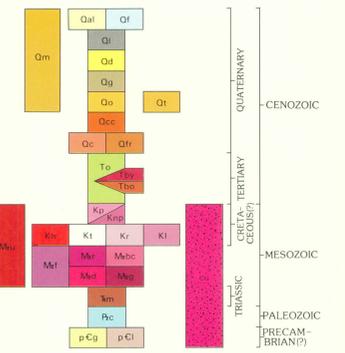
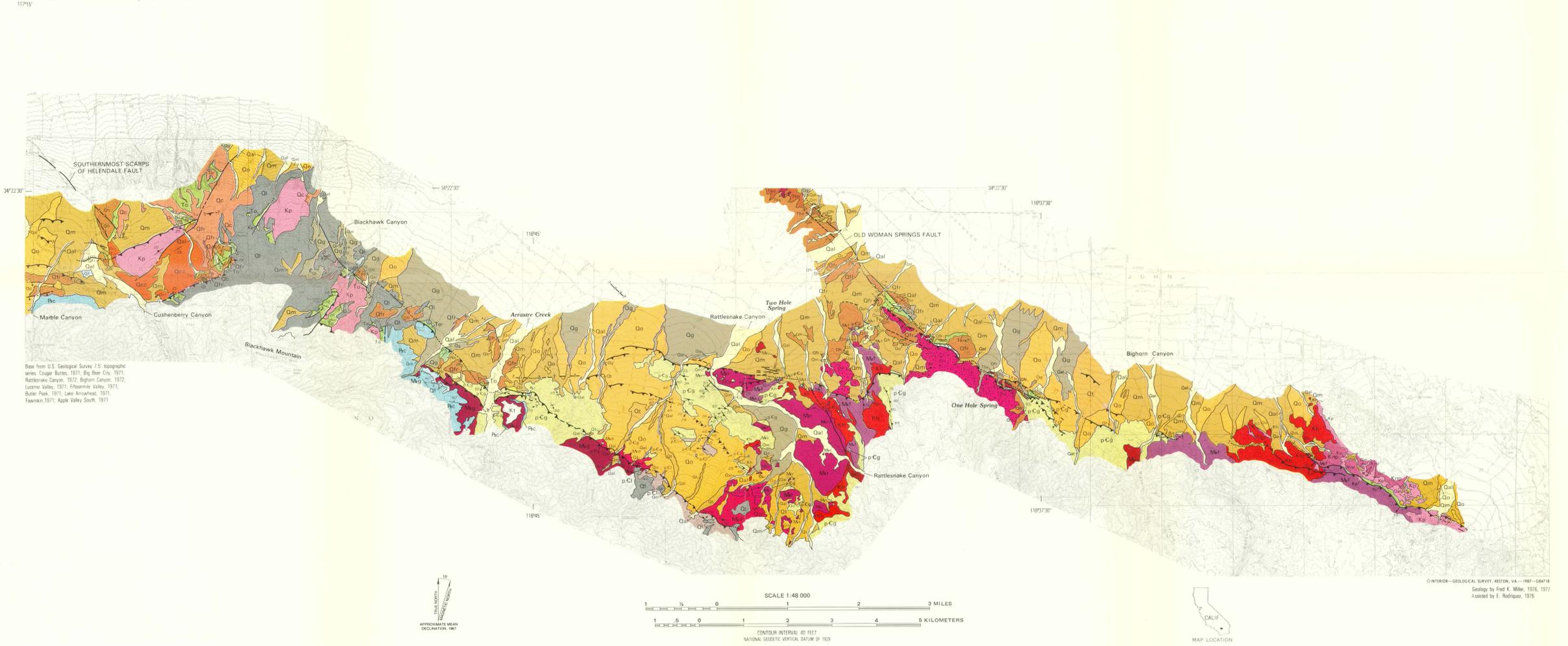


CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

- Qm** MIXED ALLUVIUM AND COLLUVIUM (QUATERNARY)—Includes alluvium derived from all other alluvial units and from bedrock. Probably contains some recent alluvium
- Qal** RECENT ALLUVIUM (QUATERNARY)—Chiefly unconsolidated boulders, gravel, sand, and clay
- Qf** ARTIFICIAL FILL (QUATERNARY)—Mine dumps and tailings
- Ql** LANDSLIDE MATERIAL (QUATERNARY)—Angular debris from landslides
- Qd** DEBRIS FLOWS (QUATERNARY)—Unsorted sediments ranging in size from boulders to silt; deposited as mass flow
- Qg** GRAY ALLUVIAL FAN MATERIAL (QUATERNARY)—Dark gray on color or aerial photographs. Forms fans with relatively unmodified geomorphic forms
- Qo** OXIDIZED ALLUVIUM (QUATERNARY)—Alluvial fan debris; surface material oxidized
- Qt** TERRACE-FORMING MATERIAL (QUATERNARY)—Same alluvium as oxidized alluvium, but has topographically lower surfaces developed on it
- Qcc** FANGLOMERATE OF CUSHENBERRY CANYON (QUATERNARY)—Moderately well indurated fanglomerate made up mostly of limestone and dolomite clasts
- Qc** CARBONATE-CEMENTED FANGLOMERATE (QUATERNARY)—Fanglomerate; mostly limestone and dolomite clasts; well cemented with carbonate minerals
- Qfr** FANGLOMERATE AND RIVER-DEPOSITED MATERIAL (QUATERNARY)—Ranges from boulder fanglomerate to sand and silt. Moderately well indurated
- Trv** YOUNGER BASALT (TERTIARY)—Vesicular, forms thin flows, has brown oxidized surface
- Tbo** OLDER BASALT (TERTIARY)—Gray basalt; slightly altered and brecciated; contains some pillows
- To** OLD WOMAN SANDSTONE (TERTIARY)—Tan arkose and conglomeratic arkose
- Mu** GRANITIC ROCKS UNDIVIDED (MESOZOIC)—Includes small bodies of undistinctive granitic rock and small masses of lithologies that are so intimately mixed that they cannot be mapped separately
- Kp** PORPHYRITIC QUARTZ MONZONITE (CRETACEOUS?)—Biotite quartz monzonite, medium grained; phenocrysts of pink potassium feldspar, average 2 cm. Locally includes:
  - Knp** Non-porphyrific phase
- Hb** HETEROGENEOUS BIOTITE QUARTZ MONZONITE (CRETACEOUS?)—Leucocratic biotite quartz monzonite; texture and composition highly variable
- Kt** TWO MICA QUARTZ MONZONITE (CRETACEOUS?)—Medium to coarse grained muscovite-biotite quartz monzonite
- Kr** RATTLESNAKE MOUNTAIN PLUTON (CRETACEOUS?)—Coarse grained biotite quartz monzonite; contains numerous small phenocrysts
- Kl** LEUCOCRATIC BIOTITE QUARTZ MONZONITE (CRETACEOUS?)—Medium to fine grained quartz monzonite with color index between 3 and 5
- Mf** FOLIATED HORNBLende-BIOTITE GRANODIORITE (MESOZOIC)—Medium to coarse grained, foliation not well developed; sphene bearing
- Mr** GRANODIORITE OF RATTLESNAKE CANYON (MESOZOIC)—Medium grained hornblende-biotite granodiorite; color index averages 15 to 18
- Mbc** HORNBLende-BIOTITE GRANODIORITE OF BOUSIC CANYON (MESOZOIC)—Probably a separate pluton of the Rattlesnake Canyon granodiorite, but is richer in potassium feldspar
- Mq** FINE-GRAINED MAFIC GRANODIORITE (MESOZOIC)—Hornblende-biotite granodiorite; color index varies from 20 to 60
- Ma** MAFIC QUARTZ DIORITE (MESOZOIC)—Hornblende-biotite quartz diorite, fine to coarse grained; color index varies from 40 to 80
- Km** HORNBLende MONZONITE (TRIASSIC)—Medium to fine grained; monzonite to quartz monzonite in composition; foliate and lineate in part
- Cr** CRYSTALLINE ROCKS UNDIVIDED (MESOZOIC AND OLDER)—Mixed granitic and metamorphic rocks; includes large pegmatitic masses and amphibolite masses
- Pc** CARBONATE ROCKS UNDIVIDED (PALEOZOIC)—Limestone and dolomite (Furnace Limestone); at most places recrystallized by younger plutonic rocks
- pCg** LAYERED GNEISS (PRECAMBRIAN?)—Well-layered gneiss with alternating bands of biotite-rich and biotite-poor rock; most is contorted
- pCl** LEUCOCRATIC GNEISS (PRECAMBRIAN?)—Quartz-feldspathic gneiss, contains minor biotite; poorly to well developed foliation



Base from U.S. Geological Survey 7.5 topographic series: Cougar Basin, 1971; Big Bear City, 1971; Rattlesnake Canyon, 1972; Bighorn Canyon, 1972; Lugoza Valley, 1971; Ehrenz Valley, 1971; Butler Peak, 1971; Lake Arrowhead, 1971; Fairview, 1971; Apple Valley South, 1971

INTERIOR—GEOLOGICAL SURVEY, RESTON, VA.—1987—G8478  
Geology by Fred K. Miller, 1976, 1977  
Assisted by E. Rodriguez, 1976

CONTACT—Approximately located. Queried where doubtful

FAULT, SHOWING DIP—Dashed where approximately located, dotted where concealed, queried where doubtful. Bar and ball on downthrown side

NORMAL FAULT—Dotted where concealed, hachured on downthrown side

THRUST FAULT, SHOWING DIP—Dashed where approximately located, dotted where concealed, queried where doubtful. Sawtooth on upper plate

SHEAR ZONE

ANTICLINE—Dashed where approximately located

BEARING AND PLUNGE OF MINOR FOLDS

STRIKE AND DIP OF INCLINED BEDS

STRIKE AND DIP OF INCLINED FOLIATION

BEARING AND PLUNGE OF INCLINED LINEATION—May be combined with other symbols

SCALE 1:48 000

CONTOUR INTERVAL 40 FEET  
NATIONAL GEODESIC DATUM OF 1929

MAP LOCATION

GEOLOGIC MAP OF THE FAULT ZONE BOUNDING THE NORTH SIDE OF THE SAN BERNARDINO MOUNTAINS, CALIFORNIA