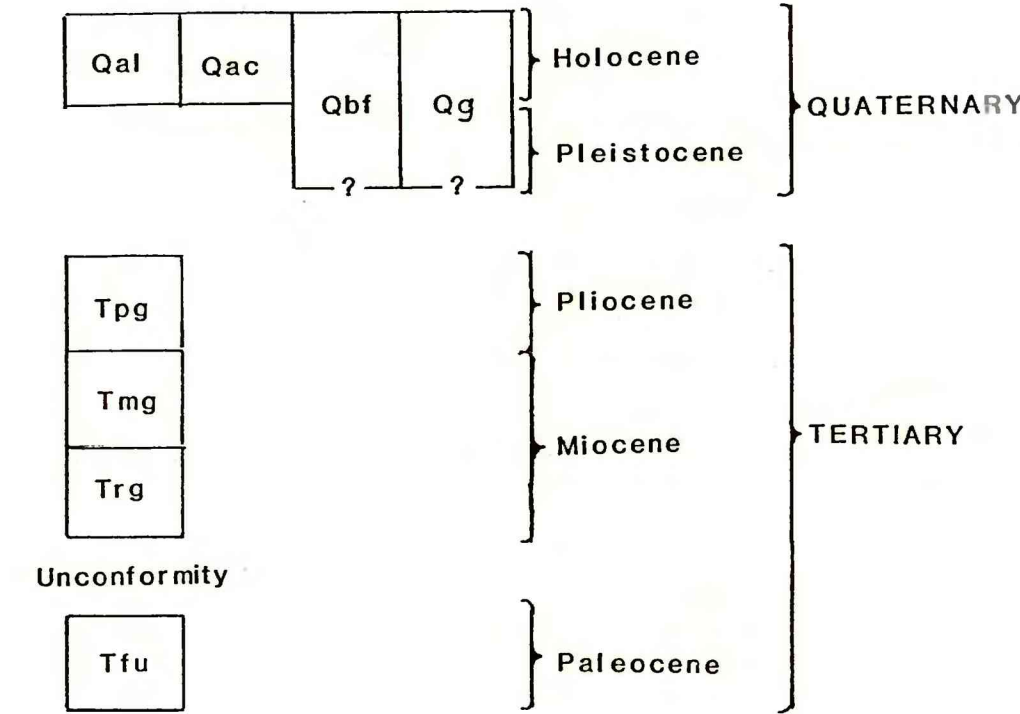




CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

- Qal Alluvium (Holocene)**—Light-brown and gray, well-stratified and well-sorted clay, silt, sand, and gravel. Thickness ranges from 1 to 4 m (3 to 13 ft) thick under the flood plain of Lower Sevenmile Creek, Thirteenmile Creek, South Fork of Thirteenmile Creek, and North Fork Deer Creek. Unit limited to areas characterized by meander or braided patterns on aerial photographs. Surface of unit may be subject to occasional flooding
- Qac Alluvium and colluvium (Holocene)**—Light-brown and gray, poorly sorted and well-stratified clay, silt, sand, and gravel deposited by slope wash and gravity processes. As much as 4 m (13 ft) thick, but generally less than 2 m (6 ft). The color and texture of the colluvium reflect the parent material upslope. May interfinger with alluvium; includes local alluvial fans and much windblown clay, silt, and sand. Soil profiles range from well-developed to poorly developed
- Qbf Baked and fused bedrock (clinker) (Holocene to Pleistocene)**—Red to orange baked shale, sandstone, and siltstone of the Fort Union Formation that was heat-metamorphosed by combustion of lignite. Hard, dense, metamorphosed sediments are known as porcellanite; locally, sediments fused and melted to form black, vesicular, glassy, scoriaceous rock called buchite, which forms linings of chimneys and veins in porcellanite. As much as 7 m (22 ft) thick, but generally less than 5 m (16 ft)
- Qg Sand and gravel, undivided (Pleistocene)**—Light-brown to light-gray, well-stratified to poorly stratified and well-sorted to poorly sorted sand and gravel. Thickness is as much as 5 m (16 ft), but generally less than 3 m (10 ft). Unit generally limited to altitudes below 824 m (2,700 ft)
- Tpg Sand and gravel, undivided (Pliocene)**—Light-brown to light-gray, well-stratified, well-sorted sand and gravel. Thickness is as much as 10 m (33 ft), but generally less than 3 m (10 ft). Unit generally limited to altitudes between 914 m (3,000 ft) and 808 m (2,650 ft). May contain some Pleistocene sand and gravel
- Tmg Sand and gravel, undivided (Miocene)**—Light-brown to light-gray, well-stratified to poorly stratified, well-sorted to poorly sorted. Thickness is as much as 10 m (33 ft), but generally less than 5 m (16 ft). Unit generally limited to altitudes between 948 m (3,110 ft) and 914 m (3,010 ft). May include some Pliocene sand and gravel
- Trg Rimroad Formation of Howard (1960) (Miocene)**—Light-brown to gray, well-sorted to poorly sorted and well-stratified to poorly stratified sand and gravel. The base of remnants of the Rimroad Formation is at an approximate altitude of 954 m (3,130 ft). Unit may contain some small thin Pliocene sand and gravel deposits. Maximum thickness of remnants of the formation is approximately 12 m (40 ft), but thickness of most remnants is less than 6 m (20 ft). The Rimroad Gravel of Howard (1960) contains volcanic ash 7.1±1.4 million years old and much sand, silt, and clay in addition to gravel. Therefore, the name is revised to Rimroad Formation and the age is limited to Miocene. The age of the volcanic ash was determined by counting fission tracks in zircons from the ash by Nancy B. Naeser (Colton, Naeser, and Wilcox, 1983)
- Tfu Tongue River Member (Collier and Knechtel, 1939) of Fort Union Formation (Paleocene)**—Yellowish- and light-brown shale and sandstone containing numerous lignite beds. Thickness under the highest parts of the quadrangle estimated to be more than 300 m (990 ft)

- w Water
- Contact—Dashed where approximately located

REFERENCES

Collier, A.J., and Knechtel, M.N., 1939, The coal resources of McCone County, Montana: U.S. Geological Survey Bulletin 905, 80 p.

Colton, R.B., Naeser, N.D., and Wilcox, R.E., 1983, Seven million-year-old ash on Missouri-Yellowstone River drainage divide near Circle, Montana: Geological Society of America Abstracts, Rocky Mountain and Cordilleran Sections, v. 15, no. 5, no. 24842, p. 414.

Howard, A.D., 1960, Cenozoic history of northeastern Montana and northwestern North Dakota with emphasis on Pleistocene: U.S. Geological Survey Professional Paper 326, p. 17.

GEOLOGIC MAP OF THE JOHNSON RESERVOIR NE
QUADRANGLE, DAWSON COUNTY, MONTANA

By

R.B. Colton, J.P. McGraw, D.K. Bozeman, and S.L. Durst

1994

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards or with the North American stratigraphic code. Any use of trade, product, or firm names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

JOHNSON COULEE EAST 88-610	BROCKWAY NE 88-631	YOUNGQUIST NINE 88-627	CIRCLE 88-630	WOODWORTH HILL 88-626	OLSON COULEE NORTH 88-620	JOHNSON RESERVOIR NW 88-613	JOHNSON RESERVOIR NE 88-611
BEAUTY CREEK 88-636	BROCKWAY 88-623	CIRCLE SW 88-629	QUICK RESERVOIR 88-618	MOUNT ANTELOPE 88-616	OLSON COULEE SOUTH 88-621	DEER CREEK CHURCH 88-628	JOHNSON RESERVOIR 88-609
HERRY SCHOOL 88-632	WATKINS 88-621	BIG SHEEP MOUNTAIN NW 88-622	BEARHACK CREEK 88-634	DIAMOND G RUTTE NW 88-607	UNION SCHOOL 88-617	LINSBAY 88-614	WOODROW 88-625
HEITZ SCHOOL 88-608	WATKINS SE 88-624	BIG SHEEP MTH 88-629	BECKER DAM 88-633	NORTH COULEE 88-619	DIAMOND G RUTTE 88-635	LINSBAY SW 88-615	UPPER CRACKER BOX SCHOOL 88-612

INDEX TO QUADRANGLES IN THE CIRCLE 30' x 60' QUADRANGLE. MAPPED
QUADRANGLE SHOWN BY STRIPES; NUMBERS ARE OPEN-FILE NUMBERS