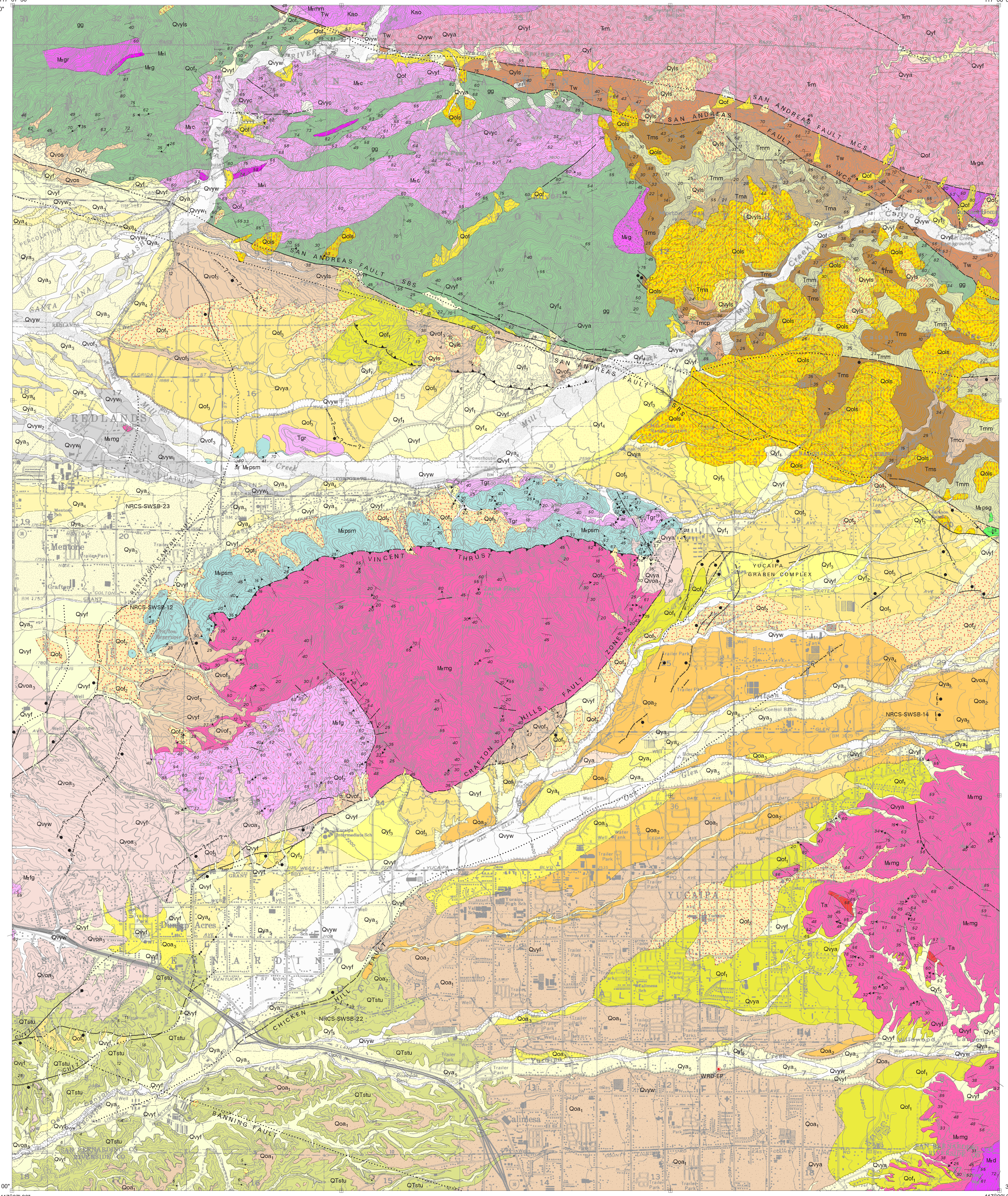
USGS science for a changing world
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

Prepared in cooperation with
SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT
U.S. FOREST SERVICE (San Bernardino National Forest), and
CALIFORNIA GEOLOGICAL SURVEY



Base from U.S. Geological Survey Yucaipa, 1967, photorevised 1980

Polyconic projection

SCALE 1:24,000

1 ½ 0 1 MILE

1 .5 0 1 KILOMETER

CONTOUR INTERVAL 40 FEET

GN MN 15°

CALIF AREA OF MAP

Geologic features that are located with an accuracy and precision of + or - 15 m meet the geologic-map accuracy standard

Geology mapped by J.C. Matti, 1979-1986, 1991; D.M. Morton, 1977; B.F. Cox, 1978-1980; S.E. Carson, 1979, 1980; T.J. Yetter, 1979

Geology of urbanized areas mapped from 1938 and 1952-vintage aerial photographs; in many places, human modifications obscure depicted geology

Updates and revises a previous geologic map of the Yucaipa 7.5' quadrangle (Matti and others, 1992a)

GEOLOGIC MAP OF THE YUCAIPA 7.5' QUADRANGLE, SAN BERNARDINO AND RIVERSIDE COUNTIES, CALIFORNIA

Version 1.0

Geology by

Jonathan C. Matti,[1] Douglas M. Morton,[2] Brett F. Cox,[3] Scott E. Carson,[3] and Thomas J. Yetter[3]

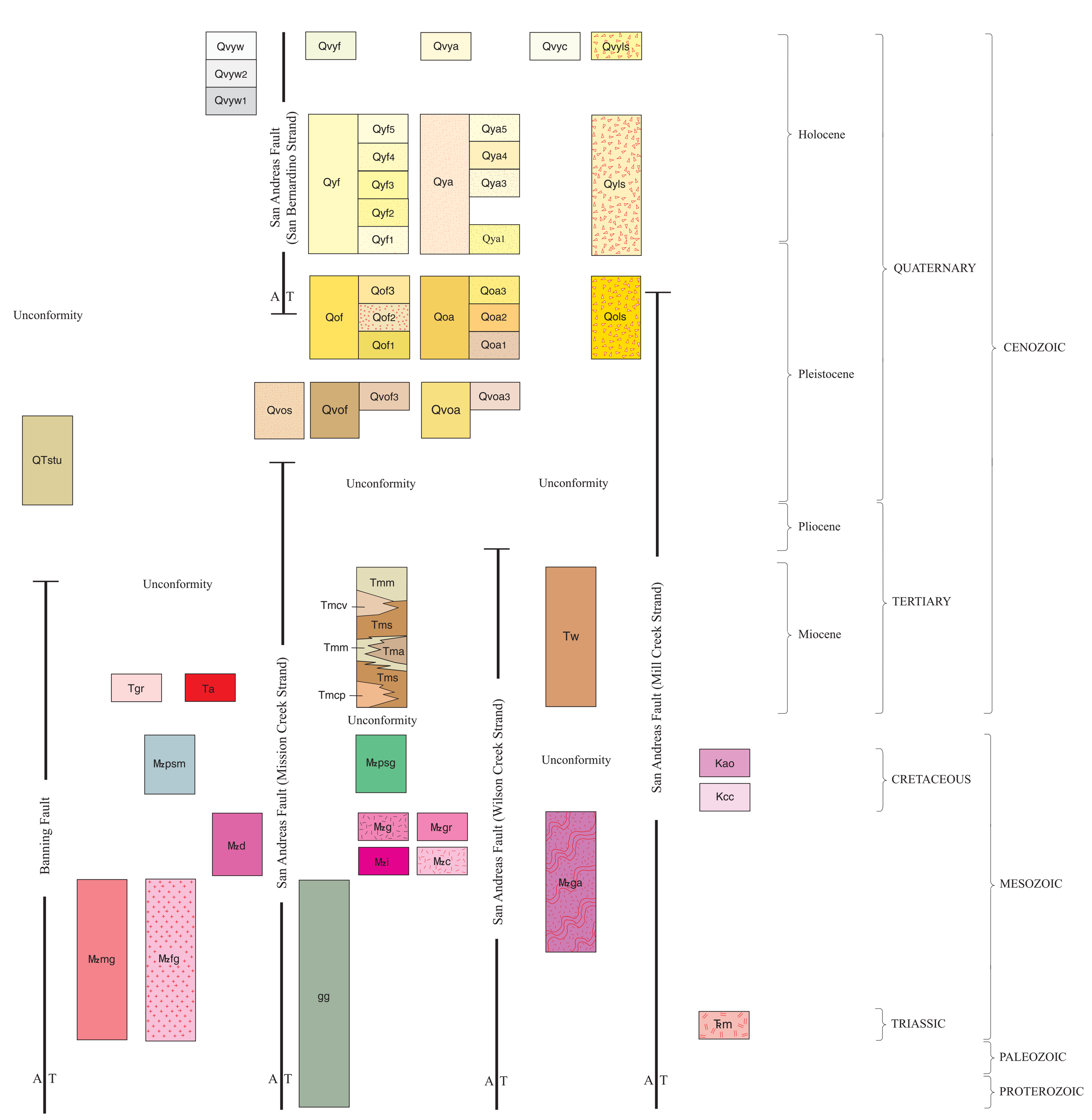
Digital preparation by

Pamela M. Cossette,[4] Bradley Jones,[1] Melinda C. Wright,[2] Steven A. Kennedy,[1] Michael L. Dawson,[2] and Rachel M. Hauser[2]

2003

[1]U.S. Geological Survey Tucson, Arizona
[2]U.S. Geological Survey Riverside, California
[3]U.S. Geological Survey Menlo Park, California
[4]U.S. Geological Survey Spokane, Washington

CORRELATION OF MAP UNITS



This Correlation of Map Units has two features that clarify relations among geologic-map units in the Yucaipa 7.5' quadrangle: (1) To clarify stratigraphic relations among Quaternary surficial units, parent categories for alluvial subunits are shown even though the parent category may not occur in the quadrangle (e.g., the Qoa parent for subunits Qoa2 and Qoa3). The accompanying summary pamphlet provides a discussion of the classification and correlation of surficial deposits in the Yucaipa quadrangle. (2) To clarify relations among major crystalline and sedimentary map units and strands of the San Andreas Fault system that bound them, the correlation chart uses thick vertical lines to show the position of the fault strands (e.g., the Mission Creek Strand of the San Andreas separates map units gg and Mzmg). For each fault, short horizontal bars indicate the capping age at which major right-lateral strike-slip displacement ended; for the modern traces of the San Andreas Fault (San Bernardino Strand), the short bar marks the inception of faulting (from Matti and Morton, 1993). See index map for regional distribution of faults; the accompanying pamphlet on the geologic setting of the Yucaipa quadrangle discusses the faults, their history, and their role in juxtaposing major basement terranes. A, fault movement away from the observer; T, fault movement toward the observer

DESCRIPTION OF MAP UNITS

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

Qvyw **Very young wash deposits, active (latest Holocene)**—Unconsolidated sand and gravel deposits in active washes

Qvyw2 **Very young wash deposits, Unit 2 (latest Holocene)**—Unconsolidated sandy cobble-boulder gravel that probably is entrained by active stream flows only intermittently

Qvyw1 **Very young wash deposits, Unit 1 (latest Holocene)**—Unconsolidated cobble-boulder gravel that probably is abandoned by active stream flows

Qvyf **Very young alluvial-fan deposits (latest Holocene)**—Unconsolidated to slightly consolidated sand and sandy gravel deposits that form active parts of alluvial fans

Qvya **Very young axial-valley deposits (latest Holocene)**—Unconsolidated sandy to cobbly alluvium of through-going stream valleys

Qvyc **Very young colluvial deposits (latest Holocene)**—Unconsolidated and incoherent soil material and (or) rock fragments deposited on slopes and at base of slopes

Qvyls **Very young landslide deposits (latest Holocene)**—Slope-movement deposits of soil and rubble and (or) displaced bedrock blocks

YOUNG SURFICIAL DEPOSITS—Sedimentary units that are slightly to moderately consolidated and slightly to moderately dissected. Alluvial-fan deposits (Qyf series) typically have high coarse:fine ratios; axial-valley deposits (Qya series) typically have low coarse:fine ratios. Upper surfaces commonly capped by slight to moderately developed pedogenic-soil profiles (A/AC to A/AC/Bcambic profiles with oxidized C horizon). Includes:

Qyf **Young alluvial-fan deposits (Holocene and latest Pleistocene)**—Slightly to moderately consolidated sand and gravel. Units distinguished from each other on the basis of soil-profile development and relative position in local terrace-riser succession. Includes:

Qyf5 **Young alluvial-fan deposits, Unit 5 (latest Holocene)**

Qyf4 **Young alluvial-fan deposits, Unit 4 (late Holocene)**

Qyf3 **Young alluvial-fan deposits, Unit 3 (middle Holocene)**

Qyf2 **Young alluvial-fan deposits, Unit 2 (early Holocene)**

Qyf1 **Young alluvial-fan deposits, Unit 1 (early Holocene and latest Pleistocene)**

Qya **Young axial-valley deposits (Holocene and latest Pleistocene)**—Slightly to moderately consolidated silt, sand, and gravel. Units distinguished from each other on the basis of soil-profile development and relative position in local terrace-riser succession. Includes:

Qya5 **Young axial-valley deposits, Unit 5 (latest Holocene)**

Qya4 **Young axial-valley deposits, Unit 4 (late Holocene)**

Qya3 **Young axial-valley deposits, Unit 3 (middle Holocene)**

Qya1 **Young axial-valley deposits, Unit 1 (early Holocene and latest Pleistocene)**

Qyls **Young landslide deposits (Holocene and latest Pleistocene)**—Slightly dissected slope-movement deposits. Locally may include old landslide material

OLD SURFICIAL DEPOSITS—Sedimentary units that are moderately consolidated and slightly to moderately dissected. Alluvial-fan deposits (Qof series) typically are gravelly, but include sand and silt; axial-valley deposits (Qoa series) are dominated by sand with minor gravel. Upper surfaces commonly capped by moderately to well-developed pedogenic soils (A/AB/B/C profiles with Bt horizons as much as 1 to 2 m thick and maximum hues typically in the range of 10YR 5/4 and 6/4 [yellowish brown and light yellowish brown] through 7.5YR 6/4 to 4/4 [light brown to dark brown] but reaching 5YR 5/6 [yellowish red]). Includes:

Qof **Old alluvial-fan deposits (late to middle Pleistocene)**—Moderately to well consolidated silt, sand, and gravel. Units distinguished from each other on the basis of soil-profile development and relative position in local terrace-riser succession. Includes:

Qof3 **Old alluvial-fan deposits, Unit 3 (late to middle Pleistocene)**

Qof2 **Old alluvial-fan deposits, Unit 2 (late to middle Pleistocene)**

Qof1 **Old alluvial-fan deposits, Unit 1 (late to middle Pleistocene)**

Old axial-valley deposits (late to middle Pleistocene)—Moderately to well consolidated silt, sand, and gravel. Units distinguished from each other on the basis of soil-profile development and relative position in local terrace-riser succession. Includes:

Qoa3 **Old axial-valley deposits, Unit 3 (late to middle Pleistocene)**

Qoa2 **Old axial-valley deposits, Unit 2 (late to middle Pleistocene)**

Qoa1 **Old axial-valley deposits, Unit 1 (late to middle Pleistocene)**

Qols **Old landslide deposits (late to middle Pleistocene)**—Moderately dissected slope-movement deposits. Probably inactive under current climatic and tectonic conditions

VERY OLD SURFICIAL DEPOSITS—Sedimentary units that are moderately to well consolidated to indurated, and moderately to well dissected. Alluvial-fan deposits (Qvof series) typically are gravelly, but include sand and silt; axial-valley deposits (Qvoa series) are dominated by sand with minor gravel. Upper surfaces are capped by moderate to well developed pedogenic soils (A/AB/B/C_{ox} profiles with Bt horizons as much as 2 to 3 m thick and maximum hues in the range of 7.5YR 6/4 to 4/4 [light brown to dark brown] and 2.5YR 5/6 [red]). Includes:

Qvos **Very old surficial deposits, undifferentiated (middle to early Pleistocene)**—Well dissected, slightly to moderately consolidated alluvium

Very old alluvial-fan deposits (middle to early Pleistocene)—Moderately to well consolidated silt, sand, and gravel. Units distinguished from each other on the basis of soil-profile development and relative position in local terrace-riser succession. Includes:

Qvof3 **Very old alluvial-fan deposits, Unit 3 (middle to early Pleistocene)**

Very old axial-valley deposits (middle to early Pleistocene)—Moderately to well consolidated silt, sand, and gravel. Units distinguished from each other on the basis of soil-profile development and relative position in local terrace-riser succession. Map units include:

Qvoa3 **Very old axial-valley deposits, Unit 3 (middle to early Pleistocene)**

CENOZOIC AND MESOZOIC ROCKS WEST OF SAN ANDREAS FAULT

QTstu **San Timoteo beds of Frick (1921), upper member (Pleistocene and Pliocene)**—Nonmarine sandstone and conglomerate. Forms upper part of thick sedimentary sequence Frick (1921, p. 314) referred to as Tertiary Deposits of the San Timoteo Badlands—specifically his "San Timoteo beds" or "Upper San Timoteo Deposition" (Frick, 1921, p. 283, 317)

Tgr **Granodiorite (Tertiary)**—Granodioritic quartz porphyry occurring as sills and small bodies intrusive into Pelona Schist

Ta **Andesite to dacite (Tertiary)**

Mzpsm **Pelona Schist, muscovite schist unit (Mesozoic protolith)**

Mzmg **Mylonitic and cataclastic granitoid rock (Mesozoic)**

Mzfg **Foliated granitoid rock (Mesozoic)**

Mzd **Diorite (Mesozoic)**

CENOZOIC AND MESOZOIC ROCKS BETWEEN MISSION CREEK AND WILSON CREEK STRANDS OF SAN ANDREAS FAULT

Mill Creek Formation of Gibson (1971) (Miocene)—Nonmarine claystone, mudstone, sandstone, and conglomerate. Includes five informal subunits based on overall lithologic character, including from youngest to oldest:

Tmm **Mill Creek Formation of Gibson (1971), mudrock unit (Miocene)**—Stratigraphic interval where mudrock predominates over sandstone

Tmcv **Mill Creek Formation of Gibson (1971), volcanic-clast-bearing unit (Miocene)**—Sandstone and conglomeratic sandstone

Tms **Mill Creek Formation of Gibson (1971), sandstone unit (Miocene)**—Stratigraphic interval where sandstone predominates over mudrock

Tma **Mill Creek Formation of Gibson (1971), arkose unit (Miocene)**—Stratigraphic interval dominated by feldspar-rich arkosic sandstone

Tmcp **Mill Creek Formation of Gibson (1971), Pelona Schist-bearing conglomerate unit (Miocene)**

gg **Gneissose granitoid rock and gneiss (Mesozoic and older)**—Compositionally and texturally heterogeneous igneous and plutonic complex

Mzg **Granitoid rock (Mesozoic)**

Mzgr **Mesocratic granitoid rock (Mesozoic)**

Mzi **Inclusion-rich granitoid rock (Mesozoic)**

Mzc **Diorite of Cram Peak (Mesozoic)**

Mzpsg **Pelona Schist, greenstone unit (Mesozoic protolith)**

CENOZOIC AND MESOZOIC ROCKS BETWEEN MILL CREEK AND WILSON CREEK STRANDS, SAN ANDREAS FAULT

Tw **Formation of Warm Springs Canyon (Miocene?)**—Nonmarine sandstone and conglomerate mapped by Morton and Miller (1975, figs. 1c-1g) along southwest margin of San Bernardino Mountains

Mzga **Orthogneiss of Alger Creek (Mesozoic?)**

ROCKS EAST OF SAN ANDREAS FAULT

Kao **Granodiorite of Angeles Oaks (Cretaceous)**

Kcc **Monzogranite of City Creek (Cretaceous)**

Trm **Porphyritic monzogranite (Triassic)**

REFERENCES CITED

Bowles, J.E., 1984, Physical and geotechnical properties of soils: New York, McGraw-Hill Book Company, 2nd Edition, 578 p.

Burnham, W.L., 1952, A preliminary report on the Yucaipa Valley crevice: unpublished manuscript, 44 p.

Frick, C., 1921, Extinct vertebrate faunas of the Badlands of Bautista Creek and San Timoteo Canon, southern California: University of California Publications in Geology, v. 12, no. 5, p. 277-424.

Gibson, R.C., 1971, Nonmarine turbidites and the San Andreas fault, San Bernardino Mountains, California, *in* Elders, W.A., ed., Geological excursions in southern California: Riverside, University of California Campus Museum Contributions, no. 1, p. 167-181.

International Union of Geological Sciences Subcommission on the Systematics of Igneous Rocks, 1973, Plutonic rocks: Geotimes, v. 18, no. 10, p. 26-30.

Matti, J.C., and Morton, D.M., 1993, Paleogeographic evolution of the San Andreas fault in southern California: a reconstruction based on a new cross-fault correlation, *in* Powell, R.E., Weldon, R.J., and Matti, J.C., eds., The San Andreas fault system: displacement, palinspastic reconstruction, and geologic evolution: Geological Society of America Memoir 178, p. 107-159.

Matti, J.C., Morton, D.M., Cox, B.F., Carson, S.E., and Yetter, T.J., 1992a, Geologic map of the Yucaipa 7.5' quadrangle, California: U.S. Geological Survey Open-File Report 92-446, 14 p., scale 1:24,000.

Matti, J.C., Morton, D.M. and Cox, B.F., 1992b, The San Andreas fault system in the vicinity of the central Transverse Ranges province, southern California: U.S. Geological Survey Open-File Report 92-354, 40 p., scale 1:250,000.

Morton, D.M., and Miller, F.K., 1975, Geology of the San Andreas fault zone north of San Bernardino between Cajon Canyon and Santa Ana Wash, *in* Crowell, J.C., ed., San Andreas fault in southern California: California Division of Mines and Geology Special Report 118, p. 136-146.

Streckeisen A., 1976, To each plutonic rock its proper name: Earth Science Reviews, v. 12, p. 1-33.

Contact—Separates geologic-map units. Solid where meets map-accuracy standard; dashed where may not meet map-accuracy standard; dotted where concealed

Contact—Separates terraced alluvial units where younger alluvial unit is incised into older alluvial unit; hachures at base of slope, point toward topographically lower surface. Solid where meets map-accuracy standard; dashed where may not meet map-accuracy standard

Landslide crown scarp—Demarcates pull-away zone at head of landslide mass; may not meet map-accuracy standard. May form geologic contact between landslide mass and bedrock, or may separate discrete landslide masses. Hachures point downslope

Fault—Solid where meets map-accuracy standard; dashed where may not meet map-accuracy standard. Dotted where concealed by mapped covering unit; queried where existence uncertain. Hachures indicate scarp, with hachures on down-dropped block. Paired arrows indicate relative movement; single arrow indicates direction and amount of fault-plane dip. Bar and ball on down-thrown block

Thrust fault—Solid where meets map-accuracy standard; dashed where may not meet map-accuracy standard. Dotted where concealed by mapped covering unit; queried where existence uncertain. Sawteeth on upper plate; hachures at base of slope on downthrown block of fault scarp

Fault-name abbreviations

Crafton Hills Fault Zone—CHFZ

San Andreas Fault—MCS, Mill Creek Strand; MiCS, Mission Creek Strand; SBS, San Bernardino Strand; WCS, Wilson Creek Strand

San Timoteo Canyon Fault Zone—STCFZ

Ground fissure (as mapped by Burnham, 1952)

Strike and dip of sedimentary layeringStrike and dip of sedimentary layering

50 Inclined

Vertical

50 Overturned

50 Binocular determination

50 Compiled

Strike and dip of foliation of mineral grains, inclusions, or schlieren in igneous rocks

20 Inclined

Vertical

Mineral foliation and (or) gneissose layering in metamorphic rocks

20 Inclined

Vertical

Strike and dip of foliation and gneissose compositional layering (origin not determined) in metamorphic and igneous complex (unit gg**)**

20 Inclined

Vertical

Mineral foliation and (or) gneissose layering in cataclastic and (or) mylonitic rocks

20 Inclined

Vertical

Azimuth and plunge of lineations

20 Streaking of crushed mineral grains

20 Alignment of elongate crystals

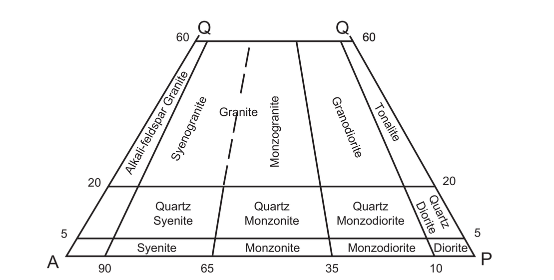
20 Rodding and ridging

20 Minor-fold axis

	Induration State	Field Criterion	Relative Density (D_r)[1]
Unconsoldiated Sediment	Very slightly consolidated	Easily indented with fingers	0.00—0.20
	Slightly consolidated	Somewhat less easily indented with fingers; easily shoveled	0.20—0.40
	Moderately consolidated	Shoveled with difficulty	0.40—0.70
Consolidated Rock	Well consolidated	Requires pick to loosen for shoveling	0.70—0.90
	Lithified	Requires blasting or heavy equipment to	0.90—1.00
	Indurated	Rings to the blow of a hammer	1.00

Criteria for distinguishing and classifying various categories of unconsolidated sediment and consolidated rock (modified from Bowles, 1984, Table 5-2)

[1]As translated by Bowles (1984, p. 151-152), relative density is an engineering parameter that relates void space determined in the laboratory to a ratio involving index values of minimum and maximum void space for specified materials under specified conditions. Void space in turn is related to in situ dry unit weight. Also see the Glossary of Geology definition of relative density in Section 3.1.



Classification of plutonic rock types (from IUGS, 1973, and Streckeisen, 1976). A, alkali feldspar; P, plagioclase feldspar; Q, quartz.

Map showing location of Yucaipa 7.5' quadrangle relative to faults and basement-rock terranes in the region. Faults in red are modern strands of the San Andreas Fault and the San Jacinto Fault; progressively older strands of the San Andreas Fault include the Mill Creek strand (orange), Mission Creek strand (yellow), and Wilson Creek strand (blue). Magenta indicates the late Miocene Banning fault. Paired black arrows indicate movement direction on strike-slip faults; bar-and-ball symbol indicates down-thrown block of normal fault. Modified from Matti and others (1992a) and Matti and Morton (1993). 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; SGPF, San Gorgonio Pass Fault zone; VT, Vincent Thrust.