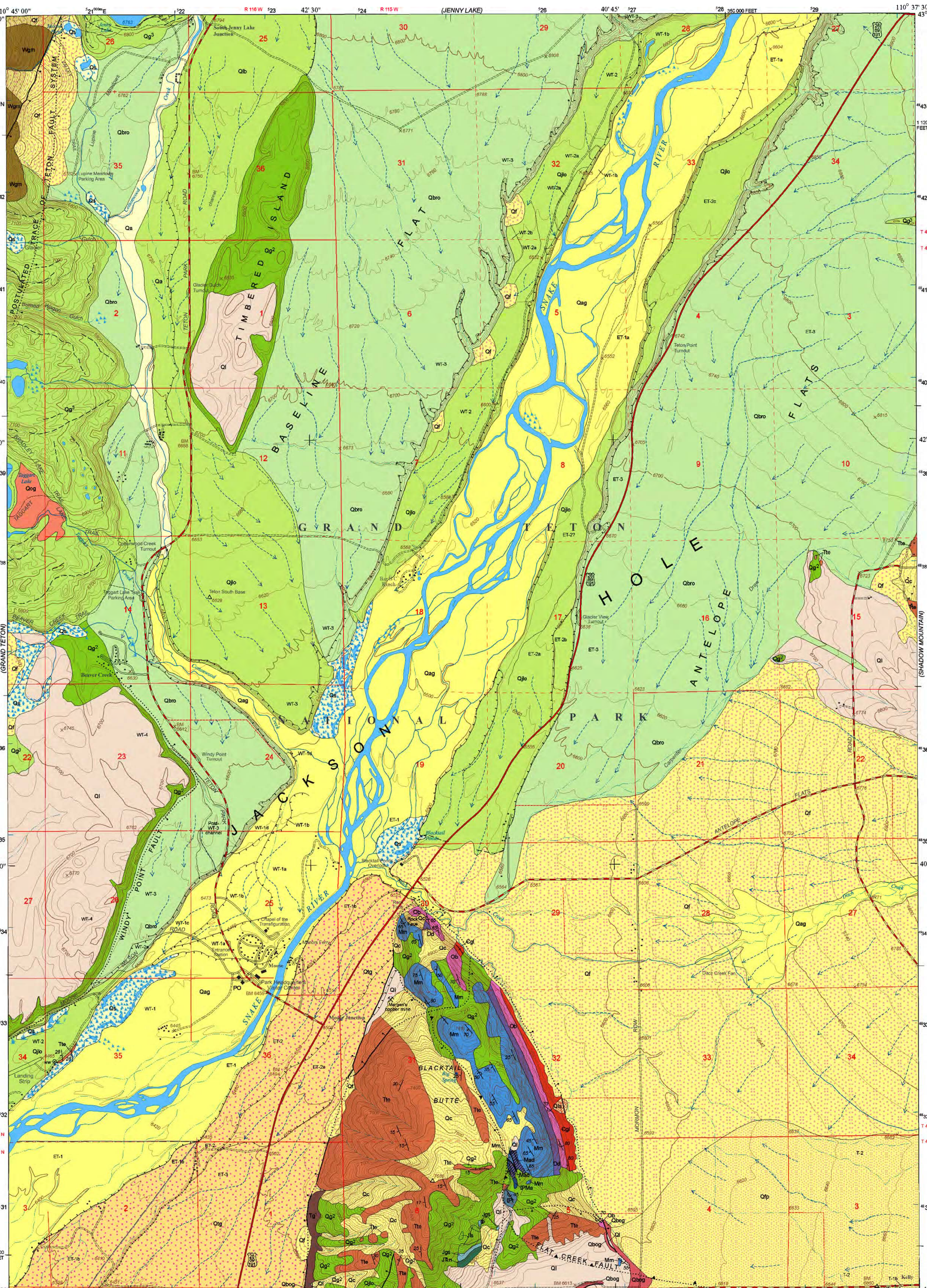
WYOMING STATE GEOLOGICAL SURVEY
Lance Cook, State Geologist
Laramie, Wyoming

Geology -- Interpreting the past to provide for the future

Prepared in cooperation with the
U.S. GEOLOGICAL SURVEY

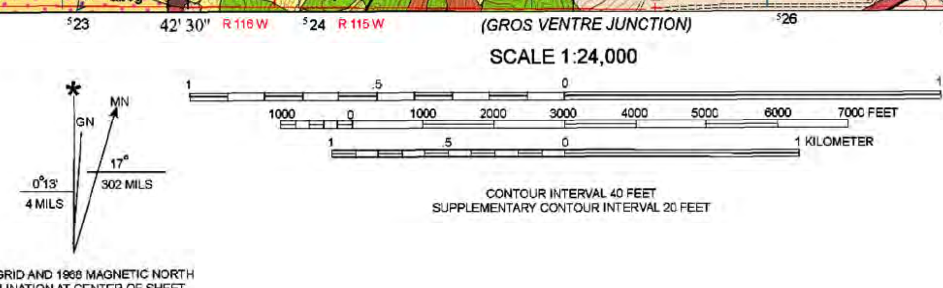
J. DAVID LOVE HISTORICAL GEOLOGIC MAP SERIES
GEOLOGY OF THE TETON - JACKSON HOLE REGION
Map LMS-3
Moose Quadrangle, Teton County, Wyoming



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



QUADRANGLE LOCATION

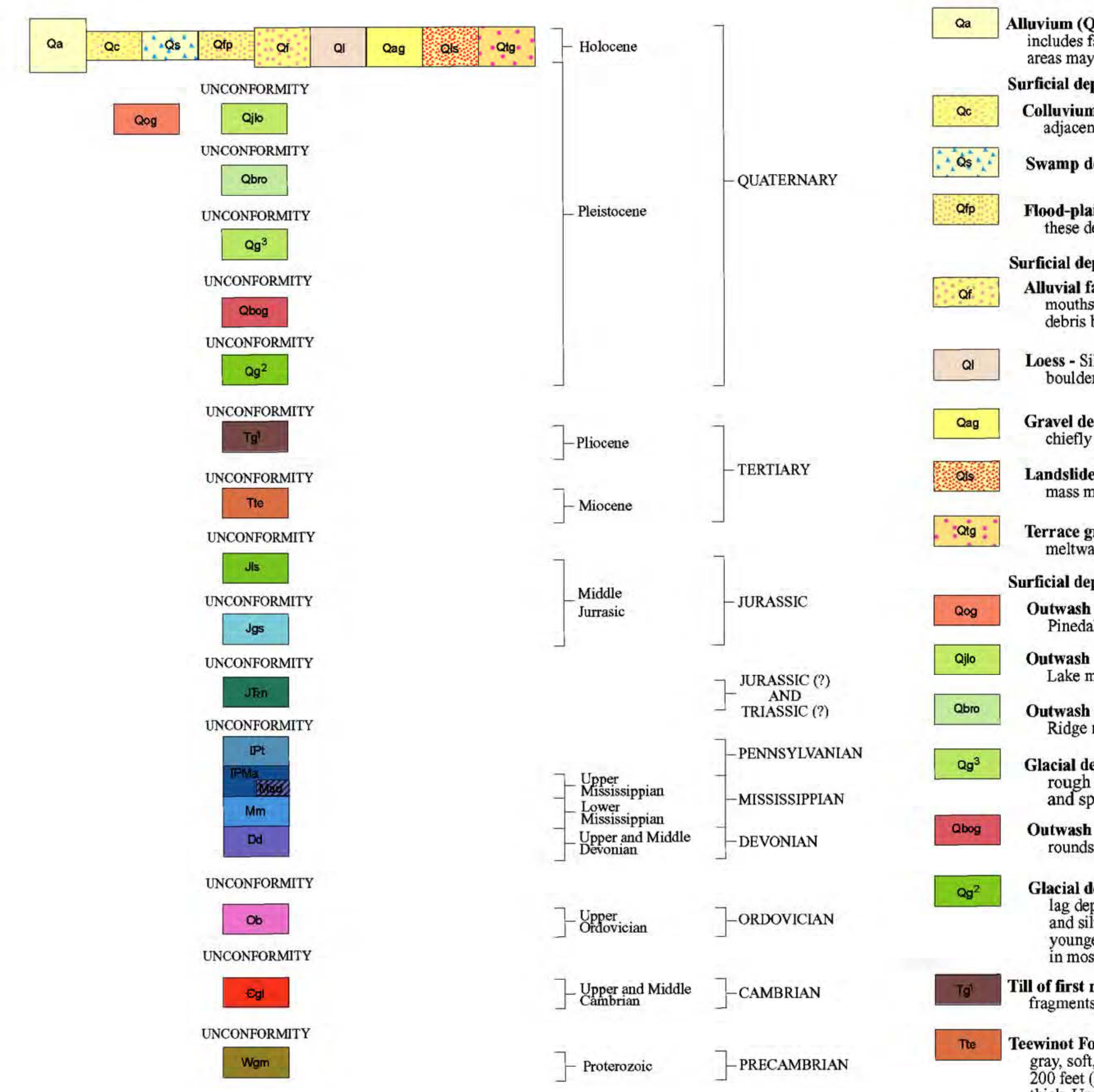
Geology by J. David Love, 1950-73; northwest margin by J.C. Reed, Jr., 1970; revised 1980

Digital cartography by Abby L. Kirkaldie and Fred H. Porter, 2000-2001

GEOLOGIC MAP OF THE MOOSE 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
- **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.
- **Thrust fault with younger normal fault along the same trace** - Dotted where concealed or inferred. Sawteeth on upper plate of thrust fault. Bar and ball on downthrown side of normal fault.

Strike and dip of beds

- 20 **Inclined**
- **Vertical**
- 70 **Overturned**
- **Horizontal**
- 35 **Generalized direction of dip without strike**
- **Glacial form lines**
- WW 398' **Water well** - Number indicates depth in feet
- **Mine or prospect**
- **Selected spring**
- **Selected stream channelway** - Most have been abandoned because of subsequent drainage changes
- T-2 T-1 **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 a mappable unit depict terrace margins; hachures on downslope side; WT-1 or ET-1 are the youngest, WT-3 or ET-3 are the oldest. Scale of the map precludes showing terrace details. Note: terrace numbers and letters are used where they can be recognized with assurance. Major terraces are described with elevations; minor terraces are listed with respect to their position above or below major terraces

Terraces related to opposite sides of Snake River:

East side:

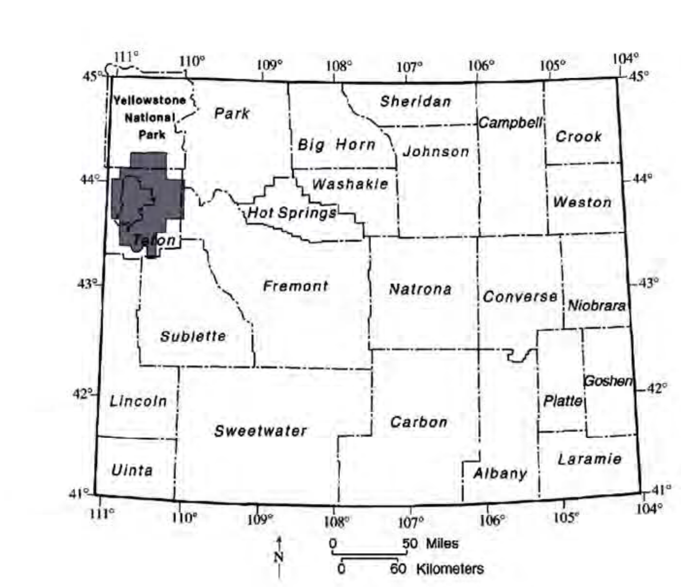
ET-1	At and within 10 feet (3 m) of present river level
ET-1a	
ET-1b	10 feet (3 m) above terrace ET-1
ET-2	
ET-2a	
ET-2b	
ET-2c	
ET-3	40 feet (12.2 m) above terrace ET-1b

West side:

WT-1	At and within 10 feet (3 m) of present river level
WT-1a	10 to 15 feet (3 to 4.6 m) above terrace WT-1
WT-1b	
WT-1c	
WT-1d	
WT-2	10 to 15 feet (3 to 4.6 m) above terrace WT-1a
WT-2a	
WT-2b	
WT-3	

Terraces along 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



GENERAL LOCATION MAP

DESCRIPTION OF MAP UNITS

Qa **Alluvium (Quaternary)** - Gravel, sand, silt, and clay along modern streams. In places includes fan glacial outwash, and stream-laid ice-contact deposits; in some forest-covered areas may include other types of surficial deposits

Surficial deposits (Holocene)

Qc **Colluvium** - slope wash of silt- to boulder-sized fragments derived from underlying and adjacent formations

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

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

Surficial deposits (Holocene and Pleistocene)

Qf **Alluvial fan deposits** - Crudely stratified gravel, sand, silt, and clay spread outward from mouths of ravines and canyons; shows linear sorting along distributaries; finer grained debris becomes progressively more abundant toward downstream margins of fans

Ql **Loess** - Silt, light gray, structureless, homogeneous, wind-deposited chaotically mixed boulders and fine-grained rock debris emplaced by mass movement

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

Qls **Landslide debris** - Chaotically mixed boulders and fine-grained rock debris emplaced by mass movement

Qtg **Terrace gravel** - Predominantly gravel of rounded quartzite fragments deposited by meltwater from adjacent glaciers

Surficial deposits (Pleistocene)

Qog **Outwash gravel deposits** - In front of Taggart Lake terminal moraine (part of third or Pinedale glaciation); equivalent to outwash gravel from Jackson Lake moraine

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

Qbro **Outwash gravel deposits from Burned ridge moraine** - Downstream from Burned Ridge moraine (part of third or Pinedale glaciation)

Qg^3 **Glacial debris of third (Pinedale) major glaciation** - Morainal debris with sharp 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

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

Tg^1 **Till of first major glaciation (Pliocene)** - Unstratified gray deposits, cheifly of angular fragments of Paleozoic rocks and rounded quartzite clasts. Thickness about 100 feet (33 m)

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 (30.5 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 million years old); in upper part 7.5 MA

Jls **Sundance Formation "Lower Sundance" (Upper and Middle Jurassic)** - Gray calcareous plastic to splintery shale, clayey limestone, hard oolitic limestone, and one or more zones of red soft plastic shale: marine; highly fossiliferous. Thickness 400 to 450 feet (122 to 137 m)

Jgs **Gypsum Spring Formation (Middle Jurassic)** - Dark-red soft shale, underlain by, and interbedded with, slabby dolomite and white gypsum. In most outcrops the gypsum has been leached, leaving lithified carbonate breccia that forms rounded cliffs. Thickness 50 to 150 feet (17 to 83 m), depending on amount of leaching gypsum

JTRn **Nugget Sandstone (Jurassic and Triassic)** - Sandstone, light tan to pink, fine-grained, crossbedded; characterized by large frosted, rounded quartz grains. Thickness about 100 feet (30 m)

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

IPMa **Amsden Formation (Pennsylvanian and Mississippian)** - Shale and siltstone, brick-red, red-brown, and green interbedded with white dolomite and limestone. Several zones contain ocher-colored and carnelian-red chert nodules. Thickness, exclusive of Darwin Sandstone Member, is 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; cross-bedded, moderately soft and porous; red shale partings near top. Thickness is about 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 part, thin-bedded and dolomitic in part, especially near base. Abundant horn corals occur in more massive beds. Many layers contain black chert nodules. Thickness is about 1100 feet (335 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 siliceous brittle dolomite containing sparse thin limestone beds. Thickness 300 feet (91 m)

Ob **Bighorn Dolomite (Upper Ordovician)** - Dolomite, 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 chalky white very fine-grained brittle dolomite. Thickness of formation is about 200 feet (60 m)

Cgl **Gallatin Limestone (Upper Cambrian)** - Limestone, dark-gray, weathering tan, mottled, hard; forms cliffs; lower part contains flat pebble "edgewise" conglomerate of limestone fragments; upper middle part has 35 feet (10.6 m) of limy shale. Thickness is about 240 feet (73 m)

Wgm **Layered gneiss, granite, and migmatite (Precambrian W or Proterozoic)** - Complex inter-layered biotite gneiss, quartz plagioclase gneiss, and amphibolite

REFERENCES

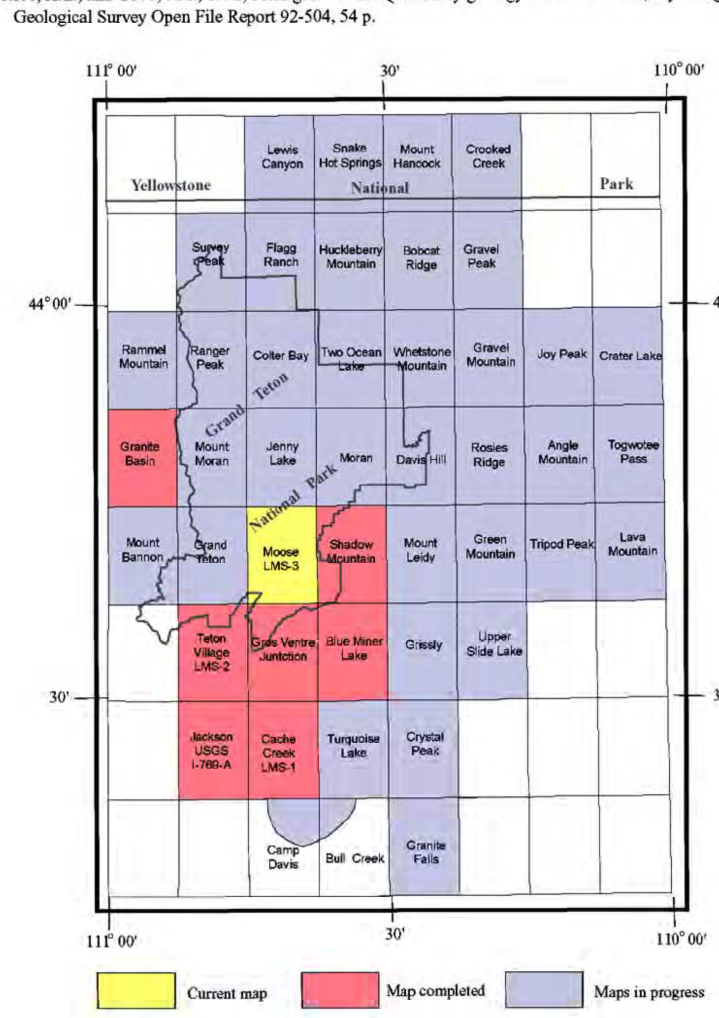
Good, J.M., and Pierce, K.L., 1996, Interpreting the landscapes of Grand Teton and Yellowstone National Parks - Recent and ongoing geology: Grand Teton Natural History Association, Moose, Wyoming, 58 p.

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

Love, J.D., and Reed, J.C., Jr., 2000, Geologic map of the Teton Village Quadrangle, Teton County, Wyoming: Wyoming State Geological Survey J.D. Love Historical Geologic Map Series LMS-2, scale 1:24,000.

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