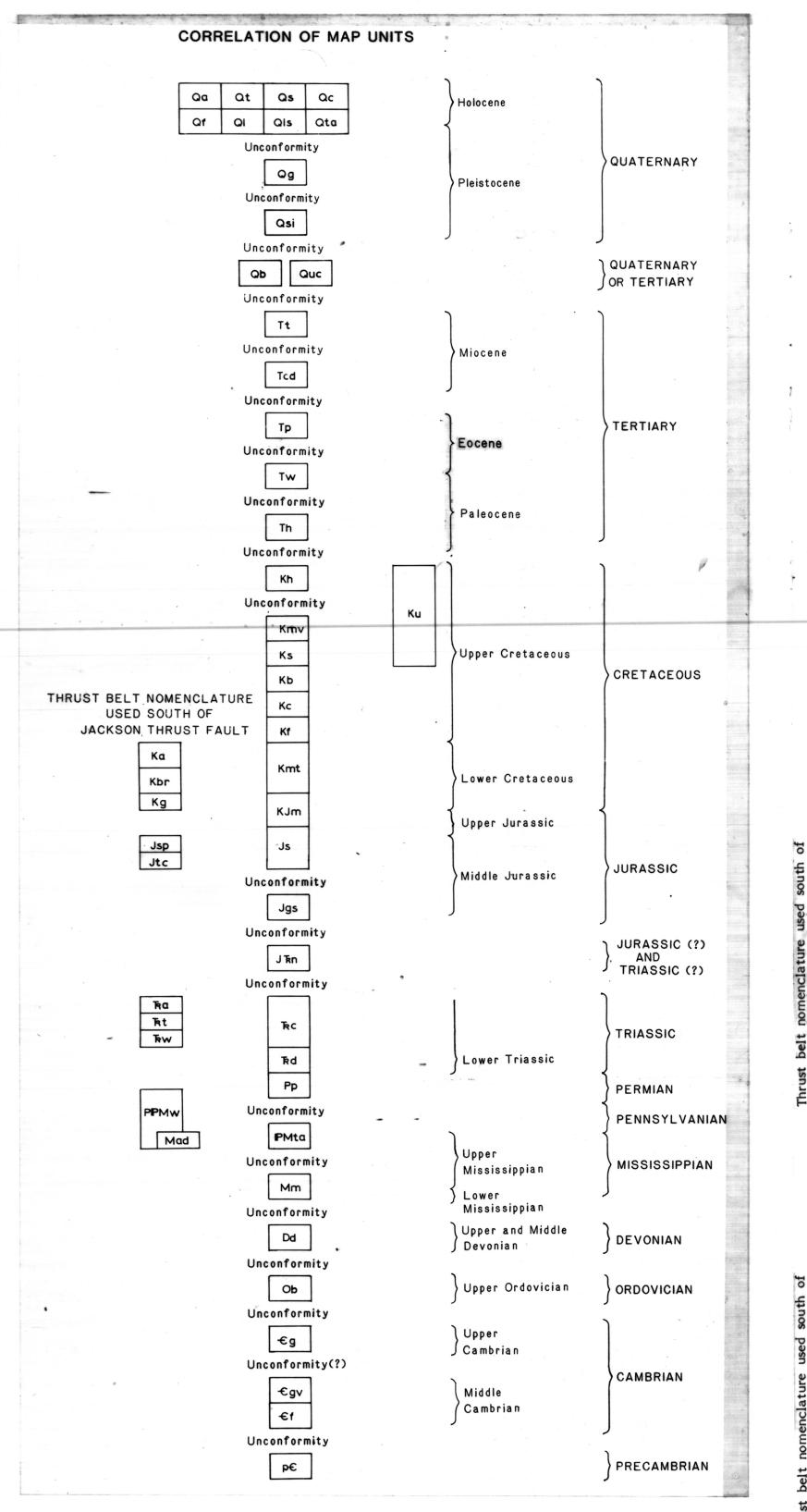


REGIONAL GEOLOGIC MAP FOR THE CACHE CREEK—BEAR THRUST ENVIRONMENTAL IMPACT STATEMENT TETON AND SUBLETTE COUNTIES, WYOMING



DESCRIPTION OF MAP UNITS

Qa ALLUVIUM (HOLOCENE) - Valley and stream deposits of gravel with lesser amounts of sand, silt, and clay Ot TERRACE AND FLOOD-PLAIN DEPOSITS (HOLOCENE) Terrace surface consists of thin discontinuous deposits of sand and silt underlain by gravel. Flood-plain deposits consist of sand, silt, clay, and minor lenses of gravel; lesser amounts of gravel at surface distinguishes these deposits from alluvium along topographically lower stream valleys

Os SWAMP DEPOSITS (HOLOCENE) - Clay, silt, and fine sand; abundant vegetal debris Qc COLLUVIUM (HOLOCENE) - Slope wash of silt- to bouldersized fragments derived from underlying and adjacent

Of ALLUVIAL FAN DEPOSITS (HOLOCENE AND PLEISTOCENE) Crudely stratified deposits of gravel, sand, silt, and clay that spread outward from mouths of ravines and canyons QI LOESS (HOLOCENE AND PLEISTOCENE) - Light-gray structureless homogeneous wind-deposited silt OIS LANDSLIDE DEBRIS AND SLUMP BLOCKS (HOLOCENE AND

PLEISTOCENE) - Landslide debris: chaotically mixed boulders and finer rock debris emplaced by mass movement. Slump blocks: massive blocks emplaced by mass movement. Unit includes intermixed landslide and glacial Qta TALUS DEPOSITS (HOLOCENE AND PLEISTOCENE) - Locally

derived coarse angular rock fragments that accumulated on steep slopes and at base of cliffs Qg GLACIAL DEBRIS (PLEISTOCENE) - Morainal debris with variety of modified surface topography depending upon age of glaciation. Debris of older glacial events tend to

have subdued surface topography and tightly cemented

lithologies, while younger debris have unmodified surface topography and sparse soil development Qsi SHOOTING IRON SEQUENCE (PLEISTOCENE) - Strata consisting of alternating locally derived nonvolcanic conglomerate, very soft volcanic sandstone, and pink, gray, green, and yellow bentonitic claystone. Isolated exposures at the heads of Flat and Granite Creeks.

Thickness varies; thickness 22 m Qb VOLCANIC ROCKS (QUATERNARY OR TERTIARY) - Occurrences of red basaltic scoria, gray basalt, black basaltic(?) scoria, hornblende-rich dacite, perlite, obsidian, and rhyolite. Exposures confined to East and West Gros Ventre Buttes and Squaw Creek areas Que UNNAMED CONGLOMERATE (QUATERNARY OR TERTIARY)

Partly lithified gray limestone conglomerate that accumulated in Cache Creek valley to a depth of 122 m Tt TEEWINOT FORMATION (MIOCENE) - Upper sedimentary limestone breccia; white to pink bentonitic sandstone, tuff, and claystone; basal limestone conglomerate. 75 m

Tcd CAMP DAVIS FORMATION (MIOCENE) - Upper unit: red conglomerate that contains Paleozoic clasts in upper part and Triassic clasts in lower part. Middle unit: poorly consolidated red conglomerate interbedded with soft red claystone, siltstone, and sandstone, overlying white limestone, pumicite, diatomite, and soft gray claystone. Lower unit: gray cliff-forming conglomerate composed of Paleozoic rock fragments. Total thickness 1,585+ m Tp PASS PEAK FORMATION (EOCENE) - Conglomerate of well-

rounded pebbles, cobbles, and boulders of quartzite in a rust-colored coarse-grained sandstone matrix. About 915 m thick Tw WASATCH FORMATION AND EQUIVALENT ROCKS (EOCENE OR PALEOCENE) - Includes Chappo Member and Lookout

Mountain Conglomerate Member. Chappo Member (Eocene and Paleocene): tan, gray, red, pink, and brown shale: gray and yellow-tan sandstone; gray, tan, and red conglomerate; gray fine-grained limestone. Lookout Mountain Conglomerate Member of Dorr, Spearing, and Steidtmann, 1977 (Eocene): red and gray conglomerate with interbeds of sandstone. 1,260 m thick

Th HOBACK FORMATION (PALEOCENE) - Includes Skyline Trail Conglomerate Member of Dorr, Spearing, and Steidtmann (1977). Skyline Trail Conglomerate Member: red conglomerate interbedded with red, gray, and green claystone and siltstone. Middle unit: gray sandstone, siltstone, and claystone becoming more conglomeratic upward. Lower unit: red conglomerate with poor exposures. Thickness 300 m for incomplete section to

Ku SEDIMENTARY ROCKS UNDIVIDED (UPPER CRETACEOUS) -Unit includes Harebell Formation, Mesaverde Formation, and Sohare sequence. Unit used to accommodate geology of Dorr, Spearing, and Steidtmann (1977) and Schroeder (1976). Thickness varies

Kh HAREBELL FORMATION (UPPER CRETACEOUS) - Coarsegrained sandstone and pea-gravel conglomerate with some gray and tan fine-grained massive crossbedded sandstone, gray to black thin claystone and shale between the conglomerate. Decrease in conglomerate content toward

the Hoback Basin. At least 274 m thick Kmv MESAVERDE FORMATION (UPPER CRETACEOUS) - Lightgray to white fine- to medium-grained well-sorted porous sandstone with occurrences of brightly colored grains. Some gray, dull-green, pink shale, claystone, and siltstone. Thin coal beds are present. Thickness varies from

at least 152 to 305 m Ks SOHARE SEQUENCE (UPPER CRETACEOUS) - Formerly unnamed lenticular sandstone and shale sequence and coaly sequence. Gray and tan lenticular fine-grained sandstone, gray shale, shaly sandstone, carbonaceous shale, maristone, and some beds of minable coal in middle of unit. At least 1,525 m thick

Kb BACON RIDGE SANDSTONE (UPPER CRETACEOUS) - Lightgray to tan fine- to medium-grained massive to thickbedded fossiliferous sandstone with abundant black grains; contains coal beds of minable thickness. Bentonite and plastic gray shale, in part, are sites of large landslides. About 230 m thick Kc CODY SHALE (UPPER CRETACEOUS) - Gray to dark-gray shale with a few thin hard fine-grained glauconitic sand-

stones; sparse marine fossils. Thickness altered in Cache Creek valley owing to tectonic compression. From 300 m to as much as 600 m thick Kf FRONTIER FORMATION (UPPER CRETACEOUS) - Gray to tan fine-to medium-grained sandstone, gray to black shale, thin partings of coal, thin bentonites and porcellanites.

About 300 m thick in normal section Kmt MOWRY AND THERMOPOLIS SHALES UNDIVIDED (LOWER CRETACEOUS) - Mowry Shale: dark-gray to black siliceous shale, dense hard silicified speckled sandstone, and thin bentonites; abundant fish scales in shale. Thermopolis Shale: black very fine grained highly fissile soft shale with thin beds of bentonite and rusty finegrained sandstone; Muddy Sandstone Member occurs at top of formation and is gray medium-grained soft crossbedded sandstone. Total thickness 255 to 303 m Ka ASPEN SHALE (LOWER CRETACEOUS) - Gray to greenishgray siliceous shale and brittle siltstone, hard fine-grained siliceous sandstone, and thin beds of porcellanite and

bentonite. About 1.189 m thick | | Kbr BEAR RIVER FORMATION (LOWER CRETACEOUS) - Black to dark-gray hard splintery siliceous shale in upper and lower parts. Middle part: gray massive tan-weathering crossbedded sandstone that forms prominent ridges and cliffs; some interbeds of carbonaceous shale. About 165 m thick Kg GANNETT GROUP UNDIFFERENTIATED (LOWER CRETA-CEOUS) - Predominantly hematitic red shale and siltstone: contains some quartzitic sandstone; base is a massive coarse-grained sandstone and upper part contains light-gray and reddish-purple to brownish-red fine-grained silty sandstone. 152 m thick

Kim CLOVERLY AND MORRISON(?) FORMATIONS UNDIVIDED (LOWER CRETACEOUS AND UPPER JURASSIC) -Uppermost unit (commonly known as the "rusty beds member" of Cloverly): olive-green, gray, and buff thinbedded sandstone that weathers to a conspicuous rusty color. Middle unit: variegated red, gray, lilac, and pink claystone with thin beds of cream-colored hard dense nodular limestone. Lower unit: buff and gray chloritic sandstone interbedded with red, green, and gray siltstone and claystone. Total thickness 132 to 201 m Js SUNDANCE FORMATION (UPPER AND MIDDLE JURASSIC) Upper unit: gray, buff, and green glauconitic very limy

sandstone and a few thin beds of shale and limestone. Lower unit: gray limy plastic to splintery shale, clayey limestone, hard oolitic limestone, and one or more zones of red soft plastic shale. About 168 m thick JSP STUMP FORMATION AND PREUSS SANDSTONE UNDIVIDED (UPPER AND MIDDLE JURASSIC) - Stump Formation (Upper and Middle Jurassic): greenish- to brownish-gray crossbedded fine- to medium-grained calcareous glauconitic sandstone. Preuss Sandstone (Middle Jurassic): red shaly sandstone and siltstone. 58 to 121 m thick TWIN CREEK LIMESTONE (MIDDLE JURASSIC) - Light-gray fine-grained limestone and shaly limestone that weathers into splinters. Lowermost part: brownish-red to yellow soft siltstone and silty claystone with interbeds of brecciated limestone and chert-bearing limestone. 228 to 244

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. 15 to 46 m thick, depending on degree of leaching

JEN NUGGET SANDSTONE (JURASSIC? AND TRIASSIC?) - Lighttan to salmon-pink fine-grained crossbedded hard brittle cliff-forming sandstone characterized by large frosted quartz grains in a finer matrix. About 115 m thick TAC CHUGWATER FORMATION (TRIASSIC) - Includes Popo Agie, Crow Mountain Sandstone, Alcova Limestone, and Red Peak Members. Popo Agie Member: ocher and purple claystone, red shale, purple lenticular limestone pellet conglomerates, and red siltstone. Crow Mountain Sandstone Member: red to salmon-pink soft porous sandstone containing large rounded frosted quartz grains in a finer matrix. Alcova Limestone Member: gray and purple hard thin-bedded limestone and dolomite with interbeds of white gypsum. Red Peak Member: red gypsiferous siltsone and very fine grained sandstone with some red shale partings; thickest unit in formation. Total thick-

ness 339 to 529 m Ra ANKAREH FORMATION (TRIASSIC) - Grayish to dusty-red siltstone and very fine grained sandstone; 3 m of lightgray thin-bedded limestone near base. 106 to 160 m thick THE THAYNES FORMATION (TRIASSIC) - Light- to olive-gray interbedded limestones and siltstones; 23 m of pale-red

very fine grained calcereous sandstone near middle of unit. 236 to 335 m thick F Rw WOODSIDE FORMATION (LOWER TRIASSIC) - Pale reddishbrown very fine grained well-cemented thin-bedded calcareous sandstone; light olive-green calcareous siltstone and thin-bedded limestone in upper third of unit; thin beds of siltstone near base. 91 to 213 m thick Rd DINWOODY FORMATION (LOWER TRIASSIC) - Brownish-gray to olive-drab hard slabby thin-bedded dolomitic siltstone;

contains thin partings of fine-grained dolomitic sandstone and silty limestone. 61 to 140 m thick Pp PHOSPHORIA FORMATION AND RELATED ROCKS (PERMIAN) - Dolomite, chert, phosphorite, and black shale. Dolomite and chert are dark gray to brown, sandy, mainly in upper part; phosphorite and black shale at top and at middle of lower part. 55 to 72 m thick IPMta TENSLEEP SANDSTONE AND AMSDEN FORMATION UNDIVIDED (PENNSYLVANIAN AND UPPER MISSISSIPPIAN) - Total thickness 282 to 304 m. Tensleep

Sandstone: light-gray weathering yellowish-brown finegrained hard brittle sandstone; quartzitic in part; middle and lower parts contain many beds of gray fine-grained limestone and dolomite. Amsden Formation: green brickred to brownish-red shale and siltstone interbedded with white dolomite and limestone; several zones contain ocher and carnelian-red chert nodules Darwin Sandstone Member of Amsden Formation (Upper Mississippian) - Gray- to brownish-pink fine- to mediumgrained sandstone with some large rounded frosted quartz grains; crossbedded; moderately soft and porous; red shale parting at top. 23 to 30 m thick. Unit mapped

separately south of Jackson thrust fault but included with

Amsden Formation north of Jackson thrust fault PIPMW WELLS FORMATION AND ASSOCIATED ROCKS (PERMIAN, PENNSYLVANIAN, AND UPPER MISSISSIPPIAN) - Upper unit: light-gray fine-grained hard sandstone; contains gray limestone beds which are more abundant in lower part. Lower unit: bluish-gray hard limestone interbedded with red and green shale and white to tan fine-grained sandstone; carnelian-red and mustard-yellow chert nodules and thin lenses conspicuous. Total thickness 277 to 292 m. Thrust belt nomeclature used south of Jackson thrust fault

Mm MADISON LIMESTONE AND EQUIVALENT ROCKS (UPPER AND LOWER MISSISSIPPIAN) - Includes Bull Ridge Member of Madison Limestone. Bull Ridge Member: red shale and siltstone interbedded with orange-red to tan

sandstone, tan to pink dolomite breccia, and blue-gray ledge-forming limestone containing very distinctive red and "zebra-stripped" gray and black chert nodules. Main part: light- to dark-gray limestone that is thick bedded to massive in upper part and becomes thin bedded and dolomitic in lower part; abundant layers and lenses of black chert; brown vuggy dolomite near base. 350 to 490 m thick. Unit equivalent to Mission Canyon Limestone, Lodgepole Limestone, and Madison Group in mapped area

south of Jackson thrust fault Dd DARBY FORMATION (UPPER AND MIDDLE DEVONIAN) Upper part: dull-yellow thin-bedded dolomitic siltstone and shale. Lower part: brown fetid vuggy siliceous brittle dolomite containing sparse thin limestone beds. 91

to 150 m thick Ob BIGHORN DOLOMITE (UPPER ORDOVICIAN) - Siliceous cliffforming dolomite with light- and dark-gray mottling. Thickness ranges from 61 m north of Jackson thrust fault to 150 m south of Jackson thrust fault €g GALLATIN LIMESTONE (UPPER CAMBRIAN) - Mottled bluish-

gray irregular-bedded hard limestone with irregular vellow patches; forms ragged cliffs. 55 to 73 m thick €gv GROS VENTRE FORMATION (MIDDLE CAMBRIAN) - Includes Park Shale, Death Canyon, and Wolsey Shale Members. Park Shale Member: green to gray highly fissile micaceous shale containing algal heads at base. Death Canyon Member: blue-gray to dark-gray fine-grained thin-bedded hard limestone, mottled with brown and tan irregular limestone blotches. Wolsey Shale Member: green to gray-green highly fissile micaceous shale. Total

thickness 165 to 290 m €f FLATHEAD SANDSTONE (MIDDLE CAMBRIAN) - White, tan, brown, and maroon crossbedded sandstone which is locally quartzitic; locally conglomeratic near base. 60 to 90 m D€ PRECAMBRIAN ROCKS UNDIVIDED (PRECAMBRIAN) - Gray medium-grained equigranular to porphyritic biotite-

——— CONTACT - Approximately located; dashed where inferred

FAULT - Dashed where approximately located; dotted where concealed; ball and bar on downthrown side. Arrows show relative movement

THRUST FAULT - Dashed where approximately located; dotted where concealed. Sawteeth on upper plate. Includes gravity faults in Camp Davis quadrangle (Schroeder, 1974) THRUST FAULT with younger normal fault along same trace

muscovite granite; biotite-hornblende gneiss; biotite

FOLDS - Showing troughlines, crestlines, and direction of plunge. Dashed where approximately located; dotted where concealed

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Teton and Lincoln Counties, Wyoming: U.S. Geological_Survey Geologic Quadrangle Map GQ-705, scale 1:24,000.

Dorr, J. A., Jr., Spearing, D. A., and Steidtmann, J. R., 1977, Deformation and deposition between a foreland-uplift and an impinging thrust belt: Hoback Basin, Wyoming: Geological Society of America Special Paper 177, 82 p.

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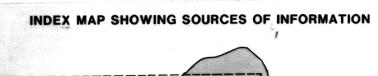
Teton County, Wyoming: U.S. Geological Survey Geologic Quadrangle Map GQ-1160, scale 1:24,000. 1976, Geologic map of the Bull Creek quadrangle, Teton and Sublette Counties, Wyoming: U.S. Geological Survey Geologic Quadrangle Map GQ-1300, scale 1:24,000.

Schroeder, M. L. 1974, Geologic map of the Gamp Davis quadrangle,

Simons, F. S., Love, J. D., Keefer, W. R., Harwood, D. S., Bieniewski, C. L., and Wilson, D. M., U.S. Geological Survey unpublished

CONVERSION TABLE

To convert	Multiply by	To obtain ENGLISH UNITS
METRIC UNITS	Multiply by	ENGLISH UNITS
Meters	3.281	Feet
Kilometers	.6214	Miles



1 Love and Albee (1972)

2 Love and Love (1978)

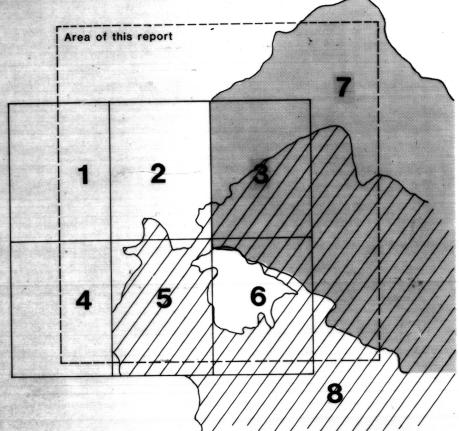
3 Love and Love (1978)

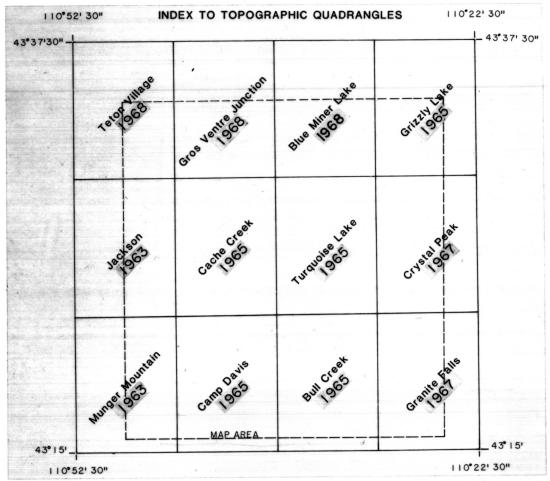
4 Albee (1968)

5 Schroeder (1974)

6 Schroeder (1976)

7 Simons and others





THIS MAP HAS NOT BEEN EDITED FOR CONFORMANCE WITH USGS EDITORIAL STANDARDS