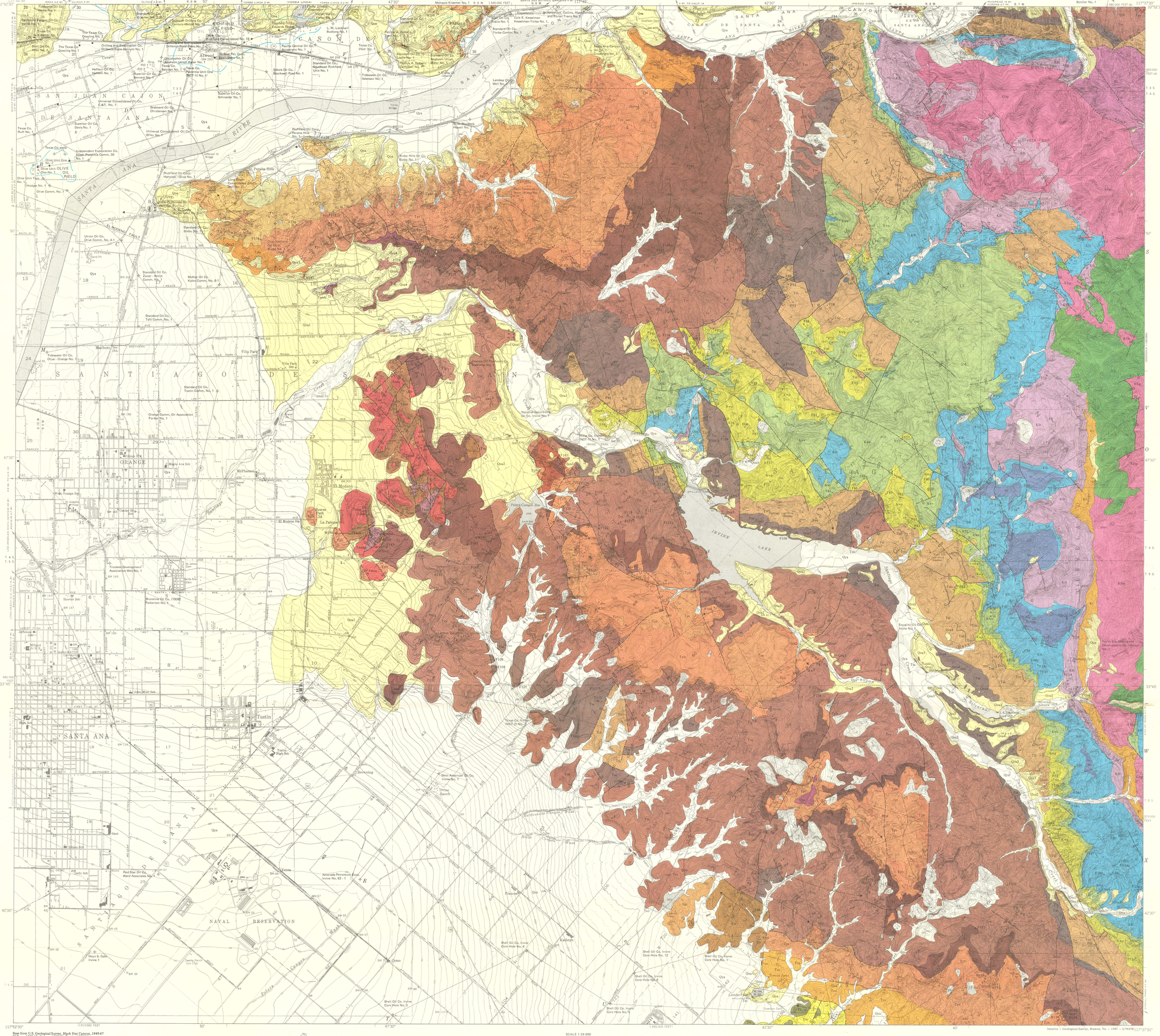


EXPLANATION

Qya — Younger alluvium
Gravel, sand, and silt

Qoa (Qoa1, Qoa2, Qoa3, Qoa4) — Older alluvium
Sand, gravel, and rubble, locally reddish brown in color. Terrace surfaces along Santiago Creek have been tentatively correlated, and each terrace is numbered in order of age. Qoa1, the youngest

Qls — Deformed alluvial deposits
Gray to reddish-brown rubble and gravel; faulted and folded

Qlh — La Habra Formation
White massive poorly sorted pebbly sandstone; yellowish-brown, reddish-brown, and greenish-gray sandy mudstone, earthy sandstone and conglomerate; nonmarine. Exposed north of Santa Ana River, present in subsurface only south of river

Fernando Formation (Pliocene)
- **Tfu** — Upper member
Brownish-yellow to greenish-gray conglomerate sandstone, and micaceous siltstone
- **Tfl** — Lower member
Greenish-gray massive to moderately well bedded micaceous siltstone and sandstone with minor amounts of conglomerate

Puente Formation (Upper Miocene)
- **Tpsc** — Sycamore Canyon Member
Brownish-yellow to gray fine- to coarse-grained sandstone with interbedded gray micaceous siltstone
- **Tpy** — Yorba Member
Chocolate-brown to pinkish-gray massive to well-laminated siltstone, light-gray laminated siltstone and diatomaceous siltstone, yellowish-brown limy siltstone concretions, thin-bedded sandstone
- **Tps** — Soquel Member
Brownish-yellow to gray medium-grained to pebbly sandstone, interbedded gray micaceous siltstone, local conglomerate
- **Tpv** (tuf, u, l, tuf) — La Vida Member
Chocolate-brown to black siltstone, locally contains phosphatic nodules and thin-bedded sandstone
tuf, white vitric tuff in southeast corner of area
u, lenticular sandstone, conglomerate, and breccia
tuf, buff sandy andesitic tuff or volcanic sandstone locally lying between Puente and Topanga Formations

Nipaul Formation
- **Tn** — Brownish-yellow conglomerate and interbedded sandstone

Capistrano Formation
- **Tso** — Oso Member
White medium- to coarse-grained massive sandstone and grit
- **Tplv** — La Vida and Yorba Members, undifferentiated
Light-gray, chocolate-brown, and black siltstone, diatomaceous siltstone, thin-bedded sandstone
- **Tm** — Monterey Shale
White to gray punky siltstone and shale and thin-bedded sandstone

El Modeno Volcanics (Middle Miocene)
- **Tema** — Andesite flows and flow breccia
Red, buff, and gray vesicular andesite flows and flow breccias; interbedded tuffaceous and limy breccia
- **Temt** — Palagonite tuff and tuff-breccia
Light-buff palagonite tuff and tuff breccia of andesitic composition, in part water-laid
- **Temb** — Basalt flows
Gray to black vesicular porphyritic olivine basalt flows, locally overlain by thin-bedded limy organic siltstone
- **Em** — El Modeno Volcanics, undifferentiated
Interbedded andesite and basalt flows, flow breccia, and palagonite tuff and tuff-breccia

Tt (u, l, tu) — Topanga Formation
Brownish-yellow to gray sandstone, conglomerate, and interbedded siltstone
u, limy organic siltstone
tu, white vitric tuff

Tvs (F, V) — Vaqueros and Sespe Formations, undifferentiated
Brownish-yellow, gray, green, red, and white clayey sandstone, conglomerate, and sandy clay, in part nonmarine; upper part contains early Miocene marine fossils
F, marine invertebrate fossil beds

Tsa — Santiago Formation
Upper part white to brownish-yellow massive coarse-grained sandstone and conglomerate; lower part thin-bedded brown to gray sandstone, sandy siltstone, and conglomerate

Tsi (F, Tsb, Tsc) — Silverado Formation
Upper part brownish-yellow to greenish-gray marine sandstone. Contains prominent oyster beds in Coal Canyon area. Lower part coarse-grained micaceous feldspathic nonmarine sandstone, grit, conglomerate, clay, and lignite. Includes:
Tsb, Sarrano Clay Bed; white clay
Tsc, Claymont Clay Bed; pisolitic clay
F, marine invertebrate fossil beds

Williams Formation (Upper Cretaceous)
- **Kwp** — Pleasants Sandstone Member
Light-brown to gray fine-grained sandstone
- **Kws** — Schultz Ranch Sandstone Member
Brownish-yellow to gray massive coarse-grained sandstone and conglomerate
- **Kw** — Williams Formation, undifferentiated
Brownish-yellow to gray fine- to coarse-grained sandstone and interbedded conglomerate

Ladd Formation (Upper Cretaceous)
- **Klb** (ms, u, l) — Holz Shale Member
Gray to black silty shale and siltstone
ms, lenticular sandstone and conglomerate beds
- **Klb** — Baker Canyon Conglomerate Member
Upper part gray, moderately well-bedded coarse-grained sandstone and conglomerate; lower part greenish-gray poorly-bedded to massive conglomerate and sandstone
- **Kl** — Ladd Formation, undifferentiated
Upper part gray to black siltstone, sandy siltstone, and interbedded sandstone and conglomerate; lower part greenish-gray sandstone and conglomerate

Kt — Trabuco Formation (Upper Cretaceous)
Reddish-brown earthy conglomerate and sandstone

KJsp — Santiago Peak Volcanics and related intrusive rocks (Upper Jurassic(?) and Lower(?) Cretaceous)
Slightly metamorphosed andesite flows and breccias; locally intruded by quartz latite porphyry and related rocks

Jbc — Bedford Canyon Formation (Middle Jurassic)
Dark-gray to black slightly metamorphosed siltstone and sandstone; minor amounts of limestone and pebble conglomerate

Contact or mapped bed
Dashed where approximately located. Queried where inferred in sections

Fault
Dip indicated where known; solid where exposed, dashed where approximately located, short dashed where inferred, dotted where concealed; U, apparent upthrown side, D, apparent downthrown side

Low-angle reverse fault
H, upper plate

Anticline showing direction of plunge
Dashed where approximately located, dotted where concealed

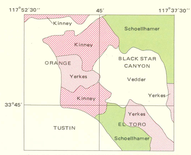
Syncline showing direction of plunge
Dashed where approximately located, dotted where concealed

Inclined — Vertical — Horizontal — Overturned
Strike and dip of beds

Approximate dip of beds, strike undetermined

Landslide

Fossil localities
F116, *Marine invertebrate megafossil locality; unnumbered localities indicate field identification*
M202, *Foraminifer locality*
V1, *Vertebrate locality*
P19, *Plant locality*



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GEOLOGIC MAP OF THE NORTHERN SANTA ANA MOUNTAINS, CALIFORNIA