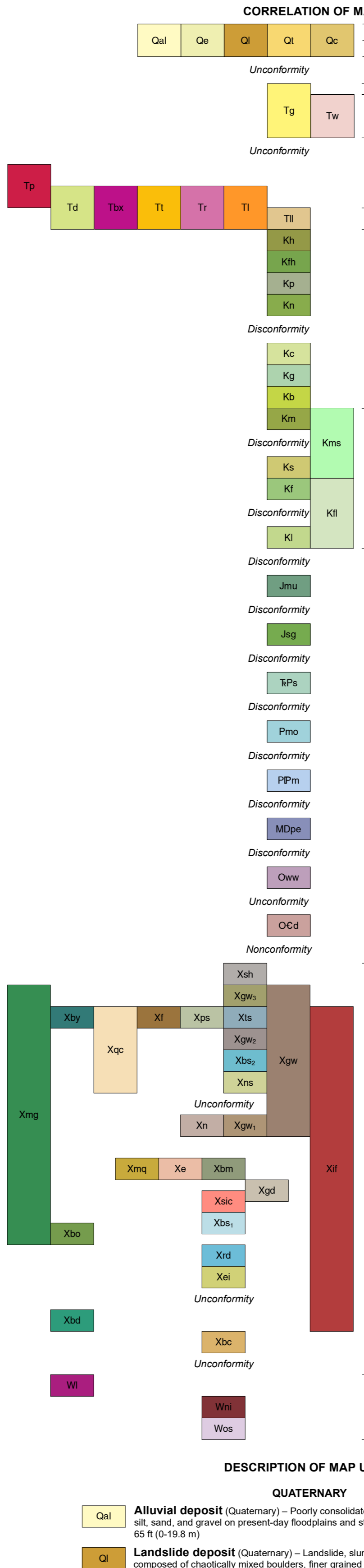
- 16) Lienbee, A.L., Redden, J.A., and Fahrenbach, M.D., 2007. Geologic map of the Maurice quadrangle, South Dakota. South Dakota Geological Survey 7.5 Minute Series Geologic Quadrangle Map 30, scale 1:24,000.
17) Lienbee, A.L., Redden, J.A., and Fahrenbach, M.D., 2015. Geologic map of the Deadwood North quadrangle, South Dakota. South Dakota Geological Survey 7.5 Minute Series Geologic Quadrangle Map 34, scale 1:24,000.
18) Lienbee, A.L., Redden, J.A., and Fahrenbach, M.D., 2020. Geologic map of the Spearfish quadrangle, South Dakota. South Dakota Geological Survey 7.5 Minute Series Geologic Quadrangle Map 31, scale 1:24,000.

- 19) Fagnon, B.A. and Lienbee, A.L., 2014. Geologic map of the Telford quadrangle, South Dakota. South Dakota Geological Survey 7.5 Minute Series Geologic Quadrangle Map 27, scale 1:24,000.
20) McGrover, E.E. and Caterline, J.M., 1973. Geologic map of the Rapid City NW quadrangle, Meade and Pennington counties, South Dakota. U.S. Geological Survey Geologic Quadrangle Map GD-1063, scale 1:24,000.
21) Redden, J.A. and DiWhitt, E., 2008. Mapping geology, structure, and geophysics of the central Black Hills, South Dakota. U.S. Geological Survey Scientific Investigations Map 2777, scale 1:100,000.

- 22) Redden, J.A., Alexander, D., and Normand, O., 2017. Geologic map of the Lower City quadrangle, South Dakota. South Dakota Geological Survey 7.5 Minute Series Geologic Quadrangle Map 38, scale 1:24,000.
23) Redden, J.A. and Fahrenbach, M.D., 2020. Geologic map of the Nemo quadrangle, South Dakota. South Dakota Geological Survey 7.5 Minute Series Geologic Quadrangle Map 39, scale 1:24,000.
24) Redden, J.A., Lienbee, A.L., and Fahrenbach, M.D., 2016. Geologic map of the Lead quadrangle, South Dakota. South Dakota Geological Survey 7.5 Minute Series Geologic Quadrangle Map 11, scale 1:24,000.

- 25) Redden, J.A., Lienbee, A.L., and Fahrenbach, M.D., 2021. Geologic map of the Deadwood South quadrangle, South Dakota. South Dakota Geological Survey 7.5 Minute Series Geologic Quadrangle Map 13, scale 1:24,000.
26) Redden, J.A., Nichols, C.E., and Terry, M.P., 2015. Geologic map of the Rochford quadrangle, South Dakota. South Dakota Geological Survey 7.5 Minute Series Geologic Quadrangle Map 25, scale 1:24,000.
27) Wilson, R.A., 1920. Oil and gas possibilities in northeastern Meade County (South Dakota). South Dakota Geological Survey and Natural History Circular 23, 24 p., scale 1:100,000.

- 28) Seavright, W.V., 1934. The Stoneville coal area. South Dakota Geological Survey Report of Investigation 22, 24 p., scale 1:62,500; scale 1:937,500.
29) Stevenson, R.E., 1962. Structures and stratigraphy of southwestern Big Horn County, South Dakota. South Dakota Geological Survey Report of Investigation 69, 32 p., scale 1:125,000.
30) Wilson, R.A., 1920. Oil and gas possibilities in northeastern Meade County (South Dakota). South Dakota Geological Survey and Natural History Circular 23, 24 p., scale 1:100,000.



DESCRIPTION OF MAP UNITS
QUATERNARY
Alluvial deposit (Quaternary) - Poorly consolidated to unconsolidated clay silt, sand, and gravel on present-day floodplains and stream valleys. Thickness 0-65 ft (0-19.8 m).
Landslide deposit (Quaternary) - Landslide, slump, and collapsed material composed of chucked masonry boulders, fine grained rock debris, and soil.
Colluvial deposit (Quaternary) - Unconsolidated soil and rock material deposited on slopes or along cliff bases. Includes talus deposits.
Terrace deposit (Quaternary) - Poorly consolidated to unconsolidated clay- to siltstone-clay class deposited as pediments, paleochannels, and terraces of former flood plains. Thickness 0-90 ft (0-27.4 m).

TERTIARY
Gravel deposit (Tertiary) - Unconsolidated to loosely consolidated, angular to rounded, clay to boulder-size clasts. Brownish-orange to reddish-brown matrix. Clasts are primarily igneous and metamorphic rocks from the central Black Hills. Also includes minor Phanerozoic lithic clasts.
White River Group (Oligocene and Eocene) - Brown to red gravel, coarse to medium sand, and minor fine, white, lacustrine limestone beds. Conglomerate layers have clasts predominantly of Precambrian origin with minor Paleozoic constituents. Includes the Bruie and Chalmers Formations. Thickness as much as 250 ft (76.2 m).

CRETACEOUS
Heli Creek Formation (Upper Cretaceous) - Tan to brown and light to dark-gray, 'horror beds' of shale, interbedded with brown to red carbonaceous shale, gray and brown bentonitic silt shale, and gray, brown, and yellow silts, sandstone, and claystone-pebbles conglomerate. Resistant sandstone beds occur near the base. Calcareous and ferromanganese concretions locally abundant. Approximate thickness 300-375 ft (91.4-114.3 m).

ARCHEAN
Minnehaha Limestone (Lower Permian) - Pink, purple, beige to gray, fine crystalline, firm to medium bedded limestone with red shale in the middle of the formation. Contains abundant stylolites, small fossils, mudcracks, algal laminae, and is locally kaolinitic. Has a petroleuous odor when broken. Thickness 35-60 ft (10.7-18.3 m).