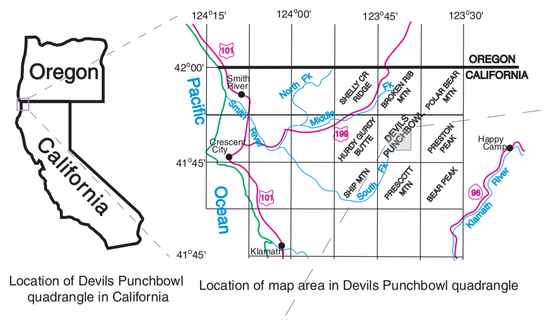
Plate 1

Geologic map of the northern part of the Bear Mountain intrusive complex, Klamath Mountains, California

by Jonathan C. Bushey, 2003



Location of Devils Punchbowl quadrangle in California

Location of map area in Devils Punchbowl quadrangle

Contact, dashed where approximate, dotted where covered

Gradational contact, approximate outer limit of dynamothermal contact aureole

Fault, dashed where approximate, dotted where covered; arrows and letters represent sense of displacement

Strike and dip of foliation; strike of vertical foliation (on right)

Trend and plunge of lineation

Enclave/inclusion

Strike and dip of dike; strike of vertical dike (on right)

Field trip stop, see Appendix I for description

Sample location

Spot elevation, in feet

Road

Foot trail

Mapped by J. C. Bushey (2001-2002)

1 0 1/2 1 Mile

1 0 5 1 Kilometer

Scale 1:12,000

Contour interval 80 feet
1000-meter UTM grid, zone 10
1927 North American Datum

Explanation of rock units

Qg Glacial deposits, undivided - Includes morainal and outwash deposits (Quaternary).

Bear Mountain intrusive complex (BMic)-Late Jurassic (~148 Ma), youngest to oldest

Jwf Wilderness Falls plutonic unit-Fine- to medium-grained, biotite and hornblende+biotite quartz diorite, tonalite, and granodiorite; low color index (typically <20), equigranular, fine grained, quartz rich; occurs as small intrusive masses, individual dikes of varying width, and swarms of mingled dikes.

Jdf Doe Flat plutonic unit-Biotite+hornblende +/- pyroxene diorite to quartz diorite; biotite+hornblende-rich with scarce pyroxene; fine- to medium-grained, moderate to strong foliation defined by the parallel alignment of tabular plagioclase and mafic aggregates.

Jdp Punchbowl plutonic unit-Hornblende-rich but biotite-poor, +/- pyroxene; medium- to coarse-grained, weak to strong foliation defined by the parallel alignment of tabular plagioclase and mafic aggregates, hornblende gabbro/diorite, biotite+pyroxene-bearing hornblende gabbro/diorite, biotite-bearing pyroxene+hornblende gabbro; inclusions of rocks of the Buck Lake unit with sharp or gradational contacts, enclaves of clinopyroxenite and hornblendite are locally common; also common are fine-grained hornblende and pyroxene+hornblende gabbro dikes, which may or may not exhibit mingling relationships and intrude subparallel to foliation, truncate foliation, or some combination of these relationships.

Jbl Buck Lake plutonic unit-Biotite+pyroxene rich, +/- hornblende; medium- to coarse-grained hornblende-bearing to hornblende+biotite+two-pyroxene+/-quartz diorite to monzodiorite with a weak to strong foliation defined by the parallel alignment of tabular plagioclase and mafic aggregates; also includes scarce plagioclase+pyroxene porphyry; the most typical rock type is a well-foliated, medium-grained, quartz-bearing hornblende+biotite+two-pyroxene diorite/monzodiorite.

Late Jurassic

Rattlesnake Creek terrane

Jmc Mafic Complex of the Preston Peak ophiolite (after Snoke, 1977)–Fine-grained, gray to gray-green metadiabase and metabasalt, commonly a salt-and-pepper texture defined by tabular plagioclase and amphibole grains, a crosscutting network of white veinlets (clinozoisite-rich) is common; weathers gray to gray-brown and typically forms angular, massive, resistant outcrops (e.g., Twin Peaks).

In the inner zone of the contact aureole of the BMic–light to dark gray, medium-grained amphibolite +/- biotite rich layers; prominent foliation due to hornblende, plagioclase, and sometimes biotite-rich layering; similar in overall appearance to metabasaltic rocks of the inner aureole.

Middle Jurassic

Part of coherent cover sequence that forms the upper part of Rattlesnake Creek terrane

JTrms Metasedimentary rocks-Fine-grained tan to dark gray metasiltstone, siliceous argillite, and metachert, also locally includes interlayered metavolcaniclastic rocks, metabasaltic rocks, and lenses of metaserpentinite; foliation variable from moderate to strong.

In the inner zone of the contact aureole of the BMic–fine- to medium-grained brownish to purplish biotite to biotite+hornblende quartz schists and/or hornfelsic schists with scarce calc-silicate lenticles (metaconcretions?); brown to purplish metacherts and fine-grained quartzose schists, typically well foliated.

JTrmb Metabasaltic rocks-Fine to medium-grained metabasaltic basaltic rocks (locally pillowed); relict igneous texture of plagioclase feldspar commonly still evident; greenish gray color from regional lower greenschist facies metamorphism; weathers light to dark gray with angular fractures and widely spaced cleavage.

In the inner zone of the contact aureole–light to dark gray, fine- to medium-grained amphibolite (or hornblende schist) +/- biotite-rich layers; prominent foliation due to hornblende, plagioclase, and sometimes biotite-rich metamorphic layering; plagioclase-rich leucosomes vary from 2–20% of the rock and sometimes are sufficiently abundant to give this rock unit a migmatitic appearance; weathers similarly to the metasedimentary rocks of the inner aureole.

Late Triassic (?) to Early Jurassic (?)

~~~~~ Inferred unconformity ~~~~~

um Ultramafic rocks-Fine- to medium-grained black, green to blue-black serpentinite; angular fractures with blocky weathering; weathers orangish brown on hill slopes and aqua-green to black in creek exposures; contains tectonic(?) blocks of metabasalt as well as intrusive mafic dikes inferred to be related to the Mafic Complex of the Preston Peak ophiolite of Snoke (1977).

In the inner zone of the contact aureole of the BMic–fine- to coarse-grained black talc +/- tremolite +/- olivine +/- anthophyllite +/- pyroxene hornfels and schists; commonly shows a rough, anastomosing foliation and rarely a mineral lineation defined by bundles of coarse, acicular tremolite grains; weathers orangish brown on hill slopes and black in creek beds.

hs = Tectonic block of metabasalt metamorphosed to biotite+quartz-bearing hornblende schist by the BMic with metarodingite along contacts with the metaserpentinite.

Samples for whole-rock chemical analysis

Bear Mountain intrusive complex

Sample no.	Unit	UTM Coordinates Easting	Northing	Rock Description
JB28	Jbl	442485	4629070	coarse-grained bio hb two-px qtz-bearing diorite
JB143	Jbl	442475	4629081	medium-grained bio hb two-px qtz-bearing diorite
JB253	Jbl	443227	4628339	medium-grained bio hb px qtz-bearing diorite
JB259	Jbl	443250	4627920	medium-grained two-px bio hb qtz-bearing diorite
JB270	Jbl	443947	4628840	medium-grained two-px bio hb diorite
JB301a	Jbl	443833	4627709	medium-grained two-px bio hb qtz-bearing diorite
JB41	Jbl?	444690	4628880	coarse medium-grained bio two-px hb qtz-bearing diorite
JB373	Jbl?	444660	4629166	coarse medium-grained bio two-px hb qtz-bearing diorite
JB27	Jdf	442540	4629340	medium-grained px-bearing bio hb qtz-bearing diorite
JB35b	Jdf	445190	4629200	medium-grained bio hb diorite
JB44	Jdf	444595	4628750	medium-grained bio hb diorite; low color index, marginal southern facies
JB291a	Jdf	445585	4629230	medium-grained lineated bio hb qtz diorite
JB300	Jdf	443408	4629478	fine medium-grained px-bearing bio hb qtz-bearing diorite
JB36	Jdp	444390	4628100	medium-grained px and bio-bearing hb gabbro
JB38	Jdp	444410	4628565	medium-grained bio hb gabbro
JB361	Jdp	444060	4628393	medium-grained bio-bearing hb diorite
JB388a	Jdp	444488	4628641	medium-grained px and bio-bearing hb diorite
JB396a	Jwf	444360	4627520	fine-grained bio tonalite; light phase Wilderness Falls suite

Dikes and country rocks

Sample no.	Unit	UTM Coordinates Easting	Northing	Rock Description
JB35a	dike	445190	4629200	fine-grained bio-bearing hb diorite
JB92	dike	442384	4629495	fine-grained bio-bearing hb px gabbro-diorite
JB142	dike	442258	4628967	fine-grained bio hb diorite
JB201	dike	442968	4630792	fine-grained bio hb qtz-bearing diorite
JB256	dike	443250	4628110	fine-grained bio-bearing hb diorite
JB291b	dike	445585	4629230	fine-grained bio hb diorite
JB389	dike	444556	4628742	fine-grained bio hb diorite
JB4	JTrmb	443620	4630585	fine-grained, well foliated plag+hb schist
JB9	hs	444255	4630280	fine-grained, well foliated bio-bearing plag+hb schist
JB29	hs	444070	4630525	fine-grained, well foliated bio+qtz-bearing plag+hb schist
JB33	hs	444370	4630230	fine-grained, foliated sphene, epidote, plag+hb schist
JB68	hs	444150	4630408	fine-grained, foliated qtz+bio-bearing plag+hb schist

Reference cited

Snoke, A. W., 1977, A thrust plate of ophiolitic rocks in the Preston Peak area, Klamath Mountains, California: Geological Society of America Bulletin, v. 88, p. 1641-1659.

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