Geologic Map of the Baker Peak Quadrangle, Blaine and Camas Counties, Idaho

David E. Stewart, Jeffrey K. Geslin, J. Brian Mahoney,
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Contents

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DESCRIPTION OF MAP UNITS

SURFICIAL DEPOSITS

(Qal) Alluvium (Holocene)—Crudely stratified clay, silt, sand, and gravel deposited by streams as channel or overbank deposits; includes postglacial stream terraces and alluvial fan deposits.

(Qt) Talus (Holocene)—Unconsolidated accumulations of rock debris deposited by rock fall, mainly in mountain cirques.

(Qc) Colluvium (Holocene)—Locally derived, poorly sorted, angular to subangular rock debris; deposited by mass-wasting processes.

(Ql) Landslide deposits (Holocene)—Locally derived, subangular to angular, poorly sorted, clay to boulder-sized debris deposited by catastrophic slope failure; characterized by hummocky topography and fan-shaped plan view.

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(Qg) Glacial deposits (Pleistocene)—Primarily unsorted subrounded gravel, cobbles, and boulders in sandy matrix deposited by ice-contact and glaciofluvial processes; include terminal, lateral, and ground moraines; common in glaciated valleys at higher elevations.

(Qog) Older gravel (Pleistocene?)—Terrace gravels composed of felsic intrusive and fine-grained metasedimentary clasts; found in the Placer Creek drainage, southeast corner of quadrangle; probably glacial outwash.

CHALLIS VOLCANIC GROUP AND INTRUSIVE COMPLEX (EOCENE)

(Tct) Tuff (Eocene)—Light green to light brown air-fall and reworked dacitic to rhyolitic vitric tuff.

(Tcvc) Volcaniclastic sedimentary rocks (Eocene)—Volcanic sandstones, conglomerates, and breccias composed of fragments of associated lava flows and tuffs.

(Tcd) Dacite lava (Eocene)—Dark gray to reddish purple porphyritic lavas of intermediate to slightly basic (K-rich dacite to andesite) composition (Fisher and Johnson, 1987; Moye and others, 1988; Snider and Moye, 1989); consists of hornblende or plagioclase phenocrysts,

or both, in an aphanitic, locally vesicular groundmass; commonly flow foliated; includes autoclastic flow breccias, heterolithologic lahar breccias, minor intercalated ash-flow tuffs, and local volcaniclastic sediments; unit locally aggregates considerable thickness (>500 m) and is apparently extruded over an irregular erosion surface developed on rocks of the Sun Valley Group (Permian-Pennsylvanian) and Idaho batholith (Cretaceous); weathers easily, forming low rounded knobs and regolith-covered slopes; dacite lava is the extrusive equivalent of the intermediate suite (composite dacite porphyry/granodiorite stocks).

Silicic Suite

(Trp) Rhyolite porphyry dikes (Eocene)—Light pink to very light gray porphyritic dikes and pods with variable percentages of fine- to medium-grained phenocrysts of alkali feldspar, plagioclase, quartz, and biotite in an aphanitic groundmass; range from pink porphyritic granite pods associated with phaneritic pink granite to laterally continuous very light gray aphyric dikes with distinct platy cleavage; intrude and are a late stage of *Tpg*.

(Tpg) Pink granite (Eocene)—Distinctly pink, coarse-grained, hypidiomorphic leucocratic granite containing perthitic alkali feldspar, quartz, and biotite; locally porphyritic with large (2-3 cm) potassium feldspar phenocrysts; includes Big Smoky Creek and Prairie Creek stocks; phaneritic equivalent of *Trp*; weathers easily, forming low rounded knobs and grus-covered slopes.

Intermediate Suite

(Trd) Rhyodacite porphyry dikes (Eocene)—Medium gray to brown to pink porphyritic dikes containing medium- to coarse-grained phenocryst of biotite, potassium feldspar, and quartz in a very fine-grained groundmass.

(Thgd) Hornblende-biotite granodiorite (Eocene)—Medium gray, fine-grained equigranular granodiorite containing hornblende, biotite, plagioclase feldspar, alkali feldspar, and quartz; phaneritic equivalent of, and grades into, dacite porphyry; resistant, forming steep cliffs and angular talus; includes Big Peak stock exposed in the west-central part of the quadrangle and the Baker Lake stock in the east-central part of the quadrangle; a sample from Big Smoky Creek yielded a K/Ar (biotite) age of 48.2 ± 1.7 Ma (Stewart, 1987).

(Tdp) Dacite porphyry (Eocene)—Dark green, chocolate-brown, and medium gray porphyritic intrusive rock containing medium- to coarse-grained euhedral phenocrysts of plagioclase with lesser amounts of hornblende and biotite in a very fine-grained to aphanitic groundmass; includes the Norton Peak stock in the northeastern part of the quadrangle, gradational with hornblende-biotite granodiorite; forms the upper portions of composite stocks; contains abundant roof pendants of metamorphosed Sun Valley Group.

Andesitic Suite

(Ta) Andesite dikes and plug (Eocene)—Dark green to black aphyric dikes and pods with rare biotite and hornblende phenocrysts; dikes are thin (0.5-4 m), laterally discontinuous, and apparently random in orientations; cross-cutting relations with other intrusive rocks are ambiguous; two generations of andesite dikes may occur, representing the oldest and the youngest dike phases (Worl and others, 1991).

IDAHO BATHOLITH

(Kgd) Biotite granodiorite (Cretaceous)—Light to medium gray, medium- to coarse-grained equigranular granodiorite of the Atlanta lobe, Idaho batholith; contains plagioclase feldspar, quartz, minor potassium feldspar, and less than 15-percent subhedral disseminated biotite; locally porphyritic with large (1-3 cm) potassium feldspar phenocrysts; hornblende rare to absent; no primary muscovite; sheet jointing common; easily weathered, forming low rounded knobs and grus-covered slopes, although steep competent cliffs occur locally in glaciated canyons.

SUN VALLEY GROUP

(PlPd) Dollarhide Formation, undifferentiated (Lower Permian to Middle Pennsylvanian?)—Dark gray to black, thinly laminated to massive, carbonaceous micritic siltstone, fine-grained sandstone, and sandy micritic limestone or marble; locally contains abundant sedimentary structures, including cross-beds, parallel and convolute laminae, graded bedding; weathers to a distinct dark gray to black regolith; regional thickness is over 1,700 m (Mahoney and others, 1991; O'Brien, 1991).

(PlPdf) Dollarhide Formation, foliated (Lower Permian to Middle Pennsylvanian?)—Light gray to light brown, locally schistose fine-grained metasedimentary rocks including phyllite, siltite, laminated or banded quartzite, foliated marble, and calc-silicate hornfels; formerly known as the Carrietown sequence; grades to Dollarhide Formation as dark gray unfoliated marble becomes more abundant and foliated rock loses its granoblastic texture; metamorphism related to intrusion of the Idaho batholith of Cretaceous age (Whitman, 1990).

(PlPdl) Dollarhide Formation, lower member (Lower Permian to Middle Pennsylvanian?)—Dark gray limestone or marble with subordinate light to dark brown siltite and fine-grained light gray or white quartzite; carbonaceous dark-colored marble locally contains tremolite porphyroblasts; unit is the protolith for and grades into *PlPdf*; regional thickness is about 800 m (Geslin, 1986;

Wavra and others, 1986; Link and Mahoney, 1989; Whitman, 1990; O'Brien, 1991; Mahoney and others, 1991).

(PlPwe) Wood River Formation, Eagle Creek Member (Lower Permian to Middle Pennsylvanian)—Gray to light brown, medium- to thick-bedded, fine-grained micritic sandstone and silica-cemented quartzite, with minor micritic siltstone and sandy micritic limestone interbeds; sedimentary structures rare; resistant to weathering, forming angular talus with a distinct tan weathering rind; regional thickness is over 1,200 m.

GEOLOGIC HISTORY OF THE BAKER PEAK QUADRANGLE

Paleozoic rocks exposed in the Baker Peak quadrangle belong to the Sun Valley Group of Permian-Pennsylvanian age (Mahoney and others, 1991). Lower Paleozoic rocks (including the Milligen Formation of Devonian age) and Precambrian rocks may occur at depth (Sanford and others, 1989). In the southern and western parts of the quadrangle the dark-colored, carbonaceous Dollarhide Formation is exposed; near the Idaho batholith it is conspicuously foliated. In the northeastern part of the quadrangle light-colored sandy limestone, and calcareous sandstone and siltstone of the Eagle Creek and Wilson Creek Members of the Wood River Formation are exposed.

The contact between the Dollarhide and Wood River Formations is a low-angle fault exposed in Baker Creek and Brodie Gulch in the eastern central part of the quadrangle. The fault is intruded by dacite porphyry dikes dated at 50.92 ± 0.22 Ma and 52.03 ± 0.32 Ma on hornblende using $^{40}Ar/^{39}Ar$ (F.Moye and L. Snee, written commun., 1989). Similar faults have been mapped west of Hailey on the Mahoney Butte quadrangle (B. Skipp, unpublished mapping; Worl and others, 1991).

Biotite granodiorite of the Atlanta lobe of the Idaho batholith underlies the southwestern part of the quadrangle. The granodiorite was intruded at about 85-75 Ma (Lewis and others, 1987) at depths of 8 to 10 km, causing metamorphism of the Dollarhide Formation in the Dollarhide Mountain quadrangle at 550°-600°C and 2.5-3.5 kb (Whitman, 1990). This metamorphism has been dated by the K-Ar method at 83.9 ± 3.4 Ma (R.L. Armstrong, written commun., 1990).

The Challis Volcanic Group (Eocene) unconformably overlies rocks of the Sun Valley Group (Permian-Pennsylvanian) and the Idaho batholith (Cretaceous). The contact is irregular and apparently developed over rugged topography, indicating a period of pronounced uplift and erosion in Paleocene and early Eocene time, perhaps due to tectonism associated with the low-angle fault that places the Wood River Formation above the Dollarhide Formation east of Baker Lake. The Challis Volcanic Group, exposed in the eastern and southeastern parts of the quadrangle, is dominated by high-K dacite and andesite lava, with minor tuff and epiclastic rock; volcanic strata dip 35 to 50 degrees to the southeast in the southeastern corner of the quadrangle.

Hall and McIntyre (1986) recognized a possible Eocene cauldron produced by posteruptive subsidence in the Smoky Mountains. The western bounding faults of this cauldron strike northwestward in the eastern part of the Baker Peak quadrangle and include the east-dipping normal faults exposed near Baker Lake and in Lost Shirt Gulch. The Fox Peak complex, consisting of a rhyolite dome and associated ash-flow tuff, is exposed in the center of the cauldron on the Boyle Mountain quadrangle to the east (Erdman and others, 1990).

The Baker Peak quadrangle contains extensive exposures of Eocene hypabyssal intrusive complexes of the Smoky Mountains, including the Prairie Creek complex east of the Big Smoky Creek fault and the Big Smoky complex west of the Big Smoky Creek fault (Stewart and others, in press). These complexes can be divided into three compositional suites: silicic, intermediate, and andesitic. The intermediate suite, which is composed of dacite porphyry and hornblende-biotite granodiorite, is intruded by a silicic suite, containing pink granite and rhyolite porphyry. The intermediate suite is the intrusive equivalent of the high-K dacite and andesite lava of the Challis Volcanic Group. The intermediate suite includes the Big Peak, Baker Lake, and Norton Peak stocks. The Big Peak stock is dated at 48.2 ± 1.7 Ma. In the headwaters of Norton Creek, the Norton Peak dacite porphyry contains roof pendants of Wood River Formation which from a distance resemble "chocolate-chips" on the cliff faces. Two dikes of dacite porphyry from Brodie Gulch in the east-central part of the quadrangle were dated at 50.92 ± 0.22 Ma and 52.03 ± 0.32 Ma ($^{40}Ar/^{39}Ar$ age on hornblende; F. Moye and L. Snee, written commun., 1989).

The silicic suite, consisting of pink granite and rhyolite porphyry, includes the Big Smoky Creek stock of the Big Smoky complex west of the Big Smoky Creek fault and the Prairie Creek stock east of the fault. The silicic suite intrudes the intermediate suite. In the headwaters of Norton Creek, the Prairie Creek stock intrudes both dacite porphyry and Sun Valley Group roof pendants.

Neogene Basin and Range style faulting along the Big Smoky Creek fault has exposed the eastern part of the Baker Peak quadrangle as a northeast-tilted half-horst, uplifted along its southwestern side. A series of three of these half-horsts is exposed to the north and east of the Baker Peak quadrangle, affording an excellent exposure of cross-sections of the Eocene hypabyssal complexes of the Smoky and Boulder Mountains. These complexes are

named, from west to east, the Big Smoky, Prairie Creek, Boulder Basin, and Ibex Canyon complexes (Stewart and others, in press).

ACKNOWLEDGMENTS

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GEOLOGIC MAP OF THE BAKER PEAK QUADRANGLE, BLAINE AND CAMAS COUNTIES, IDAHO

BY

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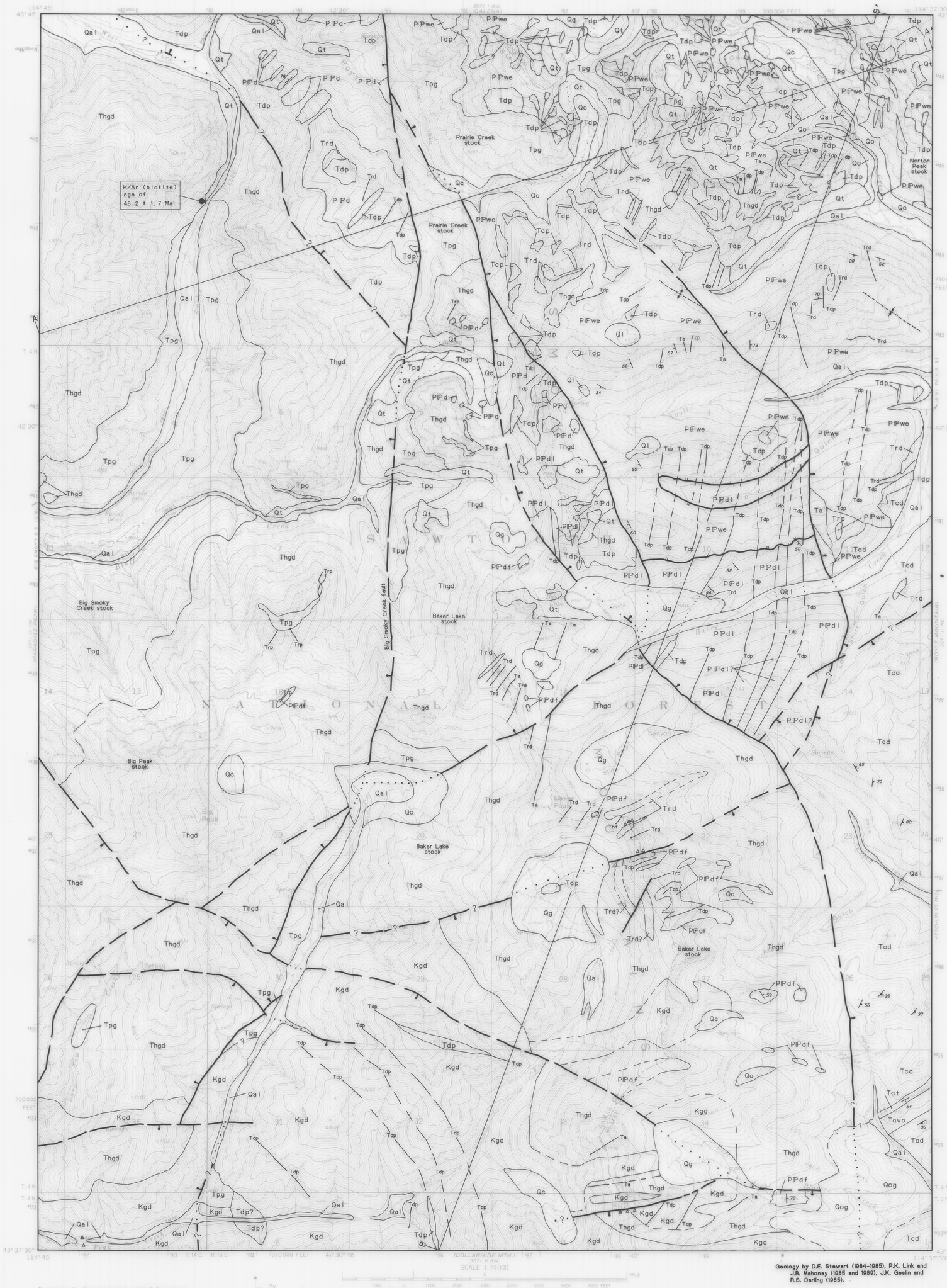
1992



Geology by D.E. Stewart (1984-1985), P.K. Link and J.B. Mahoney (1985 and 1989), J.K. Gesslin and R.S. Darling (1985).

Topography by photogrammetric methods from aerial photographs taken 1968. Field checked 1970

Polyconic projection. 1927 North American datum 10,000-foot grid based on Idaho coordinate system, central zone

UTM GRID AND 1970 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

CONTOUR INTERVAL 40 FEET
DATUM IS MEAN SEA LEVEL

QUADRANGLE LOCATION

CORRELATION OF MAP UNITS

Qt, Qal, Qc, Ql	HOLOCENE	QUATERNARY
?Qog, Qg	PLEISTOCENE	QUATERNARY
UNCONFORMITY		
?Tovc, ?Tct, ?Tod	EOCENE	TERTIARY
Thgd, Tpg, Tdp, Trp, Trd, Ta	EOCENE	TERTIARY
UNCONFORMITY		
Kgd	CRETACEOUS	
PIPd	PERMIAN	
PIPdl, PIPdf	PENNSYLVANIAN	
PIPwe	PERMIAN / PENNSYLVANIAN	

MAP UNITS

Refer to accompanying text

- Qal — Alluvium (Holocene)
- Qt — Talus (Holocene)
- Qc — Colluvium (Holocene)
- Ql — Landslide deposits (Holocene)
- Qg — Glacial deposits (Pleistocene)
- Qog — Older gravel (Pleistocene?)

CHALLIS VOLCANIC GROUP AND INTRUSIVE COMPLEX

- Tct — Tuff (Eocene)
- Tovc — Volcaniclastic sedimentary rocks (Eocene)
- Tod — Dacite lava (Eocene)

Silicic Suite

- \Trp, Trp — Rhyolite porphyry dikes (Eocene)
- Tpg — Pink granite (Eocene)

Intermediate Suite

- \Trd, Trd — Rhyodacite porphyry dikes (Eocene)
- Thgd — Hornblende-biotite granodiorite, gradational with Tdp (Eocene)
- \Tdp, Tdp — Dacite porphyry (Eocene)

Andesitic Suite

- \Ta, Ta — Andesite dikes and plugs (Eocene)

IDAHO BATHOLITH

- Kgd — Biotite granodiorite (Cretaceous)

SUN VALLEY GROUP

- PIPd — Dollarhide Formation, undifferentiated (Lower Permian to Middle Pennsylvanian?)
- PIPdf — Dollarhide Formation, foliated (Lower Permian to Middle Pennsylvanian?)
- PIPdl — Dollarhide Formation, lower member (Lower Permian to Middle Pennsylvanian?)
- PIPwe — Wood River Formation, Eagle Creek Member (Lower Permian to Upper Pennsylvanian)

MAP SYMBOLS

- Contact Solid where definite, dashed where approximately located, dotted where concealed, queried where uncertain
- High-angle normal fault bar and ball on downthrown side, solid where definite, dashed where approximately located dotted where concealed, queried where uncertain
- Low-angle normal fault double hachure on hanging wall, solid where definite, dashed where approximately located, dotted where concealed, queried where uncertain
- Dike
- Breccia
- Strike and dip of beds
- Flow foliation in lava
- Anticline, showing trace of axial plane
- Syncline, showing trace of axial plane
- Fault motion indicators, indicates movement into (⊕) and out of (⊙) plane of cross section
- Bedding orientation (cross section only)

Names of adjoining quadrangles and references to 7.5-minute geologic maps

1	Frenchman Creek (Mahoney, 1992)	
2	Galena (Mahoney, 1987; Mahoney and Link, 1992)	
3	Easley Hot Springs (Worl and others, 1991)	
4	Paradise Peak (Worl and others, 1991)	
5	Baker Peak (this report)	
6	Boyle Mountain (Erdman and others, 1990, Worl and others, 1991)	
7	Sydney Butte (Worl and others, 1991)	
8	Dollarhide Mountain (Darling, 1989)	
9	Butteroup Mountain (O'Brien and others, unpublished mapping)	

No vertical exaggeration
Dash-dot lines indicate bedding orientation

Computer-aided cartography by Daryle R. Faircloth

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