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AND GEOLOGY

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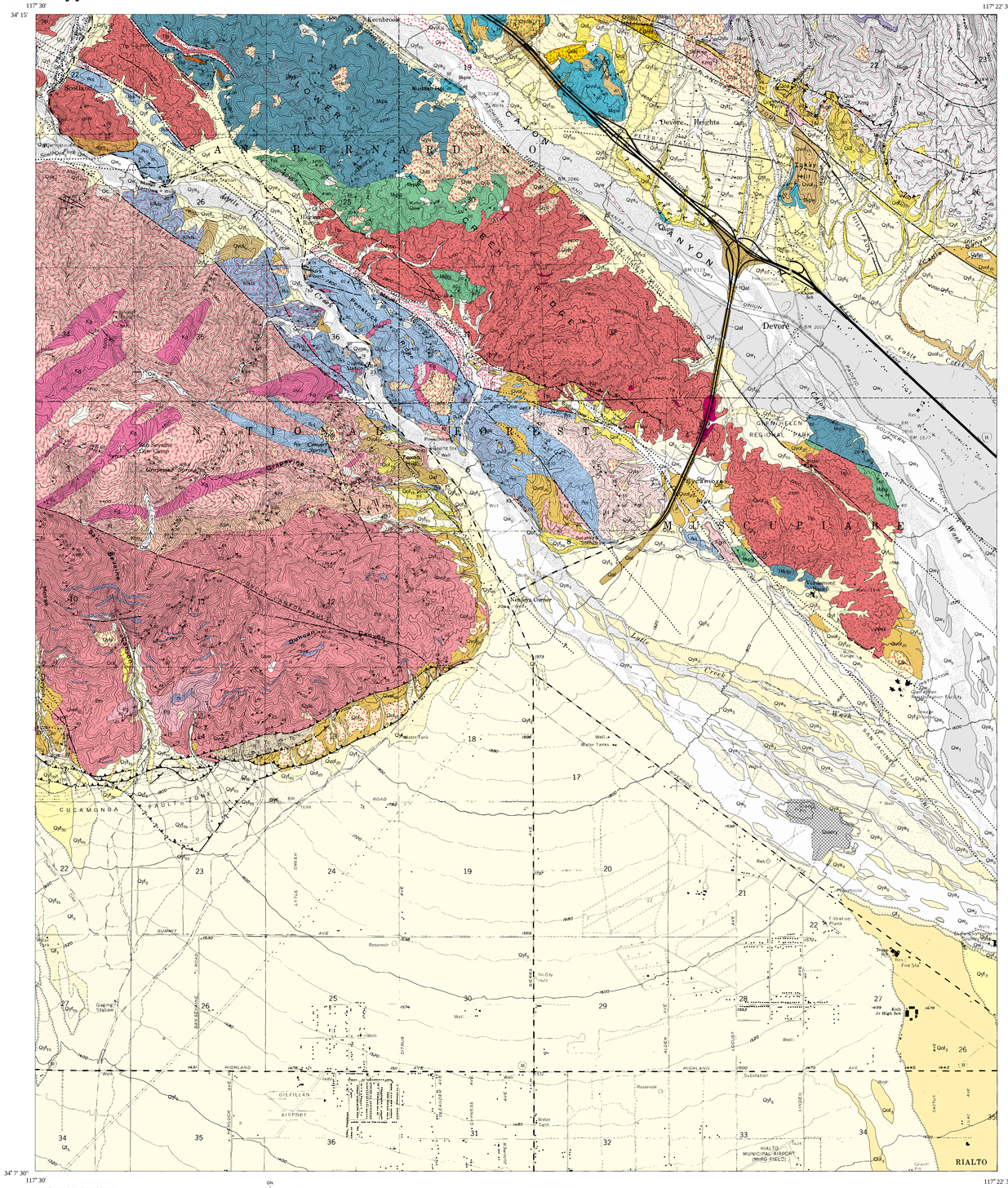
Version 1.0

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY



Base from U.S. Geological Survey
7.5' Devore quadrangle, 1966
Lambert conformal conic projection

GN
MN
15°

SCALE 1:24,000
1 0 1 MILE
1 .5 0 1 KILOMETER
CONTOUR INTERVAL 40 FEET

Geology mapped by D.M. Morton and J.C. Matti, 1977-89. Supported by National Cooperative Geologic Mapping Program and National Earthquake Hazards Reduction Program

GEOLOGIC MAP OF THE DEVORE 7.5' QUADRANGLE, SAN BERNARDINO COUNTY, CALIFORNIA

Version 1.0
By

Douglas M. Morton[1] and Jonathan C. Matti[2]
Digital preparation by
Gregory L. Morton[1] and P. M. Cossette[3]
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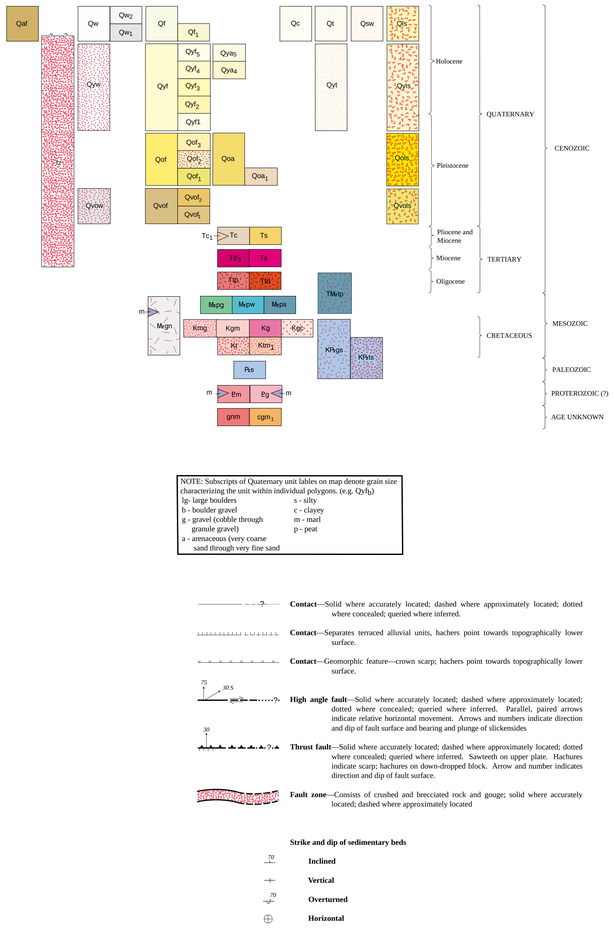
[1] U.S. Geological Survey
Department of Earth Sciences
University of California
Riverside, CA 92521

[2] U.S. Geological Survey
University of Arizona
520 North Park Avenue
Tucson, AZ 85719

[3] U.S. Geological Survey
Room 202
West 904 Riverside Avenue
Spokane, WA 99201-1087

CORRELATION OF MAP UNITS



NOTE: Subscripts of Quaternary unit lables on map denote grain size characterizing the unit within individual polygons. (e.g. Qvf_{lg})

lg- large boulders	s - silty
b - boulder gravel	c - clayey
g - gravel (cobble through granule gravel)	m - marl
a - arenaceous (very coarse sand through very fine sand	p - peat

Contact—Solid where accurately located; dashed where approximately located; dotted where concealed; queried where inferred.

Contact—Separates terraced alluvial units, hachers point towards topographically lower surface.

Contact—Geomorphic feature—crown scarp; hachers point towards topographically lower surface.

High angle fault—Solid where accurately located; dashed where approximately located; dotted where concealed; queried where inferred. Parallel, paired arrows indicate relative horizontal movement. Arrows and numbers indicate direction and dip of fault surface and bearing and plunge of slickensides

Thrust fault—Solid where accurately located; dashed where approximately located; dotted where concealed; queried where inferred. Sawteeth on upper plate. Hachures indicate scarp; hachures on down-dropped block. Arrow and number indicates direction and dip of fault surface.

Fault zone—Consists of crushed and brecciated rock and gouge; solid where accurately located; dashed where approximately located

Strike and dip of sedimentary beds

Inclined

Vertical

Overturned

Horizontal

Strike and dip of foliation and layering in metamorphic rocks

Inclined

Vertical

Bearing and plunge of aligned minerals in metamorphic rocks

Bearing and plunge of horizontal mineral lineation in metamorphic rocks

Bearing and plunge of unspecified linear features

DESCRIPTION OF MAP UNITS

MODERN SURFICIAL DEPOSITS—Sediment recently transported and deposited in channels and washes, on surfaces of alluvial-fans and alluvial plains, and on hillslopes. Soil-profile development is non-existant to minimal. Includes:

Qaf — **Artificial fill (late Holocene)**—Uncompacted fill resulting from mining and tunnel excavations, flood-control levee fill, compacted engineered road and highway fill

Qw — **Modern wash deposits (late Holocene)**—Unconsolidated coarse-grained sand to bouldery alluvium of active channels and washes flooring drainage bottoms within mountains and on alluvial-fans along base of mountains. Most alluvium is, or recently was, subject to active stream flow. Includes some low-lying terrace deposits along alluviated canyon floors and areas underlain by colluvium along base of some slopes

Qw_2 — **Modern wash deposits, Unit 2**—Unconsolidated coarse-grained sand to bouldery alluvium of recently active channels and washes; commonly distinguished by terrace level

Qw_1 — **Modern wash deposits, Unit 1**—Unconsolidated coarse-grained sand to bouldery alluvium of recently active channels and washes; commonly distinguished by terrace level

Qf — **Modern alluvial-fan deposits (late Holocene)**—Unconsolidated deposits of coarse-grained sand to bouldery alluvium of modern fans having undissected surfaces

Qf_1 — **Modern alluvial-fan deposits, Unit 1**—Unconsolidated deposits of coarse-grained sand to bouldery alluvium of modern fans having undissected surfaces; commonly distinguished by terrace level

Qc — **Modern colluvial deposits (late Holocene)**—Unconsolidated deposits of soil and angular rock debris along base of slopes. Ranges from deposits consisting of almost wholly rock fragments to deposits of soil and humus-rich material

Qt — **Modern talus deposits (late Holocene)**—Unconsolidated to slightly consolidated deposits of angular and subangular pebble-, cobble-, and boulder-size material that form scree and rubble on hillslopes and at base of slopes

Qsw — **Modern slopewash deposits (late Holocene)**—Unconsolidated to slightly consolidated sand, pebbles, cobbles, and small boulders deposited by water not confined to channels

Qls — **Modern landslide deposits (late Holocene)**—Slope failure deposits consisting of displaced bedrock blocks and (or) chaotically mixed rubble. Deposits are possibly active under current climatic conditions and moderate to strong ground-shaking conditions

YOUNGER SURFICIAL DEPOSITS—Sedimentary units that are slightly consolidated to cemented and slighlty to moderately dissected. alluvial-fan deposits (Qyf series) typically have high coarse:fine cast ratios. Younger surficial units have upper surfaces that are capped by slight to moderately developed pedogenic-soil profiles (A/C to $A/AC/B_{cambric}C_{ox}$ profiles). Includes:

Qyw — **Young wash deposits (Holocene and late Pleistocene)**—Unconsolidated to slightly consolidated coarse-grained sand to bouldery alluvium.

Qyf — **Young alluvial-fan deposits (Holocene and late Pleistocene)**—Unconsolidated to moderately consolidated, coarse-grained sand to bouldery alluvial-fan deposits having slighlty to moderately dissected surfaces. Includes from youngest to oldest:

Qyf_5 — **Young alluvial-fan deposits, Unit 5 (Holocene)**—alluvial-fan deposits having slighlty dissected surfaces and stage S7 soils. Slightly younger than Qyf_4 based on geomorphic relations. Found in northeast part of quadrangle between East Kimbark and Ames Canyons

Qyf_4 — **Young alluvial-fan deposits, Unit 4 (Holocene)**—alluvial-fan deposits having slighlty dissected surfaces and stage S7 soils

Qyf_3 — **Young alluvial-fan deposits, Unit 3 (Holocene)**—alluvial-fan deposits having slighlty dissected surfaces and stage S6 or incipiently developed stage S5 soils

Qyf_2 — **Young alluvial-fan deposits, Unit 2 (Holocene)**—alluvial-fan deposits having moderately dissected surfaces and well-developed S5 soils

Qyf_1 — **Young alluvial-fan deposits, Unit 1 (late Pleistocene)**—alluvial-fan deposits having moderately dissected surfaces and well-developed S5 soils

Qyls — **Young alluvial-valley deposits (Holocene)**—Includes:

$Qyls_5$ — **Young alluvial-valley deposits, Unit 5 (Holocene)**—Low terraces of gravelly sand

$Qyls_4$ — **Young alluvial-valley deposits, Unit 4 (Holocene)**—Low terraces of gravelly sand

Qyt — **Young talus deposits (Holocene and late Pleistocene)**—Slightly to moderately dissected, consolidated to cemented deposits of angular and subangular pebble-, cobble-, and boulder-size material that form scree and rubble on hillslopes and at base of slopes

Qyls — **Young landslide deposits (Holocene and late Pleistocene)**—Slope failure deposits that consist of displaced bedrock blocks and (or) chaotically mixed rubble. Deposits are probably inactive under current climatic conditions and moderate to strong ground-shaking conditions

OLDER SURFICIAL DEPOSITS—Sedimentary units that are moderately consolidated and slightly to moderately dissected. Older surficial deposits have upper surfaces that are capped by moderately to well developed pedogenic soils ($A/AB/B/C_{ox}$ profiles and Bt horizons as much as 1 to 2 m thick and have maximum hues in the range of 10YR 5/4 and 6/4 through 7.5YR 6/4 to 4/4 and mature Bt horizons reaching 5YR 5/6). Includes:

Qof — **Old alluvial-fan deposits (late to middle Pleistocene)**—Unconsolidated to well consolidated alluvial-fan deposits of coarse-grained sand to bouldery alluvium. These old fans have moderately to well dissected surfaces. Includes from youngest to oldest:

Qof_3 — **Old alluvial-fan deposits, Unit 3 (late Pleistocene)**—alluvial-fan deposits having moderately dissected surfaces and stage S4 soils

Qof_2 — **Old alluvial-fan deposits, Unit 2 (late Pleistocene)**—alluvial-fan deposits having well-dissected surfaces and stage S4 to stage S3 soils

Qof_1 — **Old alluvial-fan deposits, Unit 1 (middle Pleistocene)**—alluvial-fan deposits having well-dissected surfaces and stage S3 soils

Qoa — **Old alluvial-valley deposits (late to middle Pleistocene)**—Low terraces of gravelly sand

Qoa_1 — **Old alluvial-valley deposits, Unit 1 (middle Pleistocene)**—Low terraces of gravelly sand

Qols — **Old landslide deposits (late to middle Pleistocene)**—Dissected slope-failure deposits that consist of unconsolidated to moderately consolidated, massive to crudely stratified rock debris and rubble. Deposits are probably inactive under current climatic conditions and moderate to strong ground-shaking conditions

VERY OLD SURFICIAL DEPOSITS—Sediments that are slightly to well consolidated to indurated, and moderately to well dissected. Upper surfaces are capped by moderate to well developed pedogenic soils ($A/AB/B/C_{ox}$ profiles having Bt horizons as much as 2 to 3 m thick and maximum hues in the range 7.5YR 6/4 and 4/4 to 2.5YR 5/6)

Qvow — **Very old wash deposits (early Pleistocene)**—Unconsolidated to slightly consolidated coarse-grained sand to bouldery alluvium

Qvof — **Very old alluvial-fan deposits (early Pleistocene)**—Unconsolidated to well-consolidated alluvial-fan deposits of coarse-grained sand to bouldery alluvium. Many very old fans are characterized by extremely dissected surfaces. Includes from youngest to oldest:

$Qvof_2$ — **Very old alluvial-fan deposits, unit 2**—alluvial-fan deposits having extremely dissected surfaces and stage S2 soils

$Qvof_1$ — **Very old alluvial-fan deposits, unit 1**—alluvial-fan deposits having extremely dissected surfaces and stage S1 soils

Qvols — **Very old landslide deposits (early Pleistocene)**—Well dissected slope-failure deposits that consist of moderately consolidated, massive to crudely stratified rock debris and rubble. Deposits are probably inactive under current climatic conditions and moderate to strong ground-shaking conditions

Tc — **Crushed rock in fault zones (Holocene to late Tertiary)**—Gouge and crushed and brecciated rock developed along Lytle Creek and San Jacinto Fault zones

Tc1 — **Conglomerate (Pliocene and Miocene)**—Moderately indurated, gray, massive to moderately well bedded, non-marine boulder conglomerate. Contains some interbeds of coarse-grained, moderately indurated sandstone. Found along San Gabriel Mountain front where conglomerate unconformably underlies units Qofg and Qofg and is overthrust by granulitic gneiss (Pm). Locally contains conglomerate (Tc_2) which has spare clasts of argillic-altered, silicic volcanic rocks

Ts — **Arkosic sandstone (Pliocene and Miocene)**—Well indurated, indistinctly bedded, pebbly, tan, arkosic, non-marine sandstone found within the San Andreas fault zone. Contains abundant 10 to 20 cm-diameter clasts of thouroughly fractured granitic rocks and subangular, olive-brown volcanic rocks. Most of unit appears to be highly deformed, but retains a massive appearance

Td3 — **Olivine diabase and gabbro (Miocene)**—Texturally zoned small pluton consisting of aphanitic to fine-grained olivine diabase near margins, grading to coarse-grained olivine gabbro near its center. Intrudes Oligocene granodiorite of Telegraph Peak (Ttp) between Cajon and Lytle Creeks. Contains late-crystallizing, non-discrete pegmatic clots which are characterized by large amounts of ilmenite and amphibole and are cut by thin dikes of white granophyre

Ta — **Andesitic dike rocks (Miocene)**—Andesitic dikes, most under 1 m-thick, found mainly on central part of Lower Lytle Creek Ridge. Consists of fine- to medium-grained, equigranular to porphyritic hypabyssal rock of andesitic composition

Ttp — **Granodiorite of Telegraph Peak (Oligocene)**—Biotite granodiorite, ranging to biotite monzogranite. Medium- to coarse-grained, mostly massive, hypidiomorphic-granular, white-weathering biotite granodiorite. Average color index is 8. Sphene-bearing. Fine grained and porphyritic near borders. Highly fractured most places; deeply weathered on ridge tops. Intrudes greenstone unit of Mesozoic Pelona Schist on lower Lytle Ridge. May and Walker (1989) report lower intercept concordia age of 25.6 Ma on zircons from granodiorite of Telegraph Peak. Locally includes:

Tsd1 — **Hypabyssal dikes**—Dikes and irregular shaped bodies of rock transitional between biotite granodiorite and biotite dacite; probably represent shallow intrusions of granodiorite of Telegraph Peak (Ttp). East of the San Andreas Fault, having phenocrysts of quartz, feldspar, and biotite; rocks are characterized by well oriented biotite, which imparts foliated texture to rock

m Mugn — **Gneiss east of San Andreas Fault zone (Mesozoic)**—Irregularly layered and foliated, heterogeneous biotite gneiss; amphibolite grade metamorphism. Mixed with irregular concordant and discordant masses of granitic rocks that appear to be tonalite composition. Includes pods and elongate masses of coarse-grained white marble (m) that is probably Paleozoic

Mupg — **Pelona Schist (Mesozoic)**—Polymetamorphosed schist, greenstone, and quartzite. Primary sedimentary and volcanic features destroyed by metamorphism; layering in rocks is probably transposed bedding. Age is poorly established. Subdivided into (no relative age implied by order):

Greenstone—Dark-green to greenish-gray, foliated, indistinctly layered chlorite-epidote-albite greenstone. Locally contains hornblende, especially adjacent to granodiorite of Telegraph Peak (Ttp). Greenstone is highly fractured and relatively landslide prone

Mupw — **Muscovite schist**—Spotted muscovite-albite-quartz schist between San Andreas and Glen Helen Fault zones. Relatively homogeneous appearing, well layered, fissile schist that has localized quartz-rich layers, and contains sparse masses of talc and (or) tremolite rock. Spotted appearance is due to small porphyroblasts of dark-gray albite

Mups — **Siliceous schist**—Siliceous, tan to gray muscovite schist, quartzite, spotted albite schist, greenstone, and biotite-bearing schist; includes rare masses of carbonate-tremolite and talc-rich rock. Spotted and biotite-bearing schists are fissile. Quartzite is interlayered with siliceous schist. Most of unit is highly fractured and landslide prone

TMwp — **Pelona Schist and granodiorite of Telegraph Peak (Miocene and Mesozoic)**—Siliceous schist unit of Pelona Schist closely intruded by numerous dikes, sills, and small bodies of granodiorite of Telegraph Peak

Kmg — **Biotite monzogranite (Cretaceous?)**—Coarse- and medium-grained leucocratic monzogranite, grading from gneiss to gneissic granite. Sub-porphyritic, containing small, poorly formed, pink potassium feldspar phenocrysts. Highly fractured, but relatively resistant to erosion, forming smooth, rounded exposures; fractures commonly contain epidote. Cretaceous (?) age based on similarity to nearby granitic rocks of Cretaceous age

Kgm — **Leucocratic muscovite monzogranite (Cretaceous?)**—Medium- to coarse-grained, massive to semi-foliated, highly fractured muscovite monzogranite. White-weathering, largely decomposed. Restricted to small, fault- and alluvium-bounded area south of Sycamore Flat. Cretaceous(?) age based on similarity to nearby granitic rocks of Cretaceous age

Kg — **Monzogranite and granodiorite (Cretaceous?)**—Medium- grained, sub-porphyritic, massive monzogranite to granodiorite. Phenocrysts are potassium feldspar. Weathers off-white. Occurs mainly as large, northeast striking dikes up to half kilometer wide, cutting Cretaceous(?) tonalite of San Sevaine Lookout (Kt), west of Lytle Creek

Kqc — **Mylonitic leucogranite (Cretaceous?)**—Leucocratic mylonitic monzogranite west and northwest of Sycamore Flat between Cajon and Lytle Creeks. Characterized by distinct mylonitic layering defined by deformed quartz and feldspar. Thouroughly fractured and decomposed; weathers white

KPkgs — **Tonalite of San Sevaine Lookout (Cretaceous)**—Hornblende-biotite tonalite, possibly ranging to granodiorite and quartz diorite. Foliated, gray, medium- to coarse-grained; generally equigranular, but locally sub-porphyritic, containing small, poorly formed feldspar phenocrysts. Foliation defined by oriented hornblende and biotite, commonly as dark, multi-grained, flattened inclusions. Contains large septa of marble, gneiss, and schist, the latter two incorporated in varying degree into the tonalite; some rock contains scattered garnets having kelyphytic rims. Along southeast side includes:

KPkts — **Mylonitized tonalite of San Sevaine Lookout (Cretaceous)**—Mylonitized tonalitic rocks. Homogeneous, gray, porphyroblastic mylonite zone 200 to 400 m in width. Mylonite is tonalite composition, but ranges to diorite and monzogranite composition locally. Very fine grained to aphanitic, having porphyroclasts of plagioclase, quartz, and most notably porphyroclasts or porphyroblasts of hornblende as much as 3 cm in length. Most elongate porphyroclasts or porphyroblasts show strong preferential orientation down dip. Includes dark-gray to black, aphanitic mylonite and ultramylonite layers (psuedotachylyte) approximately 3 cm thick.

Pks — **Schist and gneiss (Paleozoic)**—Well foliated schist and gneiss exposed on Pennstock Ridge and areas west of Lytle Creek. Composition of schist and gneiss is variable, but most is biotite-bearing

KPkgs — **Schist, gneiss, monzogranite and granodiorite (Paleozoic)**—Schist and gneiss (Pks) mixed with large proportion of monzogranite and granodiorite (Kgi)

KPkts — **Schist, gneiss, and tonalite (Paleozoic)**—Schist and gneiss (Pks) mixed with large proportion of tonalite of San Sevaine Lookout (Kt)

m Pm — **Granulitic gneiss, mylonite, and cataclasite (Proterozoic?)**—Prograde granulitic gneiss that is largely retrograded to amphibolite and greenschist grade mylonite and cataclasite. Granulitic gneiss includes quartz-feldspar gneiss, garnet-quartz-feldspar gneiss, amphibolite, garnet-pyroxene rich rocks, and spinel-pyroxene rich rocks. Gneiss includes layers of coarse-grained marble (m) that are progressively more mylonitic southward in unit. Includes:

m Pg — **Granulitic gneiss, mylonite, and cataclasite, unretrograded (Proterozoic?)**—Same protolith as retrograded rock (Pm), but most of prograde mineralogy and texture is preserved. Unit is compositionally layered, but unfoliated garnet-pyroxene-plagioclase rock. Includes small areas of mylonitized rocks and pods of white, mylonitic marble (m)

gnm — **Cataclastic gneiss (age unknown)**—Cataclastic and mylonitic biotite gneiss intruded by granitic rocks which have also been mylonitized. Gneiss is layered, intensely folded, and contains amphibolite grade mineral assemblages. Restricted to Scotland area in northwestern part of quadrangle. Gneiss contains scattered pods of white, coarse- to very fine-grained, mylonitic marble too small to show at map scale. Includes:

cgm1 — **Chloritized, cataclastic granitic rock (age unknown)**—Cataclastic biotite gneiss containing large proportion of cataclasized, chloritic granitic rocks. Restricted to Scotland area in northwestern part of quadrangle, adjacent to cataclastic gneiss unit (gnm)

GEOLOGIC SUMMARY

The Devore quadrangle straddles part of the boundary between two major physiographic provinces of California, the Transverse Ranges Province to the north and the Peninsular Ranges Province to the south. The north half of the quadrangle includes the eastern San Gabriel Mountains and a small part of the western San Bernardino Mountains, both within the east-central part of the Transverse Ranges Province. South of the Cucamonga and San Andreas Fault zones, the extensive alluviated area in the south half of the quadrangle lies within the upper Santa Ana River Valley, and represents the northernmost part of the Peninsular Ranges Province.

There are numerous active fault traces within the quadrangle, including right-lateral strike-slip faults of the San Andreas Fault system, which dominate the younger structural elements, and separate the San Gabriel from the San Bernardino Mountains. The active San Jacinto Fault zone projects toward the quadrangle from the southeast, but its location is poorly constrained not only within the quadrangle, but for at least several kilometers to the southeast. As a result, the interrelation between it, the Glen Helen Fault, and the probable easternmost part of the San Gabriel Fault is interpretive. Thrust faults of the Cucamonga Fault zone along the south margin of the San Gabriel Mountains, represent the rejuvinated eastern end of a major old fault zone that bounds the south side of the western and central Transverse Ranges (Morton and Matti, 1993). Rejuvenation of this old fault zone, including the Cucamonga Fault zone, is apparently in response to compression in the eastern San Gabriel Mountains resulting from initiation of right-lateral slip on the San Jacinto Fault zone in the Peninsular Ranges.

The structural grain within the San Gabriel Mountains, as defined by basement rocks, is generally east striking. Within the Devore quadrangle, these basement rocks include a Paleozoic (?) schist, quartzite, and marble metasedimentary sequence, which occurs as discontinuous lenses and septa within Cretaceous granitic rocks. Most of the granitic rocks are of tonalitic composition, and much of them are mylonitic. South of the granitic rocks is a complex assemblage of Proterozoic (?) metamorphic rocks, at least part of which is metasedimentary. The assemblage was metamorphosed to upper amphibolite and lower granulite grade, and subsequently remetamorphosed to a lower metamorphic grade. It is also intensely deformed by mylonitization which is characterized by an east striking, north dipping foliation, and by a pronounced lineation that plunges shallowly east and west.

East of Lytle Creek and west of the San Andreas Fault zone, the predominant basement lithology is Mesozoic Pelona Schist, which consists mostly of greenschist grade metabasalt and metagraywacke. Intruding the Pelona Schist, between Lytle Creek and Cajon Canyon, is the granodiorite of Telegraph Peak of Oligocene age (May and Walker, 1989). East of the San Andreas Fault in the San Bernardino Mountains, basement rocks consist of amphibolite grade gneiss and schist intermixed with concordant and discordant tonalitic rock and pegmatite.

Tertiary conglomerate and sandstone occur in the Cucamonga Fault zone and in a zone 200 to 700 m wide between strands of the San Andreas Fault zone and localized thrust faults northeast of the San Andreas. Most of the conglomerate and sandstone within the Cucamonga Fault zone is overturned forming the north limb of an overturned syncline. Clasts in the conglomerate are not derived from any of the basement rocks in the eastern San Gabriel Mountains. Clasts in the conglomerate and sandstone northeast of the San Andreas Fault zone do not appear to be locally derived either. The south half of the quadrangle is dominated by the large symmetrical alluvial-fan emanating from the canyon of Lytle Creek, and by the complex braided stream sediments of Lytle Creek and Cajon Wash.

The San Andreas Fault is restricted to a relatively narrow zone marked by a pronounced scarp that is especially well exposed near the east margin of the quadrangle. Two poorly exposed, closely spaced, north-dipping thrust faults northeast of the San Andreas Fault have dips that appear to range from 55° to near horizontal. The shallower dips probably are the result of rotation of initially steeper fault surfaces by downhill surface creep. Between the San Andreas and Glen Helen Fault zones, there are several faults that have north facing scarps, the largest of which are the east striking Peters Fault and the northwest striking Tokay Hill Fault. The Tokay Hill Fault is at least in part a reverse fault. Scarps along both faults are youthful appearing.

The Glen Helen Fault zone along the west side of Cajon Creek, is well defined by a pronounced scarp from the area north of Interstate 15, south through Glen Helen Regional Park; an elongate sag pond is located within the park.

The large fault zone along Meyers Canyon, between Penstock and Lower Lytle Ridges, is probably the eastward extension of the San Gabriel Fault zone that is deformed into a northwest orientation due to compression in the eastern San Gabriel Mountains (Morton and Matti, 1993). At the south end of Sycamore Flat, this fault zone consists of three discreet faults distributed over a width of 300 m. About 2.5 km northwest of Sycamore Flats, it consists of a 300 m wide shear zone. At the north end of Penstock Ridge, the fault zone has bifurcated into four strands, which at the northwest corner of the quadrangle are distributed over a width of about one kilometer. From the northern part of Sycamore Flat, for a distance of nearly 5 km northwestward, a northeast dipping reverse fault is located along the east side of the probable San Gabriel Fault zone. This youthful reverse fault has locally placed the Oligocene granodiorite of Telegraph Peak over detritus derived from the granodiorite.

The Lytle Creek Fault, which is commonly considered the western splay of the San Jacinto Fault zone, is located on the west side of Lytle Creek. Lateral displacement on the Lytle Creek Fault has offset parts of the old Lytle Creek channel; this offset gravel-filled channel is best seen at Texas Hill, near the mouth of Lytle Creek, where the gravel was hydraulic mined for gold in the 1890s.

The Cucamonga Fault zone consists of a one kilometer wide zone of northward dipping thrust faults. Most splays of this fault zone dip north 25° to 35°.

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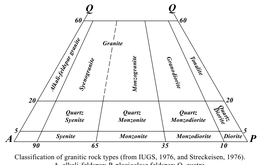


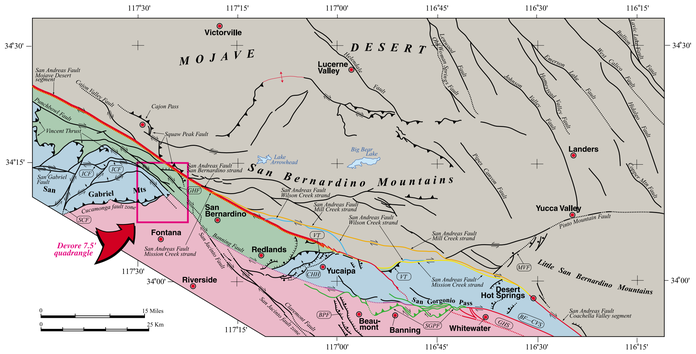
Classification of granitic rock types (from IUGS, 1976, and Streckeisen, 1976). A, alkali-feldspar; P, plagioclase feldspar; Q, quartz

Basement rocks of Peninsular Ranges-type

Basement rocks of San Bernardino Mountains- and Mojave Desert-types

Basement rocks of San Gabriel Mountains-type (upper plate of Vincent Thrust)

Basement rocks of San Gabriel Mountains-type (Pelona Schist in lower plate of Vincent Thrust)



Map showing regional geologic framework and location of Devore 7.5' quadrangle. Faults modified from Matti and others (1992), Matti and Morton (1993), and Rogers (1967). Faults shown in colors are strands of the San Andreas Fault; red indicates modern traces of the San Andreas Fault. *BF—CVS*, Banning Fault—Coachella Valley segment; *GHS*, San Andreas Fault—Garnet Hill strand; *BPF*, Beaumont Plain fault zone; *CHH*, Crafton Hills horst-and-graben complex; *GHF*, Glen Helen Fault; ICF, Icehouse Canyon Fault; *MVF*, Morongo Valley Fault; *SCF*, San Antonio Canyon Fault; *VT*, Vincent Thrust