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Geology by J. D. Love, 1948-49, 1961-73; J. C. Antweiler, 1966-73; J. L. Weitz, 1948-49, 1966-73; K. K. Hose, 1948-49.

WYOMING
QUADRANGLE LOCATION

GEOLOGIC MAP OF THE GRAVEL MOUNTAIN QUADRANGLE, TETON COUNTY, WYOMING

By

J.D. Love

1975

CORRELATION OF MAP UNITS

Qs, Qc, Qf, Qog, Qls, Qg, Qlg	Holocene	QUATERNARY
	Pleistocene	
Qg²		
UNCONFORMITY		
QTb		QUATERNARY OR TERTIARY
UNCONFORMITY		
Twi	Eocene	TERTIARY
UNCONFORMITY		
TKp	Paleocene	
UNCONFORMITY		
Kh		
UNCONFORMITY		
Ks	Upper Cretaceous	CRETACEOUS
Kb		
Kc		
Kf		
Kmr		
Kt		
KJm, Kevr, KJmv	Lower Cretaceous	
Jus	Upper Jurassic	JURASSIC
Jls		
UNCONFORMITY		
Jgs	Middle Jurassic	
Trc		TRIASSIC
Trd		
Pp		PERMIAN
PMta		PENNSYLVANIAN
Mm		MISSISSIPPIAN

DESCRIPTION OF MAP UNITS

Qs SWAMP DEPOSITS (HOLOCENE)--Clay, silt, and fine sand, dark-gray and brown; rich in vegetal debris

Qc COLLUVIUM (HOLOCENE AND PLEISTOCENE)--Slope wash of silt- to boulder-sized fragments derived from underlying and adjacent formations

Qf ALLUVIAL FAN DEPOSITS (HOLOCENE AND PLEISTOCENE)--Rudely stratified gravel, sand, silt, and clay spread outward from mouths of ravines; shows linear sorting along distributaries; finer grained debris becomes progressively more abundant toward downstream margins of fans; locally includes some colluvium

Qog OUTWASH GRAVEL (HOLOCENE AND PLEISTOCENE)--Gravel deposited along flood plains of major streams; composed chiefly of quartzite rock fragments; contains some concentrations of placer gold

Qls LANDSLIDE DEBRIS (HOLOCENE AND PLEISTOCENE--Chaotically mixed boulders and smaller size rock debris emplaced by mass movement

Qg UNDIFFERENTIATED GLACIAL DEBRIS (PLEISTOCENE)--Morainal debris deposited by ice that moved from the north and east

Qg^2 GLACIAL DEBRIS OF SECOND MAJOR GLACIATION (PLEISTOCENE)--Very old formless glacial deposits; preserved only at higher elevations or under younger glacial debris

Qlg LANDSLIDE AND GLACIAL DEBRIS (HOLOCENE AND PLEISTOCENE)--Landslide and glacial debris so completely intermixed that they cannot be mapped separately

QTb BASALT OF UNCERTAIN AGE (QUATERNARY OR TERTIARY)--Basalt, black, intruded into Wiggins Formation

Twi WIGGINS FORMATION (EOCENE)--Volcanic conglomerate, brown and gray, waterlaid; consists chiefly of mafic andesite and basalt boulders in a gray coarse crystal tuff matrix; fossil wood common --some upright trees. Thickness 1,000 feet (305 m) or more

TKp PINYON CONGLOMERATE (PALEOCENE AND UPPER CRETACEOUS)--Boulder conglomerate, rusty-brown, composed of highly rounded fragments of quartzite in rusty coarse-grained sandstone matrix; sporadic boulders as much as 18 inches (46 cm) in diameter. Basal 800 feet (244 m) of section in northwest corner of quadrangle is nonconglomeratic gray sandstone, dark-gray claystone, and tuff. Tuff has a K-Ar age of 67±0.7 m.y. (J. D. Obradovich, oral commun., 1974); claystones contain Cretaceous pollen. Thickness more than 2,000 feet (610 m)

Kh HAREBELL FORMATION (UPPER CRETACEOUS)--Conglomerate, sandstone, and claystone. Conglomerate is brown, composed of highly rounded quartzite pebbles, cobbles, and boulders; sandstone is brown, gray, and dull green, silty, hard, somewhat tuffaceous, rich in magnetite; claystone is gray, dark green, black, and mustard yellow, silty, tuffaceous; marine or brackish water in part. Thickness about 10,000 feet (3,050 m)

Ks UNNAMED LENTICULAR SANDSTONE AND SHALE SEQUENCE (UPPER CRETACEOUS)--Sandstone, gray and brown, fine-grained, interbedded with light- and dark-gray shale and siltstone; largely nonmarine; contains thin coal beds. Thickness about 800 feet (245 m)

Kb BACON RIDGE SANDSTONE (UPPER CRETACEOUS)--Sandstone, tan to gray, thick-bedded, fine-grained; interbedded with gray and black shale; several coal and bentonite beds; thickness 1,800 feet (549 m) or more

Ke CODY SHALE (UPPER CRETACEOUS)--Shale, dull-gray, interbedded with lesser amounts of gray siltstone and gray fine-grained slabby sandstone; hard persistent marker sandstone 800 feet (245 m) above base; marine. Thickness about 1,700 feet (518 m)

Kf FRONTIER FORMATION (UPPER CRETACEOUS)--Sandstone, gray, fine- to coarse-grained, pebbly and highly glauconitic near top; interbedded with gray and black shale; bentonite and porcellanite beds and thin coals in lower part. Thickness about 1,000 feet (305 m)

Kmr MOWRY SHALE (LOWER CRETACEOUS)--Shale, dark-gray to black, weathering silvery gray, very hard, brittle, siliceified, thin-bedded; several cream-colored bentonite beds, one of which has a K-Ar age of 97.5 m.y. (J. D. Obradovich, oral commun., 1974) at a site 15 miles (24 km) northwest of the quadrangle. Thickness about 650 feet (200 m)

Kt THERMOPOLIS SHALE (LOWER CRETACEOUS)--Shale, black, fine-grained, fissile, flaky; full thickness not exposed, but probably is 150-200 feet (46-61 m) thick. Includes Muddy Sandstone Member at top, which is rusty-gray sandstone interbedded with black and gray siltstone and shale; probably about 50 feet (15 m) thick

KJm CLOVERLY AND MORRISON(?) FORMATIONS (LOWER CRETACEOUS AND UPPER JURASSIC)--Consists of two mappable sequences

Kevr Rusty beds member--Hard slabby rusty ripple-marked sparkly sandstone. Thickness 150 feet (46 m)

KJmv Variegated sequence--Plastic to hard lavender, red, gray, and white claystone, silty in part, and red to gray sandstone. Thickness about 450 feet (137 m)

Jus "UPPER SUNDANCE" (UPPER JURASSIC)--Sandstone, greenish-gray, highly glauconitic, very limy, hard, marine, highly fossiliferous; forms marker ridges. Thickness 75-100 feet (23-30 m)

Jls "LOWER SUNDANCE" (UPPER AND MIDDLE JURASSIC)--Shale, gray, limy, interbedded with gray shaly limestone; one and, in places, two red shale zones present in middle part; marine; highly fossiliferous. Thickness about 400 feet (122 m)

Jgs GYPSUM SPRING FORMATION (MIDDLE JURASSIC)--Shale, dark-red, soft, 10-15 feet (3-4.6 m) thick, overlain by 45-50 feet (13.7-15.2 m) of white soft gypsum. Above this is 20 feet (6 m) of white, pink, and buff nodular brecciated limestone and dolomite. Thickness 75-85 feet (23-25.8 m)

Trc CHUGWATER FORMATION (TRIASSIC)--Siltstone, shale, and sandstone, dark-red, soft, thin-bedded; white and pink sandstone in upper part and purple and ocher-colored claystones and lime-pellet conglomerate lenses near top. Thickness about 1,000 feet (305 m)

Trd DINWOODY FORMATION (TRIASSIC)--Siltstone, brown, hard, thin-bedded, dolomitic. Thickness 200 feet (61 m)

Pp PHOSPHORIA FORMATION (PERMIAN)--Dolomite, gray, cherty, sandy; some black shale and phosphorite beds. Thickness 200 feet (61 m)

PMta TENSLEEP SANDSTONE AND AMSDEN FORMATION (PENNSYLVANIAN AND MISSISSIPPIAN)--Tensleep is light-gray hard fine-grained cherty brittle sandstone about 380 feet (115 m) thick. Amsden Formation is dolomite, chert, sandstone, and red, green, and black shale. The black shale is persistent, about 50 feet (15.2 m) thick, petroliferous, slightly radioactive, and contains copper and other trace elements in above-average amounts. At base is Darwin Sandstone Member, a gray crossbedded sandstone 0-60 feet (0-18 m) thick. Total thickness of Amsden is about 230 feet (70 m)

Mm MADISON LIMESTONE (MISSISSIPPIAN)--Limestone, blue-gray, gray dolomite, and locally in upper part thin beds of black and red shale and sandstone. Thickness about 1,100 feet (335 m)

Contact

Mappable bed of quartzite roundstone conglomerate --Generally less than 100 feet (30 m) thick. On and east of Gravel Mountain and in the Box Creek syncline, the thickness and extent of conglomerate makes any such portrayal impractical

Mappable bed (nonconglomeratic)

Glacial scour troughs

Upper limit of granite erratics carried westward by ice from the Buffalo Fork region (at right angles to ice that moved south and southwest from the Yellowstone-Absaroka region)

Normal fault--Dotted where concealed or inferred. Bar and ball on downthrown side

Thrust or reverse fault--Dotted where concealed or inferred. Sawteeth on upper plate

Thrust fault with younger normal fault along same trace--Dotted where concealed or inferred. Sawteeth on upper plate of thrust fault; bar and ball on downthrown side of normal fault

Anticline--Short dashes where concealed or inferred

Syncline--Short dashes where concealed or inferred

Strike and dip of beds

10 Inclined

Vertical

70 Overturned

Horizontal

Generalized dip without strike

Location of measured and sampled section--Dotted where offset, covered, or not detailed

Boundary of "chaos" area--Consists of shattered masses and randomly oriented blocks of Madison Limestone

L66-80 Field station where samples were obtained for chemical analysis, or fossils collected

"Pimpled area" of round raised mounds--Probably of glacial origin but mechanics of development uncertain

T-1 Outer margin of terrace in outwash gravel--T-1 is youngest and is at approximate level of major streams. T-3 is 15-50 feet (4.6-15.2 m) above T-1 (T-2 is not distinguishable in this quadrangle)

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This map is preliminary and has not been edited or reviewed for conformity with Geological Survey standards or nomenclature.