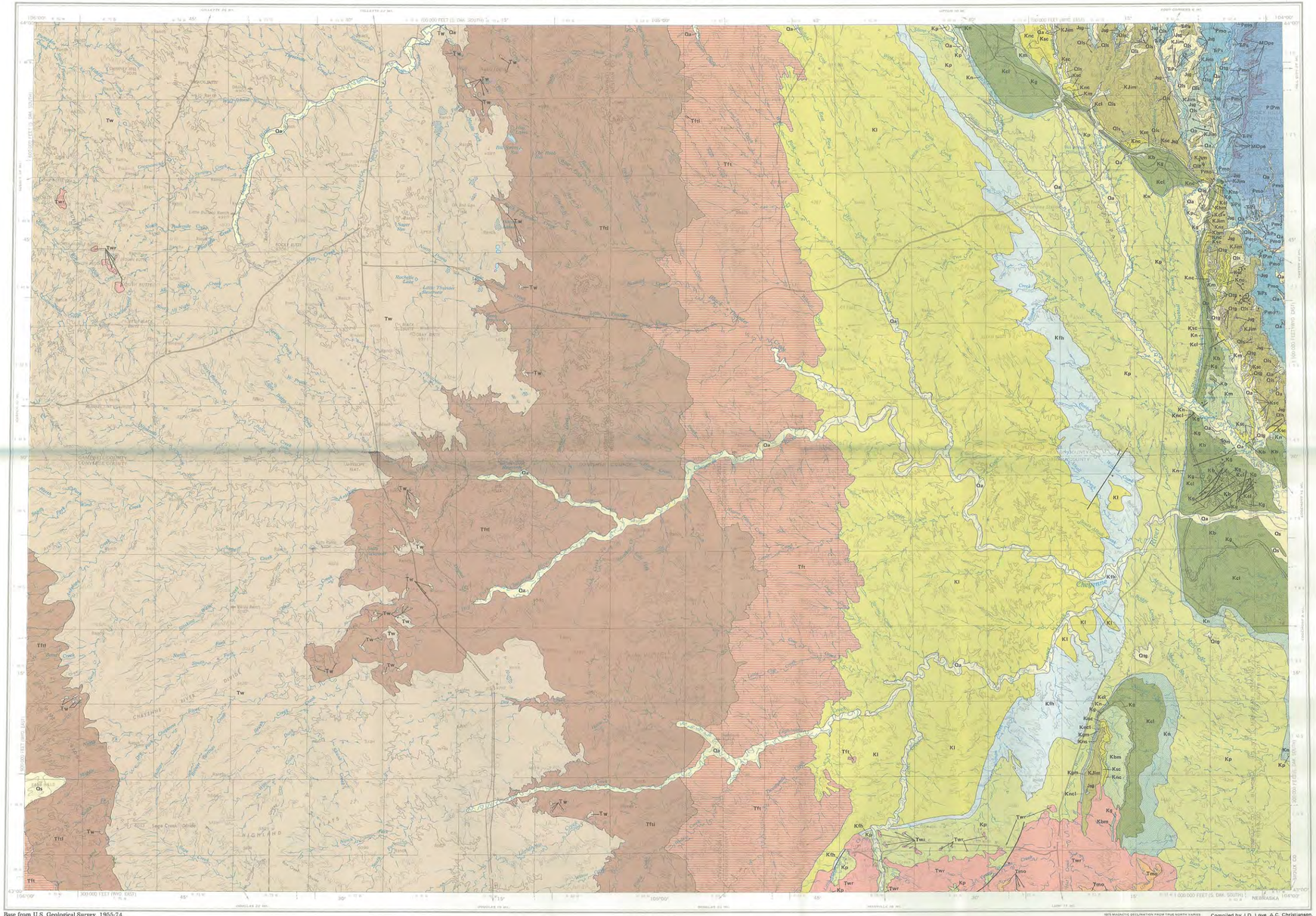
THE GEOLOGICAL SURVEY OF WYOMING
Gary B. Glass, State Geologist

Prepared in cooperation with
THE UNITED STATES GEOLOGICAL SURVEY



Base from U.S. Geological Survey, 1955-74, modified 1987 by Geological Survey of Wyoming.

Scale 1:250,000

5 0 5 10 15 20 Statute Miles
5 0 5 10 15 20 25 30 Kilometers
5 0 5 10 15 Nautical Miles

CONTOUR INTERVAL 200 FEET
TRANSVERSE MERCATOR PROJECTION

GEOLOGIC MAP OF THE NEWCASTLE 1°x2° QUADRANGLE NORTHEASTERN WYOMING AND WESTERN SOUTH DAKOTA

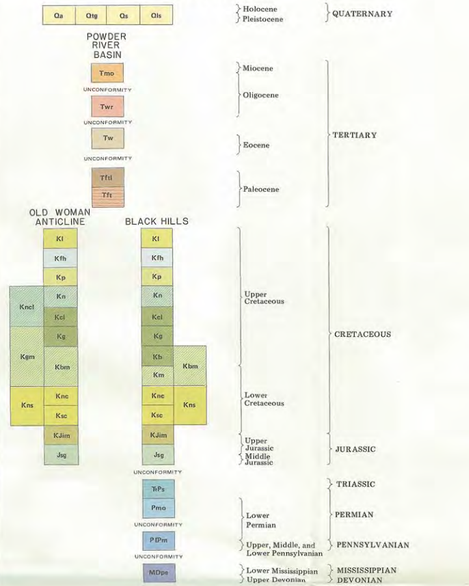
By
J.D. Love, Ann Coe Christiansen, and Laura W. McGrew

1987

Compiled by J.D. Love, A.C. Christiansen, L.W. McGrew, Richard W. Jones, and Cassandra Sever, 1955-77 and 1986. Cartography by Fred H. Porter III.

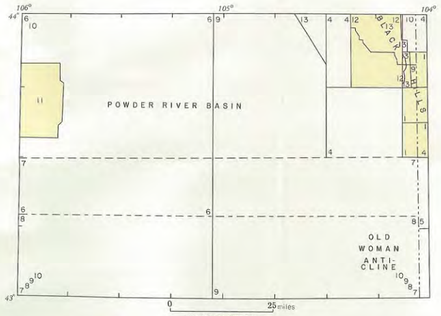
LOCATION DIAGRAM

CORRELATION OF MAP UNITS



CONTACT

FAULT — Dotted where concealed or inferred. Bar and ball on downthrown side.



EXPLANATION

Area covered by source maps of scales 1:62,500 or larger.

Area covered by source maps of scales smaller than 1:62,500.

GEOLOGIC SOURCES

[Numbers indicate source maps]

1. Brobst, D.A., 1961 [1962], Geology of the Dewey Quadrangle, Wyoming-South Dakota: U.S. Geological Survey Bulletin 1063-B, plate 5, scale 1:24,000.
2. Brobst, D.A., and Epstein, J.B., 1963 [1964], Geology of the Fanny Peak Quadrangle, Wyoming-South Dakota: U.S. Geological Survey Bulletin 1063-I, plate 25, scale 1:24,000.
3. Cuppels, N.P., 1963, Geology of the Clifton Quadrangle, Wyoming and South Dakota: U.S. Geological Survey Bulletin 1063-H, plate 23, scale 1:24,000.
4. Darton, N.H., 1904, Description of the Newcastle Quadrangle [Wyoming-South Dakota]: U.S. Geological Survey Geologic Atlas Folio 107, scale 1:125,000.
5. Darton, N.H., and Smith, W.S.T., 1904, Description of the Edgemont Quadrangle [South Dakota-Nebraska]: U.S. Geological Survey Geologic Atlas Folio 108, scale 1:125,000. [Extrapolation between Edgemont Quadrangle and Dobbin, Kramer, and Horn (1957).]
6. Denson, N.M., U.S. Geological Survey unpublished mapping of Tertiary rocks, 1965, 1969-71, scale 1:126,720.
7. Denson, N.M., and Horn, G.H., 1972, Geologic map of Tertiary and uppermost Cretaceous rocks showing structure contours, oil and gas fields, dry holes, and mines in the southern part of the Powder River Basin, Converse, Niobrara, and Natrona Counties, Wyoming: U.S. Geological Survey Open-File Report [unnumbered], scale 1:126,720.
8. Denson, N.M., and Horn, G.H., 1975, Geologic and structure map of the southern part of the Powder River Basin, Converse, Niobrara, and Natrona Counties, Wyoming: U.S. Geological Survey Miscellaneous Investigations Series Map I-877, scale 1:125,000.
9. Dobbin, C.E., Kramer, W.B., and Horn, G.H., 1957, Geologic and structure map of the southeastern part of the Powder River Basin, Wyoming: U.S. Geological Survey Oil and Gas Investigations Map OM-185, scale 1:125,000.
10. Hodson, W. G., Pearl, R.H., and Druse, S.A., 1973 [1974], Water resources of the Powder River Basin and adjacent areas, northeastern Wyoming: U.S. Geological Survey Hydrologic Investigations Atlas HA-465, sheet 1, scale 1:250,000. [Quaternary alluvium only.]
11. Love, J.D., 1952, Preliminary report on uranium deposits in the Pumpkin Buttes area, Powder River Basin, Wyoming: U.S. Geological Survey Circular 176, plate 1, scale 1:62,500.
12. Mapel, W.J., and Pillmore, C.L., 1963, Geology of the Newcastle area, Weston County, Wyoming: U.S. Geological Survey Bulletin 1141-N, plate 1, scale 1:48,000.
13. Robinson, C.S., Mapel, W.J., and Bergendahl, M.H., 1964, Stratigraphy and structure of the northern and western flanks of the Black Hills uplift, Wyoming, Montana, and South Dakota: U.S. Geological Survey Professional Paper 404, plate 1, scale 1:96,000. [All geology except Wasatch Formation and some alluvial deposits.]
— Swinehart, J.B., Souders, V.L., DeGraw, H.M., and Diffendal, R.F., Jr., 1985, Cenozoic paleogeography of western Nebraska, *in* R.M. Flores and S.S. Kaplan, editors, Cenozoic paleogeography of west-central United States: Society of Economic Paleontologists and Mineralogists, Rocky Mountain Section, Rocky Mountain Paleogeography Symposium 3, p. 209-229.

Map Series 25-I
Newcastle 1°x 2°Geology
Wyoming and South Dakota

MS 25-1

DESCRIPTION OF MAP UNITS

HOLOCENE AND PLEISTOCENE SURFICIAL DEPOSITS

Qa Alluvial deposits — Unconsolidated and poorly consolidated clay, silt, sand, and gravel, mainly in floodplains and terraces.

Qtg Terrace gravel — May include some high-level deposits of Tertiary age.

Qs Windblown sand — Chiefly quartz sand. Includes active and dormant sand dunes.

Qls Landslide deposits — Chaotically mixed boulders and finer grained rock debris.

Tmo LOWER MIOCENE AND UPPER OLIGOCENE ROCKS — Light gray to buff, fine-grained, poorly bedded sandstone containing abundant magnetite grains; some siltstone, limestone, and tuff; lenticular conglomerate near base. Equivalent to the Arikaree Group of Swinehart and others (1985, p. 215, fig. 5). Thickness 0-200 feet.

Twr WHITE RIVER FORMATION (OLIGOCENE) — White, pink, green, and brown tuffaceous claystone and siltstone; lenticular conglomerates near base; thin beds of ash and limestone. Thickness 0-500 feet.

Tw WASATCH FORMATION (EOCENE) — Buff arkosic sandstone, lenticular conglomerates, drab siltstone, carbonaceous shale, and many coal beds; upper part contains much variegated claystone in northwestern part of quadrangle. Thickness 0-3,000 feet; upper 1,000 feet occurs only in northwestern corner of map area.

FORT UNION FORMATION (PALEOCENE)

Tfd Tongue River and Lebo Members — Upper part (Tongue River) is fine-grained drab to gray sandstone, finely conglomeratic in places, interbedded with drab siltstone, claystone, and shale; thick coal beds near top. Lower part (Lebo) is gray shale and claystone. Thickness 0-2,500 feet.

Tft Tullock Member — Has a drab appearance and contains massive sandstone, whereas the Lebo Member is lighter colored and contains more shale and claystone. Thickness 0-1,500 feet.

Kl LANCE FORMATION (UPPER CRETACEOUS) — Somber colored shale and drab, massive, lenticular, concretionary sandstone; many thin coal beds in lower half. Thickness 2,000-2,500 feet.

Kfh FOX HILLS SANDSTONE (UPPER CRETACEOUS) — White to light gray sandstone and gray sandy shale containing marine fossils. Thickness 150-200 feet.

Kp PIERRE SHALE (UPPER CRETACEOUS) — Dark gray to black, concretionary marine shale. Includes Kara Bentonitic Member in upper part, Red Bird Silty Member in middle part; Mitten Member and its Pedro Bentonite Bed in lower part; Sharon Springs Member and its Ardmore Bentonite Bed near base; and Gammon Ferruginous Member. Thickness 2,000-3,100 feet.

Kn NIOBRARA FORMATION (UPPER CRETACEOUS) — Light gray to yellow chalky marl and limestone and gray to yellow limy speckled shale. Thickness 150-275 feet.

Kcl CARLILE SHALE (UPPER CRETACEOUS) — Dark gray to black, soft, sandy shale. Sage Breaks Member at top; Turner Sandy Member in middle. Thickness 450-750 feet.

Kncl NIOBRARA FORMATION AND CARLILE SHALE

Kg GREENHORN FORMATION (UPPER CRETACEOUS) — Light colored marl, limestone, and limy sandstone interbedded with gray concretionary shale. Thickness 200-350 feet.

Kb BELLE FOURCHE SHALE (UPPER CRETACEOUS) — Black, soft, bentonitic, concretionary shale. Thickness 350-500 feet.

Km MOWRY SHALE (LOWER CRETACEOUS) — Black, hard, siliceous shale; weathers silvery gray. Thickness 180-200 feet.

Kgm GREENHORN FORMATION AND BELLE FOURCHE AND MOWRY SHALES.

Kbm BELLE FOURCHE AND MOWRY SHALES.

Kne NEWCASTLE/MUDDY SANDSTONE (LOWER CRETACEOUS) — Gray sandstone, sandy shale, and siltstone; some bentonite and coal. Pinches out on southwest flank of Black Hills in sec. 20, T. 43 N., R. 60 W. Thickness 0-100 feet.

Ksc SKULL CREEK SHALE (LOWER CRETACEOUS) — Black, soft, fissile shale. Thickness 200-250 feet.

Kns NEWCASTLE/MUDDY SANDSTONE AND SKULL CREEK SHALE.

KJim INYAN KARA GROUP AND MORRISON FORMATION.

Inyan Kara Group (Lower Cretaceous)
Fall River Formation — Brown sandstone, siltstone, and shale. Thickness 150-200 feet.
Fuson and Lakota Formations — Intertongued variegated claystones and sandstones underlain by gray conglomeratic sandstone; gold-bearing coal bed near base. Thickness 200-500 feet.
Morrison Formation (Upper Jurassic) — Dully variegated siliceous claystone containing nodular limestone and gray silty sandstone lenses. Thickness 50-100 feet.

Jsg SUNDANCE AND GYPSUM SPRING FORMATIONS

Sundance Formation (Upper and Middle Jurassic) — Greenish gray glauconitic sandstone and shale underlain by red and gray nonglauconitic sandstone and shale. Thickness 350-400 feet.
Gypsum Spring Formation (Middle Jurassic) — Massive white gypsum and red shale. Thickness 0-20 feet.

TrPs SPEARFISH FORMATION (TRIASSIC AND PERMIAN) — Red shale, red siltstone, and white gypsum beds. Thickness 150-550 feet.

Pmo MINNEKAHTA LIMESTONE AND OPECHE SHALE (LOWER PERMIAN).

Minnekahta Limestone — gray, slabby, hard limestone. Thickness about 40 feet.
Opeche Shale — Red, sandy, soft shale. Thickness 75-160 feet.

PPm MINNELUSA FORMATION (LOWER PERMIAN AND UPPER, MIDDLE, AND LOWER PENNSYLVANIAN) — Light gray and red sandstone, breccia that merges with anhydrite in subsurface, thin limestones and dolomites and red and black shale. Thickness 900-1,300 feet.

MDpe PAHASAPA LIMESTONE AND ENGLEWOOD FORMATION

Pahasapa Limestone (Lower Mississippian) — Gray, massive, locally cavernous, dolomitic limestone. Thickness 300-600 feet.
Englewood Formation (Lower Mississippian and Upper Devonian) — Pink, slabby, dolomitic limestone. Thickness 50-60 feet.

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