WYOMING STATE GEOLOGICAL SURVEY
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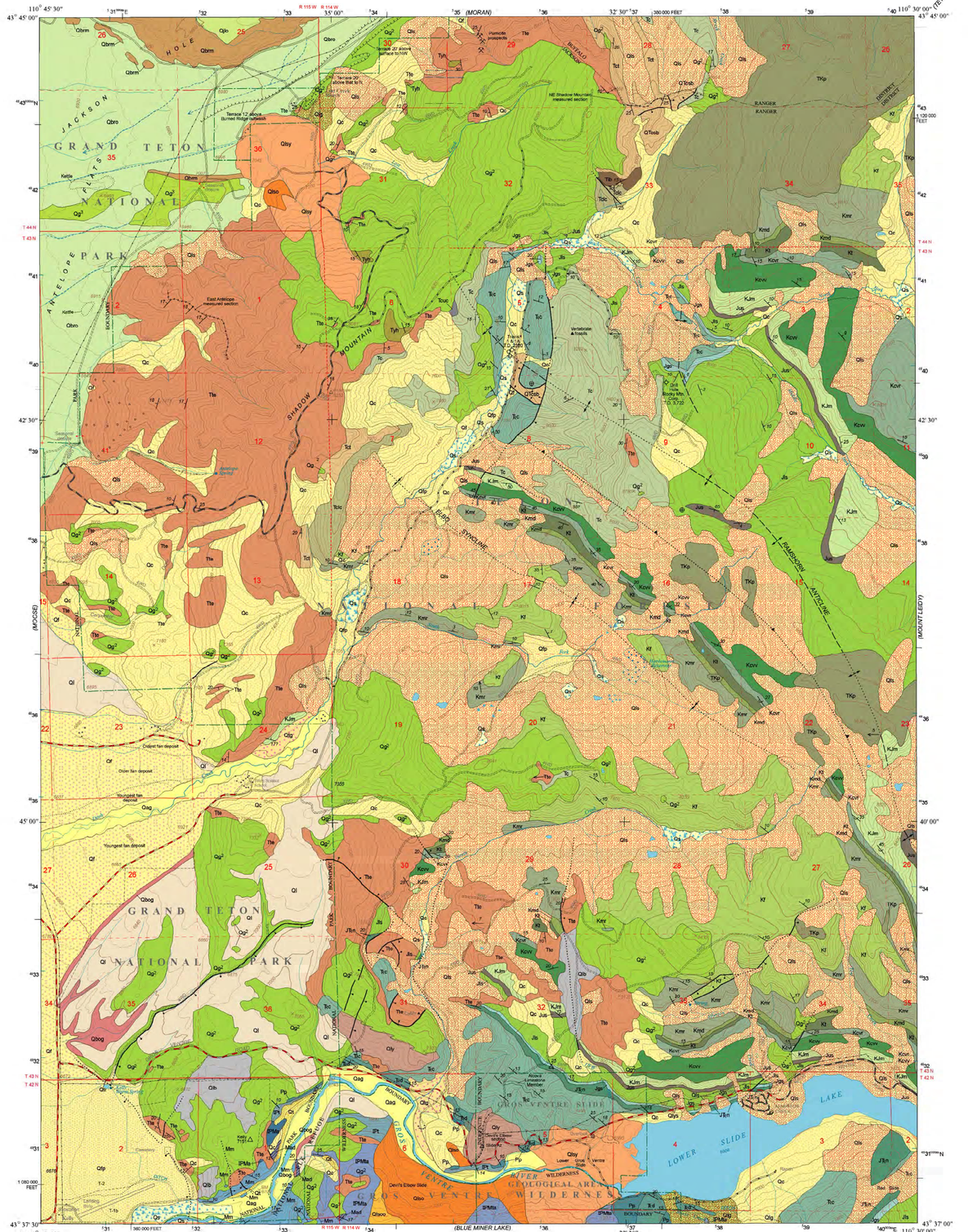
Laramie, Wyoming

Geology — Interpreting the past to provide for the future

Prepared in cooperation with the
U.S. GEOLOGICAL SURVEY

J. DAVID LOVE HISTORICAL GEOLOGIC MAP SERIES
GEOLOGY OF THE TETON - JACKSON HOLE REGION
Map LMS-7
Shadow Mountain Quadrangle, Teton County, Wyoming



North American Datum (NAD27). Projection 10,000-foot grid ticks: Wyoming coordinate system, west zone (Lambert conformal conic). Blue 1000-meter Universal Transverse Mercator ticks, zone 12

Hydrography, hypsography, public land survey, and transportation base by U.S. Geological Survey, various years

Digital base files prepared by Wyoming State Geological Survey, 2000

UTM GRID AND 1997 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET (DIAGRAM IS APPROXIMATE)

SCALE 1:24,000

CONTOUR INTERVAL 40 FEET
SUPPLEMENTARY CONTOUR INTERVAL 20 FEET

QUADRANGLE LOCATION

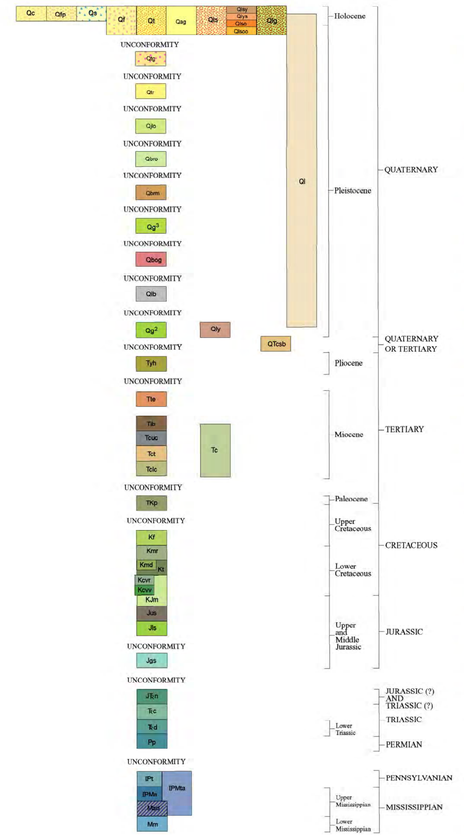
Geology mapped by J. David Love, 1950, 1954, 1957, 19/1, 19/2, and 1974; W. R. Keefer, 1950

Digital cartography by Abby L. Kirkaldie and Phyllis A. Ranz

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

by
J. David Love
2001

CORRELATION OF MAP UNITS



MAP SYMBOLS

Formation contact

Fault - Sense of motion or displacement not specified; dotted where concealed or inferred

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

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

Anticline - Showing crestline. Dotted where concealed or inferred

Syncline - Showing troughline. Dotted where concealed or inferred

Strike and dip of beds

Inclined

Vertical

Overturned

Horizontal

Generalized direction of dip without strike

Measured section - Offsets shown by dotted line

Drill hole - Company, drill hole number, and total depth, T.D., in feet

Mine or prospect

Lag erratics, too sparse to map

Fan deposit boundary

Selected stream channel-Most have been abandoned because of subsequent drainage changes

Terrace sequence - Dots mark outer boundary of terrace surface except where terrace marks contact between two mappable units; in those places the contact is shown as solid line with hachures on downslope side. Solid hachured lines within mappable unit depict terrace margins; hachures on downslope side; T-1 is the youngest, T-2 is the oldest. Scale of the map precludes showing terrace details. (Note: only terrace levels T-1b and T-2 occur on this quadrangle)

Terraces related to the Gros Ventre River:

T-1	At and within 10 feet (3 m) of present stream level
T-1a	5 feet (1.5 m) above terrace T-1
T-1b	7 feet (2.1 m) above terrace T-1a
T-2	5 feet (1.5 m) above terrace T-1b

DESCRIPTION OF MAP UNITS

Holocene surficial deposits

Qc — **Colluvium** - Silt- to boulder-sized fragments derived from underlying and adjacent units. Locally includes glacial drift

Qfp — **Flood-plain deposits** - Sand, silt, clay, and minor lenses of gravel; lesser amount of gravel at surface distinguishes these deposits from alluvium along topographically lower stream valleys

Qs — **Swamp deposits** - Clay, silt, and fine sand, dark-gray and brown; rich in vegetal debris

Holocene and Pleistocene surficial deposits

Ql — **Loess** - Light-gray, structureless, homogeneous; wind-deposited silt. Gastropods from several localities in adjoining quadrangles

Qf — **Alluvial fan deposits** - Crudely stratified deposits of gravel, silt, and clay that spread outward from mouths of ravines and canyons; deposits show linear sorting along distributaries: finer debris is progressively more abundant toward downstream margins of fans. Dotted lines separate different-aged fan deposits

Qt — **Talus deposits (including rock glaciers)** - Locally derived coarse, angular rock fragments that accumulated on steep slopes and at base of cliffs; merge in places with the youngest glacial moraines

Qag — **Gravel deposits** - Gravel deposited along flood channelways of major streams; composed chiefly of quartzite roundstones

Qls — **Landslide debris** - Chaotically mixed boulders and finer rock debris emplaced by mass movement

Qlsy — **Youngest landslide debris emplaced in 1925**

Qlsn — **Lacustrine deposit associated with second oldest landslide debris (Qlso)** - Thin-bedded fine-grained clay and sand associated with lake impounded behind Devile Elbow Slide. Less than 5000 years old. Located along main road north of Lower Slide Lake (Love and Love, 1988)

Qlso — **Next oldest landslide debris overlapping oldest landslide debris**

Qlsoo — **Oldest landslide debris** - Comprised of chaotic mass of angular Tensleep and Amsden blocks

Qlg — **Landslide and glacial debris intermixed**

Pleistocene deposits

Qtg — **Terrace gravel** - Outwash gravel composed predominately of quartzite roundstones; deposited by glacial meltwater

Qtr — **Travertine** - Gray limestone deposited by springs; only occurrence on quadrangle is in at Kelly Warm Spring

Qly — **Leidy Formation** - Intertonguing lacustrine, fluviatile, and glacial deposits. Chiefly very fine-grained chocolate-brown, pink, and gray clay, laminated in part, interbedded with unlithified gray sand; lenticular quartzite boulder conglomerate in some places; intertongues laterally with drift and outwash deposits of second (Bull Lake) glaciation (Qg^2). Normal polarity and lack of volcanic debris indicate age younger than about 0.75 (Mega-annum or millions of years). Thickness 0 to 450 feet (0 to 140 m)

Qjo — **Outwash gravel deposits from Jackson Lake moraine** - Downstream from Jackson Lake moraine (part of third or Pinedale major glaciation)

Qbro — **Burned Ridge outwash gravel** - Downstream from Burned Ridge moraine (part of third or Pinedale glaciation)

Qbrm — **Burned Ridge moraine** - Part of third (Pinedale) glaciation. Chiefly a mixture of quartzite clasts and Cretaceous sands and claystone fragments?? Southern margin of moraine that extends across the floor of Jackson Hole

Qg^3 — **Glacial debris of third (and youngest) (Pinedale) major glaciation** - Morainal debris has rough, unmodified surface topography, little weathering of rock fragments, and sparse soil development

Qbog — **Outwash gravel deposits from second (Bull Lake) glaciation** - Gravel of quartzite roundstones, crudely stratified; top surface characteristically planar

Qlb — **Loess and boulders** - Chalky white formless unstratified deposits consisting of glacial erratics of many sizes and compositions, derived from till of second (Bull Lake) glaciation and embedded in a matrix of white calcareous loess. Chiefly on higher hills in National Elk Refuge between Flat Creek and Gros Ventre River

Qg^2 — **Glacial debris of second (Bull Lake) major glaciation** - Very old formless piles and lag deposits of large and small erratics, in places mixed with outwash gravel, sand, and silt; most erratics are not locally derived and the softer ones are deeply weathered; extensive soil development in some places. May include slightly younger morainal debris with subdued surface topography; capped by loess and soil in most places

QTosb — **Slump block of Colter Formation (Quaternary or Tertiary)**

Tertiary sedimentary rocks

Tyh — **Huckleberry Ridge Tuff (Pliocene)** - Compound cooling unit of ash-flow tuff. Gray to brown generally densely welded and divitrified but locally glassy or partly welded. Most parts contain abundant phenocrysts of quartz, sanidine, and sodic plagioclase; sparse opaque oxides, clinopyroxene, and fayalitic olivine. Thickness 100 feet (33 m)

Tle — **Teewinot Formation (Miocene)** - Limestone, claystone, and pumicite, chalky white to light-gray, soft, porous; lower two-thirds is chiefly nodular porous limestone in beds 100 to 200 feet (30 to 60 m) thick interbedded with pumicite in beds 20 to 75 feet (6 to 23 m) thick. Upper part is very fossiliferous thin-bedded claystone, marlstone, and tuff. Thickness more than 6000 feet (1829 m), age in lower part about 10 M in upper part 7.5 M

Tlb — **Basalt (Miocene) intruded into Colter Formation** - Gray sugary breccia and dense black and red basalt on Ditch Creek. Relation to Colter Formation uncertain but could be contemporaneous with it

Tc — **Colter Formation (middle and lower Miocene)** - Light-gray, green, and brown tuff, sandstone, ash, and mafic volcanic conglomerate. Thickness 1400 feet (427 m)

Tcuc — **Upper conglomerate in Colter Formation**

Tct — **Tuff member of Colter Formation**

Tclc — **Lower conglomerate in Colter Formation**

TKp — **Pinyon Conglomerate (Paleocene and Upper Cretaceous)** - Rusty brown conglomerate composed of quartzite roundstones in matrix of rusty coarse-grained sandstone that contains tiny flakes of gold; sporadic boulders of older conglomerate and quartzite 5 to 8 feet in diameter. Thickness 0 to 3800 feet (0 to 1158 m)

Kf — **Frontier Formation (Upper Cretaceous)** - Gray to tan, fine- to medium-grained sandstone, gray to black shale, thin coaly partings, thin bentonites and porcellanites. Thickness uncertain because of tectonic squeezing; in normal sections it is about 1000 feet (305 m)

Knr — **Mowry Shale (Upper Cretaceous in part)** - Dark-gray to black siliceous shale, dense hard silicified speckled sandstone, and thin bentonites; many shales weather silvery gray and are characterized by abundant fish scales. Thickness uncertain but probably between 500 and 700 feet (150 and 215 m)

Kt — **Thermopolis Shale (Lower Cretaceous)** - Black, very fine-grained highly fissile soft shale 100 to 200 feet (30 to 1 m) thick; thin beds of bentonite and rusty fine-grained sandstone

Kmd — **Muddy Sandstone Member** - Gray medium-grained soft crossbedded sandstone; occurs at top of Thermopolis Shale; 50 to 100 feet (15 to 30 m) thick

KJm — **Cloverly and Morrison (?) Formations undivided (Lower Cretaceous and (?) Upper Jurassic)** - Three units are present, the upper and middle mapped separately in some places and described below. The lowermost unit is buff and gray chloritic, in part sparkly, sandstone interbedded with red, green, and gray siltstone and claystone; 185 to 250 feet (56 to 76 m) thick

Kcvr — **Uppermost unit (commonly known as the "rusty beds member" of Cloverly Formation)** - Olive-green, gray, and buff thin-bedded sandstones that weather with a conspicuous rusty color; in the southwestern corner of the quadrangle, contains a unique silicified mollusean fauna; 100 to 250 feet (30 to 76 m) thick

Kcvy — **Middle unit** - Variegated red, gray, lilac-colored, and pink claystone containing thin beds of hard nodular dense cream-colored limestone; 290 to 545 feet (88 to 166 m) thick

Sundance Formation (Upper and Middle Jurassic)

Jus — **"Upper Sundance"** - Glauconitic gray, buff, and green very limy sandstone and a few thin shale and limestone beds; 75 to 140 feet (23 to 43 m) thick

Jls — **"Lower Sundance"** - Gray limy plastic to splintery shale, clayey limestones, hard oolitic limestone, and one or more zones of red plastic shale; 450 to 550 feet (137 to 168 m) thick

Jgs — **Gypsum Spring Formation (Middle Jurassic)** - Red shale, slabby gray dolomite, and white gypsum. In most outcrops the gypsum has been leached out, leaving a lithified carbonate breccia that forms rounded cliffs. Thickness 50 to 150 feet (15 to 46 m), depending on the amount of leaching of gypsum

JTRn — **Nugget Sandstone (Jurassic and Triassic)** - Light-tan to salmon-pink, fine-grained, crossbedded, hard brittle cliff-forming sandstone characterized by large frosted rounded quartz grains in a finer matrix. Thickness about 375 feet (115 m)

Trc — **Chugwater Formation (Triassic)** - Sandstone, siltstone, and shale; red, evenly stratified, crops out in ridges of hard sandstone reparted by valleys of softer beds. Gray gypsiferous Alcova Limestone Member crops out on north side of Lower Slide Lake. Thickness about 1200 feet (350 m), but thins rapidly northward

Trd — **Dinwoody Formation (Lower Triassic)** - Siltstone, brownish-gray to olive-drab, hard, slabby, thin-bedded, dolomitic; contains thin partings of fine-grained dolomitic sandstone and silty limestone. Thickness 200 to 450 feet (61 to 140 m)

Pp — **Phosphoria Formation and equivalent units (Permian)** - Dolomite, chert, phosphorite, and black shale. Dolomite and chert are dark-gray to brown, sandy, chiefly in upper part; phosphorite and black shale at top and lower part. Thickness 180 to 235 feet (55 to 72 m)

IPt — **Tensleep Sandstone (Pennsylvanian)** - Sandstone, light-gray, weathering yellowish-brown, fine-grained, hard, brittle, quartzitic in part. Middle and lower parts contain many beds of gray fine-grained limestone and dolomite. Contact with underlying Amsden Formation transitional. Thickness 400 to 450 feet (122 to 137 m)

IPMs — **Tensleep and Amsden Formations undivided (Pennsylvanian and Upper Mississippian)** - Includes Darwin Sandstone in some places

IPMa — **Amsden Formation (Pennsylvanian and Upper Mississippian)** - Shale and siltstone, brick-red, red-brown, and green, interbedded with white dolomite and limestone. Several zones contain ocher and carnelian-red chert nodules. Thickness exclusive of Darwin Sandstone Member about 450 feet (137 m)

Darwin Sandstone Member (Upper Mississippian) - Gray to brownish-pink, fine- to medium-grained sandstone with some large rounded frosted quartz grains; crossbedded, moderately soft and porous; red shale partings near top. Thickness 75 to 100 feet (23 to 30 m)

Mm — **Madison Limestone (Upper and Lower Mississippian)** - Limestone, light- to dark-gray, thick-bedded to massive in upper part, thin-bedded and dolomitic in lower part; vuggy brown dolomite near base; many layers and lenses of black chert. Thickness about 1100 feet (335 m)

REFERENCES

Good, J.M. and Pierce, K.L., 1996, Interpreting the landscapes of Grand Teton and Yellowstone National Parks, Recent and ongoing geology: Grand Teton Natural History Association, Moose, Wyoming, 58 p.

Love, J.D., 2001a, Geologic map of the Moose Quadrangle, Teton County, Wyoming; Wyoming State Geological Survey J. D. Love Historical Geologic Map Series LMS-3, scale 1:24,000.

Love, J.D., 2001b, Geologic map of the Gros Ventre Junction Quadrangle, Teton County, Wyoming; Wyoming State Geological Survey J. D. Love Historical Geologic Map Series LMS-4, scale 1:24,000.

Love, J.D., 2001c, Geologic map of the Blue Miner Lake Quadrangle, Teton County, Wyoming; Wyoming State Geological Survey J. D. Love Historical Geologic Map Series LMS-6, scale 1:24,000.

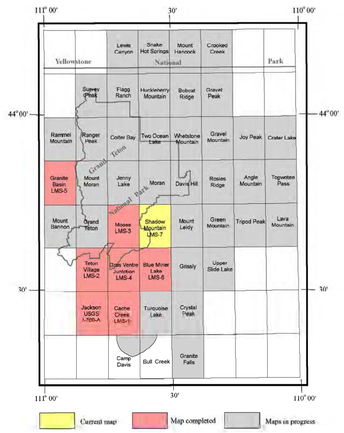
Love, J.D., and Love, J.M., 1988, Geologic road log of part of the Gros Ventre River valley including the Lower Gros Ventre Slide: Wyoming State Geological Survey Reprint 46, 14 p.

Love, J.D., and Love, J.M., 1997, Geologic road log, Jackson to Dinwoody and return: Wyoming State Geological Survey Public Information Circular 20, 38 p.

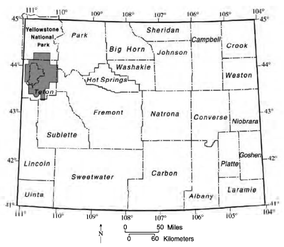
Love, J.D., Montagne, J.M., and Richmond, G.M., 1965, Relation of Quaternary tectonics and volcanism to glaciation: International Association for Quaternary Research, 7th Congress, Field Conference E, Northern and Middle Rocky Mountains, p. 37-47.

Love, J.D., Reed, J.C., Jr., and Christiansen, A.C., 1992, Geologic map of Grand Teton National Park, Teton County, Wyoming: U.S. Geological Survey Miscellaneous Investigations Series Map I-2031, scale 1:62,500.

Pierce, K.L., and Good, J.M., 1992, Field guide to the Quaternary geology of Jackson Hole, Wyoming: U.S. Geological Survey Open-File Report 92-504, 54 p.



INDEX TO LOVE MAP SERIES SHOWING LOCATION OF 7.5-MINUTE QUADRANGLES AND MAPPING PROGRESS



GENERAL LOCATION MAP