WEST OF SAN ANDREAS FAULT

CENOZOIC — QUATERNARY — Holocene

- **Q — ALLUVIUM**
- **Qls — LANDSLIDE DEPOSITS** (Shown in areas where practicable; data incomplete).
- **Qs — DUNE SAND** (Includes beach sand).

CENOZOIC — QUATERNARY — Pleistocene

- **Qt — TERRACE DEPOSITS** Unsorted and unconsolidated rock fragments deposited on stream- and wave-cut surfaces.
- **Qmi — MILLERTON FORMATION** Marine and nonmarine clay, silt, sand, and conglomerate; in San Andreas fault zone.
- **Qo — OLDER ALLUVIUM** Dissected alluvial deposits.

CENOZOIC — TERTIARY — Pliocene

- **Por — OHLSON RANCH FORMATION** Marine sandstone, siltstone and conglomerate.
- **Pwg — WILSON GROVE FORMATION** (Formerly "Merced Formation"). Sandstone, conglomerate, limestone concretions, tuff; mostly marine.

CENOZOIC — TERTIARY — Miocene

- **Mdb — DRAKES BAY FORMATION** Cream colored siltstone interbedded with massive silty mudstone; marine.
- **Mmy — MONTEREY FORMATION** Gray to brown organic shale and thin-bedded chert, well-bedded siltstone; marine. (Includes Point Arena Formation and unnamed marine deposits at Fort Ross).
- **Ml — LAIRD SANDSTONE** Quartzose-feldspathic sandstone; basal conglomerate; marine.
- **Mgs — GALLAWAY—SKOONER GULCH FORMATIONS** Marine sandstone and mudstone with prominent fine-grained fossiliferous glauconitic bed.
- **Mib — IVERSEN BASALT**

CENOZOIC — TERTIARY — Oligocene

CENOZOIC — TERTIARY — Eocene

CENOZOIC — TERTIARY — Paleocene

- **Ꝑgr — GERMAN RANCHO FORMATION** Gray arkosic sandstone, gray-black mudstone interbeds, minor conglomerate; marine.
- **Ꝑpr — POINT REYES FORMATION** Conglomerate, interbedded sandstone; marine.

MESOZOIC — CRETACEOUS

- **Kga — GUALALA FORMATION** Sandstone, mudstone, and conglomerate of Stewart's Point and Anchor Bay; marine.
- **sbp — SPILITE NEAR BLACK POINT** (Structurally underlies Upper Cretaceous rocks; stratigraphic position uncertain). Fine-grained to aphanitic dark blue to green altered basalt; very similar to Franciscan greenstone.
- **Kgr — GRANITIC ROCKS** Quartz diorite to granodiorite

MESOZOIC — JURASSIC

PALEOZOIC

- **PzMz — METAMORPHIC ROCKS OF UNCERTAIN AGE** Biotite schist, quartzite, and limestone. (ls = limestone and marble)

EAST OF SAN ANDREAS FAULT

CENOZOIC — QUATERNARY — Holocene

- **Q — ALLUVIUM** Poorly sorted stream and basin deposits; clay to boulder size.
  - Qs — Natural levee and channel deposits.
  - Qb — Basin deposits
- **Qi — INTERTIDAL DEPOSITS** Soft mud and peat deposited in marshes, swamps, and adjacent waterways.
- **Qls — LANDSLIDE DEPOSITS** (Shown in areas where practicable; data incomplete).
- **Qs — DUNE SAND** (Includes beach sand).

CENOZOIC — QUATERNARY — Pleistocene

- **Qo — OLDER ALLUVIUM** Dissected alluvial deposits; includes older fan deposits and rhyolitic gravel in Rodgers Creek fault zone.
- **Qt — TERRACE DEPOSITS** Unsorted and unconsolidated rock fragments deposited on stream- and wave-cut surfaces.
- **QTev — CLEAR LAKE VOLCANICS**
  - Quaternary cinder cone or volcano
  - d—dacite, a—andesite, b—basalt, r—rhyolite, t—tuff and other pyroclastic rocks — Not necessarily in stratigraphic sequence.
- **Qmr — MODESTO—RIVERBANK FORMATIONS** Undifferentiated arkosic alluvial deposits.

CENOZOIC — TERTIARY — Pliocene

- **QT — HUICHICA FORMATION (PLEISTOCENE) GLEN ELLEN FORMATION (PLIOCENE)** Fluvial deposits of gravel, silt, sand, and clay with interbedded tuff. (Includes pumiceous sedimentary rocks near Lake Berryessa; unnamed gravel, silt, sand, and clay near Hopland).
- **Pp — PETALUMA FORMATION** Massive claystone, siltstone, mudstone with lenses of friable sandstone; thin interbeds of fossiliferous limestone; mostly nonmarine.
- **Psv — SONOMA VOLCANICS** Psv—Undifferentiated volcanic and/or sedimentary rocks.
  - b—basalt, a—andesitic to basaltic rocks, r—rhyolite, t—tuff and other pyroclastic rocks — Not necessarily in stratigraphic sequence.
- **QTc — "CACHE FORMATION"** (Includes Pleistocene Kelseyville and Lower Lake Formations of Rymer, 1980). Pebbly sandstone, conglomerate, siltstone, and tuff; nonmarine.
- **Qrb — RED BLUFF FORMATION** Poorly sorted gravel in a reddish silty or sandy matrix; nonmarine.
- **Pt — TEHAMA FORMATION** Nonmarine sand, silt, and volcaniclastic rocks.
  - Ppt — PUTAH TUFF MEMBER
- **Puc — UNNAMED CONTINENTAL DEPOSITS** Poorly sorted sandstone and conglomerate, near Little Sulphur Creek.

CENOZOIC — TERTIARY — Miocene

- **Mbm — VOLCANIC ROCKS OF BURDELL MOUNTAIN** Andesitic mudflow breccia (lahar) and andesite flows. (Includes subsurface Tolay volcanic rocks).
- **Mpp — PUTNAM PEAK BASALT** Augite basalt near Vacaville. [Correlated with Lovejoy Basalt; age uncertain, see Durrell (1959) and Gromme (1963)].
- **Msp — SAN PABLO GROUP** (Includes: Neroly Sandstone, Cierbo Sandstone, Briones Sandstone). Fossiliferous marine sandstone and shale.
- **Mmy — MONTEREY GROUP** (Includes: Rodeo Shale, Hambre Sandstone, Tice Shale, Ourisan Sandstone, Claremont Shale, Sobrante Sandstone and small exposures of Oligocene San Ramon Sandstone). Marine.

CENOZOIC — TERTIARY — Oligocene

- **Emk — MARKLEY SANDSTONE** Massive brownish-gray feldspathic micaceous marine sandstone.
- **En — NORTONVILLE SHALE** Dark brown silty shale and interbedded sandstone; marine.
- **Ed — DOMENGINE SANDSTONE** Marine quartzose sandstone; basal glauconitic grit.
- **Ec — CAPAY FORMATION** Feldspathic sandstone with conglomerate interbeds; marine. Includes Vacaville Shale of Weaver (1949).

CENOZOIC — TERTIARY — Eocene

- **Eum — UNNAMED MARINE EOCENE DEPOSITS** Sedimentary rocks in Conn Valley; and "Tejon Formation" of Brice (1953) in Lower Lake quadrangle.

CENOZOIC — TERTIARY — Paleocene

- **Ꝑmz — MARTINEZ FORMATION** Quartzose sandstone; some conglomerate and shale interbeds; marine.

MESOZOIC — CRETACEOUS

- **FRANCISCAN COMPLEX**
  - **COASTAL BELT - TKf** — Marine sandstone, shale, conglomerate, minor limestone, and rare greenstone.
  - Coastal belt thrust (CBT)
  - **CENTRAL AND EASTERN BELTS - KJf** — Parts of the Franciscan Complex are melange—chaotic mixtures of fragmented rock masses in a sheared shaly matrix.
    - Coherent rock masses large enough to be shown on this map are shown as follows:
    - ss — Sandstone, shale and conglomerate
    - ch — Chert
    - gs — Greenstone (altered basalt; includes metagreenstone and local chert).
    - um — Serpentinized ultramafic (peridotite) rock
    - mg — Metagraywacke (semischist)
    - Blueschist blocks
    - Horizontal pattern denotes undifferentiated melange
    - These units are not necessarily in stratigraphic sequence. The Franciscan Complex is a tectonically disrupted subduction complex composed of diverse rock types including sandstone, shale, conglomerate, greenstone (altered basalt), chert, limestone, metagraywacke (semischist), schist, blueschist, gabbro, and serpentinized peridotite.
  - TKf
  - KJf
- **Coast Range thrust (CRT)**
  - **GREAT VALLEY SEQUENCE**
    - **Ku — UPPER CRETACEOUS ROCKS** Undifferentiated marine sedimentary rocks.
      - Formations of Kirby (1943):
      - **Kfo — FORBES FORMATION** Shale and siltstone; marine.
      - **Kg — GUINDA FORMATION** Sandstone, mudstone; marine.
      - **Kf — FUNKS FORMATION** Shale and sandstone; marine.
      - **Ks — SITES FORMATION** Sandstone; marine.
      - **Ky — YOLO FORMATION** Shale and sandstone; marine.
      - **Kv — VENADO FORMATION** Massive sandstone; conglomerate near base; marine.
    - **Kl, Klsp — LOWER CRETACEOUS ROCKS** Undifferentiated marine mudstone, sandstone and conglomerate; conglomerate rich in rhyolite clasts west of Maacama fault. Klsp—detrital serpentine (possibly Upper Cretaceous near Middletown).
    - **KJu, KJsp — LOWER CRETACEOUS and UPPER JURASSIC ROCKS** Undifferentiated marine mudstone, sandstone, and conglomerate (includes "Knoxville Formation"). Locally the basal part of the sequence is a chaotically deformed mixture of sedimentary rocks, mafic igneous rocks, and serpentine. KJsp—detrital serpentine.
  - **COAST RANGE OPHIOLITE**
    - **Jv — VOLCANIC ROCKS** Mainly basalt; includes silicic volcanic rocks west of the Maacama fault.
    - **Jgd — GABBRO, DIABASE**
    - **um — ULTRAMAFIC ROCKS (PERIDOTITE)** Partly to completely serpentinized.

SOUTH OF CARQUINEZ STRAIT

CENOZOIC — QUATERNARY — Holocene

- **Q — ALLUVIUM**
- **Qi — INTERTIDAL DEPOSITS** Soft mud and peat deposited in marshes, swamps, and adjacent waterways.

CENOZOIC — QUATERNARY — Pleistocene

- **Qo — OLDER ALLUVIUM** Dissected alluvial deposits.
- **Qt — TERRACE DEPOSITS** Unsorted and unconsolidated rock fragments deposited on stream- and wave-cut surfaces.

CENOZOIC — TERTIARY — Pliocene

- **QT? — Fluvial gravel, sand, and silt of uncertain age.**
- **Pt — TEHAMA FORMATION** Nonmarine sand, silt, and volcaniclastic rocks
  - Ppt — PUTAH TUFF MEMBER

CENOZOIC — TERTIARY — Miocene

- **Mo? — ORINDA (?) FORMATION** Pebbly sandstone and conglomerate.
- **Mpt — PINOLE TUFF**
- **Msp — SAN PABLO GROUP** (Includes: Neroly Sandstone, Cierbo Sandstone, Briones Sandstone). Fossiliferous marine sandstone and shale.
- **Mmy — MONTEREY GROUP** (Includes: Rodeo Shale, Hambre Sandstone, Tice Shale, Ourisan Sandstone, Claremont Shale, Sobrante Sandstone, and small exposures of Oligocene San Ramon Sandstone). Marine.

CENOZOIC — TERTIARY — Oligocene

- **KREYENHAGEN FORMATION**
  - **Emk — MARKLEY SANDSTONE** Massive brownish-gray, feldspathic, micaceous, marine sandstone.
  - **En — NORTONVILLE SHALE** Dark brown silty shale, interbedded sandstone; marine.
  - **Ed — DOMENGINE SANDSTONE** Marine quartzose sandstone; basal glauconitic grit.

CENOZOIC — TERTIARY — Paleocene

- **Ꝑmz — MARTINEZ FORMATION** Quartzose sandstone; some conglomerate and shale interbeds; marine.

MESOZOIC — CRETACEOUS

- **Ku, KJu — GREAT VALLEY SEQUENCE** Sandstone, shale, siltstone, mudstone, conglomerate; marine. Ku—Upper Cretaceous rocks. KJu—Lower Cretaceous and Upper Jurassic rocks.

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GEOLOGIC MAP EXPLANATION OF THE SANTA ROSA QUADRANGLE, CALIFORNIA, 1982