DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES
MAP MF-1619-A
SHEET 1 OF 2
PAMPHLET ACCOMPANIES MAP

Approximate boundary of roadless areas

Approximate boundary of roadless areas

CORRELATION OF MAP UNITS

af Qra Qal Qc Qt Qls Qrs	Holocene	QUATERNARY
Qrg Qpr Ql Qp Qcg Qpb Qg Qb	Pleistocene	QUATERNARY
QTs		QUATERNARY OR TERTIARY
Ts Tvc	Pliocene and Miocene	TERTIARY
Ti	Eocene(?)	TERTIARY
Kf	Upper Cretaceous	CRETACEOUS
Ka Kb Kgu	Lower Cretaceous	CRETACEOUS
Ke		CRETACEOUS
Jsp	Upper Jurassic	JURASSIC
Jt	Middle Jurassic	JURASSIC
JTrn		JURASSIC(?) AND TRIASSIC(?)
Tra	Upper Triassic	TRIASSIC
Trt		TRIASSIC
Trw Trd	Lower Triassic	TRIASSIC
Pp		PERMIAN
PPw Pt		PENNSYLVANIAN
PMa	Upper Mississippian	MISSISSIPPIAN
Mm Ml	Lower Mississippian	MISSISSIPPIAN
Dd	Upper and Middle Devonian	DEVONIAN
Ob	Upper Ordovician	ORDOVICIAN
€g	Upper Cambrian	CAMBRIAN
€gu €gv €gd		CAMBRIAN
€gl	Middle Cambrian	CAMBRIAN
€f		CAMBRIAN
Ag		ARCHEAN

DESCRIPTION OF MAP UNITS

af ARTIFICIAL FILL--Compacted, size-graded, crushed rock; mapped in only a few places along major highways

Qra ROCK AVALANCHE DEPOSIT (HOLOCENE)--Angular to subangular rock fragments, heterogeneous in size, derived from rockslides and rockfalls along Blowout Canyon. Thickness from 20 to 300 ft

Qal ALLUVIUM (QUATERNARY)--Gravel, sand, and clay; poorly to moderately well sorted; unconsolidated; on floodplains and in large fans. As mapped, includes probable outwash terraces of youngest glaciation

Qc COLLUVIUM (QUATERNARY)--Very coarse to fine, angular to subangular rock debris, sand, mud, and soil; unconsolidated and generally unstratified. Includes slopewash as much as 6 ft thick and small alluvial fans of tributary valleys as much as 40 ft thick

Qt TALUS (QUATERNARY)--Accumulations of coarse, angular rock fragments beneath steep, rocky slopes

Qls LANDSLIDES (QUATERNARY)--Masses of gravitationally displaced rock units and soil, partly broken and disaggregated

Qrs ROCKSLIDES (QUATERNARY)--Slides composed of fragmented rock with little or no soil

Qrg ROCK GLACIERS (QUATERNARY)--Rock-fragment flows in and below cirques. Inferred to have moved with interstitial ice derived from melting snow following deglaciation or with residual glacial ice insulated by talus cover

Qpr PROTALUS RAMPARTS (QUATERNARY)--Arcuate ridges of angular rock fragments below talus slopes

Ql LOESS (QUATERNARY)--Fine sand and silt; light brown; unconsolidated

Qtg TERRACE GRAVELS AND OLD ALLUVIUM (QUATERNARY)--Gravel, sand, and silt; poorly to moderately well sorted; unconsolidated; partly dissected. In several terraces of different altitudes and ages (shown by contacts within Qtg where prominent) along major streams. Probably includes glacial-outwash terraces. Terraces higher than 120 ft above Snake River covered by silt 6-40 ft thick; those lower than 100 ft above river, by less than 2 ft of silt. Thickness from 25 to 60 ft

Qp YOUNGER GLACIAL DEPOSITS (PLEISTOCENE)--Moraines of probable Pinedale age in and below cirques. Distinguished from older glacial deposits by fresh appearance, lack of loess cover, and thin, weakly developed soil, locally derived detritus, and proximity to source rocks. Thickness from 3 to 10 ft

Qpb OLDER GLACIAL DEPOSITS (PLEISTOCENE)--Formless glacial deposits probably of pre-Bull Lake age. Distinguished from younger glacial deposits by loess cover, well-developed soil about 4 ft thick of slightly hard, light-gray silty loam above 1 ft of light-yellow-brown, silty clay loam in B-2 horizon, and presence of erratics and clasts of Precambrian gneissic granite and quartzite and Tertiary obsidian derived from Jackson area. Extent minimized to show underlying bedrock; more extensive than shown on hills west and south of Jackson Hole and on divides from 6,400 to 7,400 ft high

Qb BASALT (PLEISTOCENE)--Intracanyon basalt along Pine Creek and along Snake River in Swan Valley. Black to dark-brownish-gray, partly vesicular; finely crystalline matrix contains plagioclase and clinopyroxene laths and olivine crystals; includes some basaltic tuff. Thickness of about 100 ft exposed along Pine Creek

Qg GRAVEL (PLEISTOCENE)--Unconsolidated weathered gravel of unknown origin deposited on high terraces and slopes on southwest side of Jackson Hole. May include glacial deposits of pre-Bull Lake age, winnowed lag concentrates of Tertiary conglomerate, old very high terrace deposits, or combinations thereof

QTb BASALT (PLEISTOCENE OR TERTIARY)--Medium-gray basalt of unknown age along west side of Swan Valley

Tvc VOLCANICLASTICS AND CONGLOMERATE (PLIOCENE AND MIOCENE)--Heterogeneous unit consisting dominantly of ashflow tuff, ash, and (or) conglomerate containing clasts ranging from boulders to granules derived from nearby bedrock units; locally includes airfall tuff, vitrophyre, flows ranging from basalt to rhyolite, diamictite, sedimentary breccia, sandstone, siltstone, and marlstone. Includes undifferentiated rocks assigned previously to the Salt Lake, Teewinot, Long Spring, and Camp Davis Formations, the Kirkham Hollow Volcanics, and various unnamed lithologic units. Ages of dated volcanic rocks within the unit range from 8.48 ± .08 (obsidian) to 2.02 ± .02 (Huckleberry Ridge Tuff) m.y. (million years)

Ts SLIDE MASSES (PLIOCENE AND (OR) MIOCENE)--Moderately coherent, tabular but disjunct masses of partly to intensely brecciated Cambrian to Mississippian rocks underlain and overlain by conglomerate of Tvc. Inferred to have slid from crest and southwest flank of Snake River Range. Thicknesses 40-150 ft

Ta ANDESITE (MIOCENE)--Medium-dark-gray to medium-bluish-gray, partly vesicular, very finely crystalline, mainly porphyritic (locally 5 percent phenocrysts of pyroxene and plagioclase) flow(s) as much as 750 ft thick. Age about 6.3 m.y.

Ti DIORITE STOCK AND ASSOCIATED PORPHYRITIC DIKES AND SILLS (EOCENE ?)--Light- to dark-gray, fine- to medium-crystalline, equigranular, and hydrothermally altered diorite in small stocks associated with dikes and sills of porphyritic hornblende andesite. Although undated, presumed correlative with similar rocks at Caribou Mountain (middle Eocene)

Kf FRONTIER FORMATION (UPPER CRETACEOUS)--Chiefly interbedded sandstone, siltstone, and shale; subordinate beds and lenses of conglomerate, carbonaceous shale, and coal. Sandstone is light gray to tan, brown, and olive green, friable, calcareous, and consists of quartz, white to black chert, and some feldspar; shale is medium to dark gray and green. Unit is incompletely preserved here but is more than 2000 ft thick in nearby areas

Ka ASPEN SHALE (LOWER CRETACEOUS)--Interbedded gray siltstone, claystone, and quartzitic, cherty, and calcareous sandstone; also light-gray, white, and pink porcelanite (silicified volcanic ash); includes some beds of black fissile shale, limestone, and bentonite. Unit contains more siliceous sandstone and porcelanite and is more resistant than adjoining formations. About 2000 ft thick

Kb BEAR RIVER FORMATION (LOWER CRETACEOUS)--Black fissile shale, light- to dark-gray and green mudstone and siltstone, olive-brown quartzitic and partly argillaceous or calcareous fine-grained sandstone. About 1000 ft thick

Kgu GANNETT GROUP (LOWER CRETACEOUS)
Upper part--includes Smoot Formation of Eyer (1969), Draney Limestone, Bechler Formation, and Peterson Limestone. Resistant, white-weathering, light-gray to pale-bluish-gray sublithographic limestone inter-bedded with variegated (mainly red) mudstone, siltstone, and sandstone. Ranges from 250 to 350 ft thick

Ke Ephraim Conglomerate--Brick-red to orange-red sandy siltstone and mudstone; light-gray, red, and brown, crossbedded, coarse-grained, calcareous to quartzitic sandstone; red to brown, resistant, quartzitic, chert-pebble conglomerate; and light-gray to tan nodular limestone. Thickness from 300 to 400 ft

Jsp STUMP FORMATION AND PREUSS RED BEDS (UPPER AND MIDDLE JURASSIC)--The Stump consists of greenish- to brownish-gray, fine- to medium-grained, crossbedded, calcareous, glauconitic sandstone and silty to sandy limestone; the Preuss, of purplish- to maroon-red siltstone, silty claystone, and fine-grained sandstone. From 220 to 300 ft thick

Jt TWIN CREEK LIMESTONE (MIDDLE JURASSIC)--Mainly medium- to dark-gray, thin-bedded, argillaceous limestone; weathers to light-gray, splintery, finger-sized (pencil-cleavage) fragments; includes fossiliferous beds and units of light- to medium-gray, medium-bedded, oolitic and bioclastic limestone and pale-green, yellow, and red siltstone and mudstone. Thickness decreases to northeast from 1,100 to 760 ft

JTrn NUGGET SANDSTONE (JURASSIC? AND TRIASSIC?)--Light-tan to reddish-brown, crossbedded, massive, well-sorted, fine- to medium-grained quartzite and quartzitic, slightly calcareous sandstone. About 400 ft thick

Tra ANKAREH RED BEDS (UPPER TRIASSIC)--Red, purple, and green, sandy and calcareous mudstone; red, tan, and white, fine-grained sandstone and siltstone; and some beds of red and light-gray argillaceous limestone. Thickness from 500 to 550 ft

Trt THAYNES LIMESTONE (LOWER TRIASSIC)--Yellow-to brown-weathering, light- to medium-gray, sandy and silty, partly fossiliferous limestone; greenish-gray calcareous siltstone; tan or gray, medium- to thick-bedded, bioclastic limestone; and greenish-gray siltstone and mudstone. Thickness decreases to northeast from 900 to 400 ft

Trw WOODSIDE REDBEDS (LOWER TRIASSIC)--Red mudstone, siltstone, and very fine grained sandstone. Thickness increases to northeast from 400 to 800 ft

Trd DINWOODY FORMATION (LOWER TRIASSIC)--Greenish-gray and brown, sandy mudstone, siltstone, and claystone containing layers of bluish-gray, silty and sandy, partly fossiliferous limestone. Thickness decreases to northeast from 600 to 440 ft

Pp PHOSPHORIA FORMATION AND RELATED ROCKS (PERMIAN)--As mapped, includes Shedhorn Sandstone, Retort Phosphatic Shale, Rex and Tosi Chert, and Meade Peak Phosphatic Shale Members of the Phosphoria Formation, and Franson Tongue of the Park City Formation. Upper part is mainly dark- to light-gray chert, shale, and sandstone; lower part is brown-weathering, dark-gray, phosphatic shale, siltstone, and limestone, and beds of phosphorite. Thickness from 200 to 220 ft

PPw WELLS FORMATION (PERMIAN AND PENNSYLVANIAN)--Upper part massive, sandy dolomite and limestone possibly equivalent to Grandeur Tongue of Park City Formation. Middle and lower parts, light- to yellow-gray, well-sorted, fine-grained, crossbedded, slightly calcareous, quartzitic sandstone and beds of white-weathering, medium-gray, cherty dolomite and dolomite. About 1,000 ft thick

Pt TENSLEEP SANDSTONE (PENNSYLVANIAN)--Light-gray, well-sorted, fine-grained, partly quartzitic sandstone; weathers yellowish brown. Exposed north of Jackson fault in Teton block. About 400 ft thick

PMa AMSDEN FORMATION (LOWER PENNSYLVANIAN AND UPPER MISSISSIPPIAN)--As mapped, includes the main body of the Amsden, the Upper Mississippian Darwin Sandstone Member of the Amsden Formation, and the Upper Mississippian Bull Ridge Member of the Madison or Mission Canyon Limestone; coincides with the lower unit of the Wells Formation as mapped in Idaho by W. F. Albee, D. A. Jobin, and M. L. Schroeder. Heterogeneous unit of light-gray sandstone; medium- to dark-gray, locally fossiliferous limestone; red shale, siltstone, and sandstone; carmel-red, mustard-yellow, and gray chert; and argillaceous limestone solution breccia. Ranges from 400 to 700 ft in thickness

Mm MISSION CANYON LIMESTONE (UPPER AND LOWER MISSISSIPPIAN)--Light- to dark-gray, thick-bedded to massive, cliff-forming, medium- to coarse-grained, fossiliferous, bioclastic, partly cherty limestone; top includes solution breccia. Thickness decreases to northeast from 1000 to 700 ft

Ml LODGEPOLE LIMESTONE (LOWER MISSISSIPPIAN)--Mainly dark-gray, thin-bedded, fine-grained, fossiliferous limestone and some coarse-grained bioclastic beds. Thickness decreases to northeast from 800 to 400 ft

Dd DARBY FORMATION (UPPER AND MIDDLE DEVONIAN)--Dark-gray, medium-bedded, medium-crystalline dolomite that weathers dark brown to brownish-gray, and dark-gray, fine-grained limestone that contains interbeds of yellowish-brown, yellow, and red, sandy, calcareous siltstone in upper part. Uppermost beds may be of Mississippian age. Thickness decreases to northeast from 600 to 400 ft

Ob BIGHORN DOLOMITE (UPPER ORDOVICIAN)--White to light-gray, massive, fine- to medium-crystalline, slightly calcareous, cliff-forming dolomite with some light-gray mottling. Thickness 500-600 ft

Eg GALLATIN LIMESTONE (UPPER CAMBRIAN)--Light- to dark-gray, fine-grained, partly glauconitic limestone; contains irregular patches and partings of yellow, silty dolomite; beds of intraformational conglomerate; and light-gray dolomite. About 200 ft thick

Egv GROS VENTRE FORMATION (UPPER AND MIDDLE CAMBRIAN)

Egu Upper (Park) shale member--Olive-green, glauconitic shale containing interbeds of flat-pebble, intraformational limestone conglomerate. About 200 ft thick

Egd Middle (Death Canyon) limestone member--Bluish- to light-gray, thin- to medium-bedded, fine-grained limestone; contains abundant patches and partings of yellow dolomitic siltstone; forms cliffs. Thickness decreases to northeast from 500 to 300 ft

Egl Lower (Wolsey) shale member--Olive-gray, fissile shale and fucoidal siltstone; interbeds of limestone. Thickness 150-200 ft

Ef FLATHEAD QUARTZITE (MIDDLE CAMBRIAN)--Light-gray to pink, partly iron-stained, fine- to medium-grained, massive quartzite. Contains conglomerate in lower part and green to red, partly glauconitic, silty shale, siltstone, and fine-grained sandstone in upper part. Exposed north of Jackson fault in Teton block. 200 to 240 ft thick

Ag GRANITIC GNEISS, GRANITE, AND SCHIST (ARCHEAN)--Includes amphibolite and pegmatite. Exposed only in the Teton Range

Base mosaicked and reduced from U.S. Geological Survey topographic quadrangles shown on index map.

SCALE 1:50 000

1 ½ 0 1 2 3 MILES
1 .5 0 1 2 3 KILOMETERS

Geology modified by Oriel and Moore (1985) from sources shown in index.

EXPLANATION

LINE SYMBOLS
Dashed where located approximately; dotted where concealed

- CONTACT
- HIGH-ANGLE FAULT--Ball and bar on downthrown side
- THRUST FAULT--Sawteeth on upper plate
- LOW ANGLE FAULT--At base of masses presumed to have slid. Sawteeth on upper plate
- SYNCLINE--Showing trace of axial plane and direction of plunge
- OVERTURNED SYNCLINE--Showing trace of axial plane and direction of dip of limbs
- ANTICLINE--Showing trace of axial plane and direction of plunge
- OVERTURNED ANTICLINE--Showing trace of axial plane and dip of limbs
- SINKHOLE

STRIKE AND DIP OF BEDS

15 inclined | vertical | 30 overturned | horizontal

30 arrow on dip records sedimentologic evidence of stratal top

MINES, PROSPECTS, SAMPLED TRENCHES, AND BOREHOLES

- 5 PROSPECT OR MINE (listed in table 1)
- CAVED ADIT (listed in table 1)
- TRENCH IN PHOSPHORIA FORMATION--Sampled for phosphate and associated metals. G, described by Gardner (1964); CP-22, described by Gere and others (1966); BM-12 described by Benham (1983) and by Motooka and others (1984)
- 4 DRY HOLE--Drilled for petroleum exploration (listed in table 2)

Area of high potential for oil and gas

Jtk n Areas of low potential for stratabound minerals. Corresponds to areas of exposed Nugget Sandstone, locally containing stratabound metal anomalies

Pp Areas of exposed Phosphoria Formation containing beds of phosphorite with associated metal concentrations

Areas of exposed intrusive bodies with associated geochemical anomalies of low potential for resources

FIGURE 1.--INDEX MAP SHOWING LOCATION OF THE PALISADES ROADLESS AREAS, TETON AND BONNEVILLE COUNTIES, IDAHO, AND TETON AND LINCOLN COUNTIES, WYOMING.

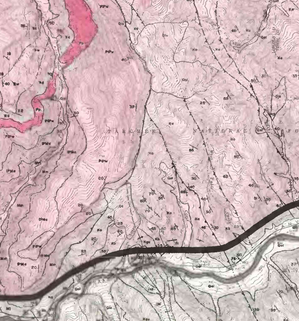

FIGURE 2.--INDEX MAP OF SOURCES OF DATA USED FOR STUDY OF PALISADES AREA
Shows topographic quadrangle base maps (by quadrangle name and date of edition). Principal sources of geologic data are shown by numbers listed below. Hachures show the boundaries of geologic maps covering areas larger than 7 1/2-minute quadrangles.

1. Staatz, M. H., and Albee, H. F., 1966.
2. Pampeyan, E. H., Schroeder, M. L., Schell, E. M., and Cressman, E. R., 1967.
3. Schroeder, M. L., 1972.
4. Jobin, D. A., and Schroeder, M. L., 1964b.
5. Jobin, D. A., and Soister, P. E., 1964.
6. Jobin, D. A., 1965.
7. Schroeder, M. L., 1969.
8. Love, J. D., and Albee, H. F., 1972.
9. Gardner, L. S., 1961.
10. Jobin, D. A., unpublished data.
11. Woodward, N. B., 1979.
12. Moore, D. W., Woodward, N. B., and Oriel, S. S., 1984.
13. Albee, H. F., 1973.
14. Albee, H. F., 1968.
15. Albee, H. F., and Cullins, H. L., 1975.
16. Jobin, D. A., 1972.
17. Schroeder, M. L., Albee, H. F., and Lunceford, R. A., 1981.

MINERAL RESOURCE POTENTIAL MAP OF THE WEST AND EAST PALISADES ROADLESS AREAS, IDAHO AND WYOMING

By
Steven S. Oriel, John C. Antweiler, and David W. Moore, U.S. Geological Survey,
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John R. Benham, U.S. Bureau of Mines
with contributions by Don R. Mabey, U.S. Geological Survey

1985

INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1985

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