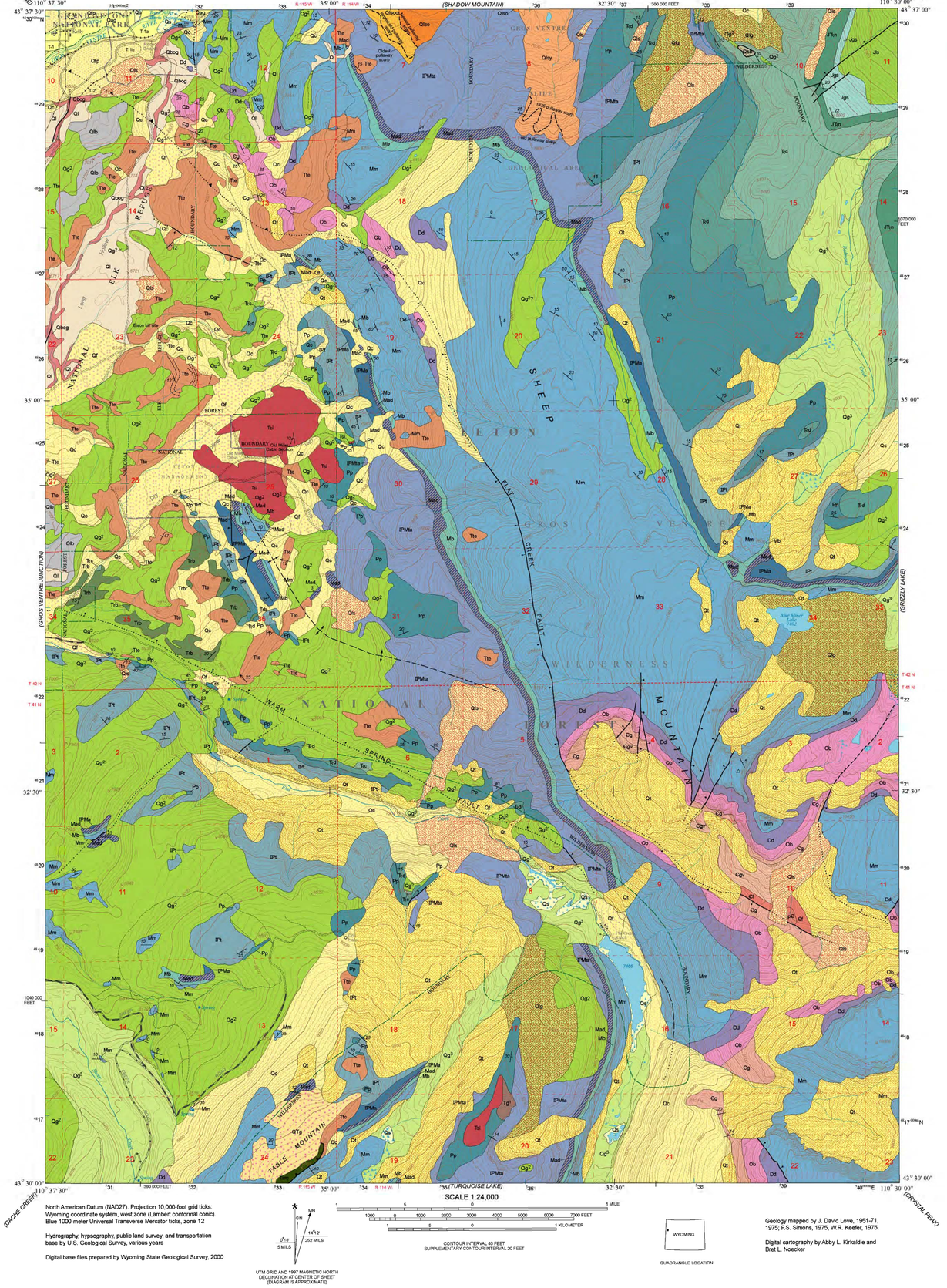
WYOMING STATE GEOLOGICAL SURVEY
Lance Cook, State Geologist
Laramie, Wyoming

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-6
Blue Miner Lake 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

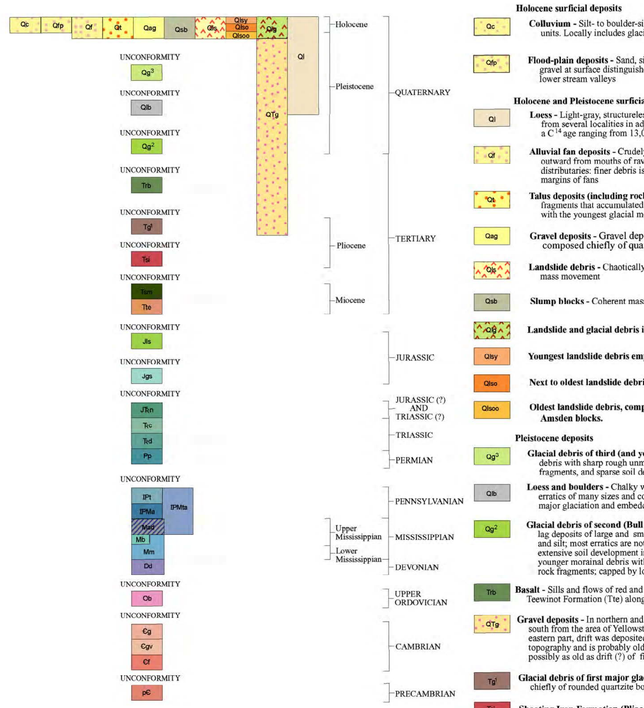
Geology mapped by J. David Love, 1951-71, 1975; F.S. Simons, 1975; W.R. Keefer, 1975.

Digital cartography by Abby L. Kirkaldie and Bret L. Noecker

GEOLOGIC MAP OF THE BLUE MINER LAKE 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 on upper plate

Anticlinal axis - Approximately located, showing crestline; dotted where concealed or inferred

Synclinal axis - Approximately located, showing troughline; dotted where concealed or inferred

Monoclinal axis - Approximately located, arrow on steep flank; dotted where concealed or inferred

Strike and dip of beds

Inclined

Horizontal

Vertical

Generalized direction of dip without strike

Terrace sequence - Dots mark outer boundary of terrace surface except where terrace marks contact between two mappable units; in these places contact is shown as solid line with hachures on downslope side. Solid hachured lines within a mappable unit depict terrace margins; hachures on downslope side; T-1 is the youngest, T-2 is oldest. Scale of the map precludes showing terrace details

Terraces related to 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

Holocene and Pleistocene surficial deposits

Ql **Loess** - Light-gray, structureless, homogeneous wind-deposited silt. Gastropods from several localities in adjoining quadrangles to the north and northwest have a C^{14} age ranging from 13,000 to 19,000 years before present

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

Qe **Talus deposits (including rock layers)** - 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

Qsb **Slump blocks** - Coherent masses of bedrock that have moved downslope

Qls **Landslide and glacial debris intermixed**

Qlsy **Youngest landslide debris emplaced in 1925**

Qlso **Next to oldest landslide debris overlapping oldest landslide debris**

Qlsoo **Oldest landslide debris, comprised of chaotic mass of angular Tensleep and Amsden blocks.**

Pleistocene deposits

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

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) major glaciation and embedded in a matrix of white calcareous loess

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. In some areas, may consist of slightly younger morainal debris with subdued surface topography, moderately weathered rock fragments; capped by loess and soil in most places

Trb **Basalt** - Sills and flows of red and black basalt. Vuggy scoriaceous basalt intrudes Teewinot Formation (Tte) along Flat Creek

Qg^1 **Gravel deposits** - In northern and northeastern part, drift was deposited by ice that moved south from the area of Yellowstone National Park or east from the Teton Range; in eastern part, drift was deposited by westward-moving ice. Most drift has more subdued topography and is probably older than drift of third (Pinedale) glaciation (Qg^3); some is possibly as old as drift (?) of first glaciation (Tg^1)

Tg^1 **Glacial deposits of first major glaciation in this area (Pliocene)** - Formless deposits chiefly of rounded quartzite boulders and Paleozoic rock fragments

Tsi **Shooting Iron Formation (Pliocene)** - Pink, red, green, yellow, dark-gray, and brown lacustrine and fluvial claystone, gray and yellow tuffaceous sandstone and siltstone, and pebble conglomerate of volcanic rock fragments in bentonitic matrix. Some mollusks indicate deep-water environment. Exposed north of Flat Creek along east edge of map area and locally on south ends of East and West Gros Ventre Buttes. Maximum thickness greater than 100 feet (30 m)

Tom **Slump mass (Miocene)** - Brecciated and recemented slump mass of Madison Limestone incorporated in the Teewinot Formation

Tte **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 (31 to 61 m) thick interbedded with pumicite in beds 20 to 75 feet (6.1 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 MA (Mega-annum or millions of years old); in upper part 7.5 MA

Jts **"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 north of the Jackson thrust fault and nearly 800 feet (245 m) thick in the overthrust facies south of this fault

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 near-surface 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), but thins rapidly northward

Tc **Chugwater Formation (Triassic)** - Sandstone, siltsone, and shale, red, evenly stratified, cropping out in ledges and cliffs of hard sandstone separated by valleys of softer rock. Gray Alcova Limestone in upper middle. Thickness about 1200 feet (365 m)

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)

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)

Mad **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)

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

Madison Limestone

Mb **Bull Ridge Member (Upper Mississippian)** - Shale and siltstone, red, interbedded with orange-red to tan sandstone, tan to pink dolomite breccia, and blue-gray ledge-forming limestone containing highly distinctive red and "zebra-striped" gray and black chert nodules. Not mapped separately on cliff faces or in areas of intense deformation. Thickness 50 to 100 feet (15 to 30 m)

Mm **Main Part (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 to 1500 feet (335 to 460 m)

Dd **Darby Formation (Upper and Middle Devonian)** - Upper part is dolomitic siltstone and shale, dull-yellow, thin-bedded, lower part is brown fetid vuggy siliceou brittle dolomite containing sparse thin limestone beds. Thickness 300 feet (91 m)

Ob **Bighorn Dolomite (Upper Ordovician)** - Domomite, light-and dark-gray, mottled, siliceous; forms ragged gray cliffs. Leigh Dolomite Member, about 50 feet (15 m) thick, forms slope at top and consists of chalk-white very fine-grained brittle dolomite. Thickness about 200 feet (61 m)

Cg **Gallatin Limestone (Upper Cambrian)** - Limestone, bluish-gray, mottled, with irregular granular yellow patches; irregularly bedded, hard; forms ragged cliffs. Thickness 180 to 240 feet (55 to 73 m)

Cgv **Gros Ventre Formation (Upper and Middle Cambrian)** - Includes Park Shale Member at top, a green to gray highly fissile micaceous shale containing numerous algal heads at base; 150 to 350 feet (45 to 105 m) thick. Middle part is hard blue-gray to dark-gray fine-grained thin-bedded limestone, mottled with brown and tan irregular limestone blotches; conspicuous cliff-former; equivalent to Death Canyon Limestone to west. At base is a distinctive bed of brown-weathering dolomite. Thickness 300 to 370 feet (90 to 113 m)

Cf **Flathead Sandstone (Middle Cambrian)** - Sandstone, white, tan, brown, and maroon, crossbedded, locally conglomeratic near base; locally quartzitic. Thin partings of green micaceous shale are in upper part. Thickness 200 to 300 feet (60 to 90 m)

pC **Precambrian granite gneiss of uncertain age and correlation.**

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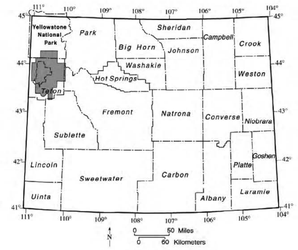
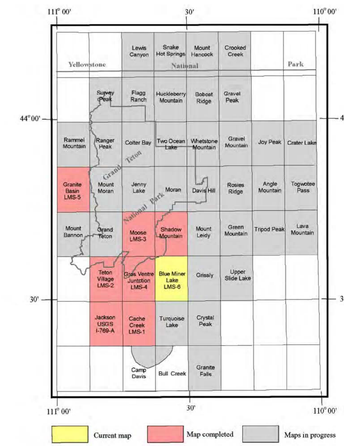


GENERAL LOCATION MAP



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