CALIFORNIA GEOLOGICAL SURVEY
MICHAEL S. REICHLE, ACTING STATE GEOLOGIST

STATE OF CALIFORNIA- ARNOLD SCHWARZENEGGER, GOVERNOR
THE RESOURCES AGENCY- MICHAEL CHRISMAN, SECRETARY FOR RESOURCES
DEPARTMENT OF CONSERVATION- DARRYL YOUNG, DIRECTOR

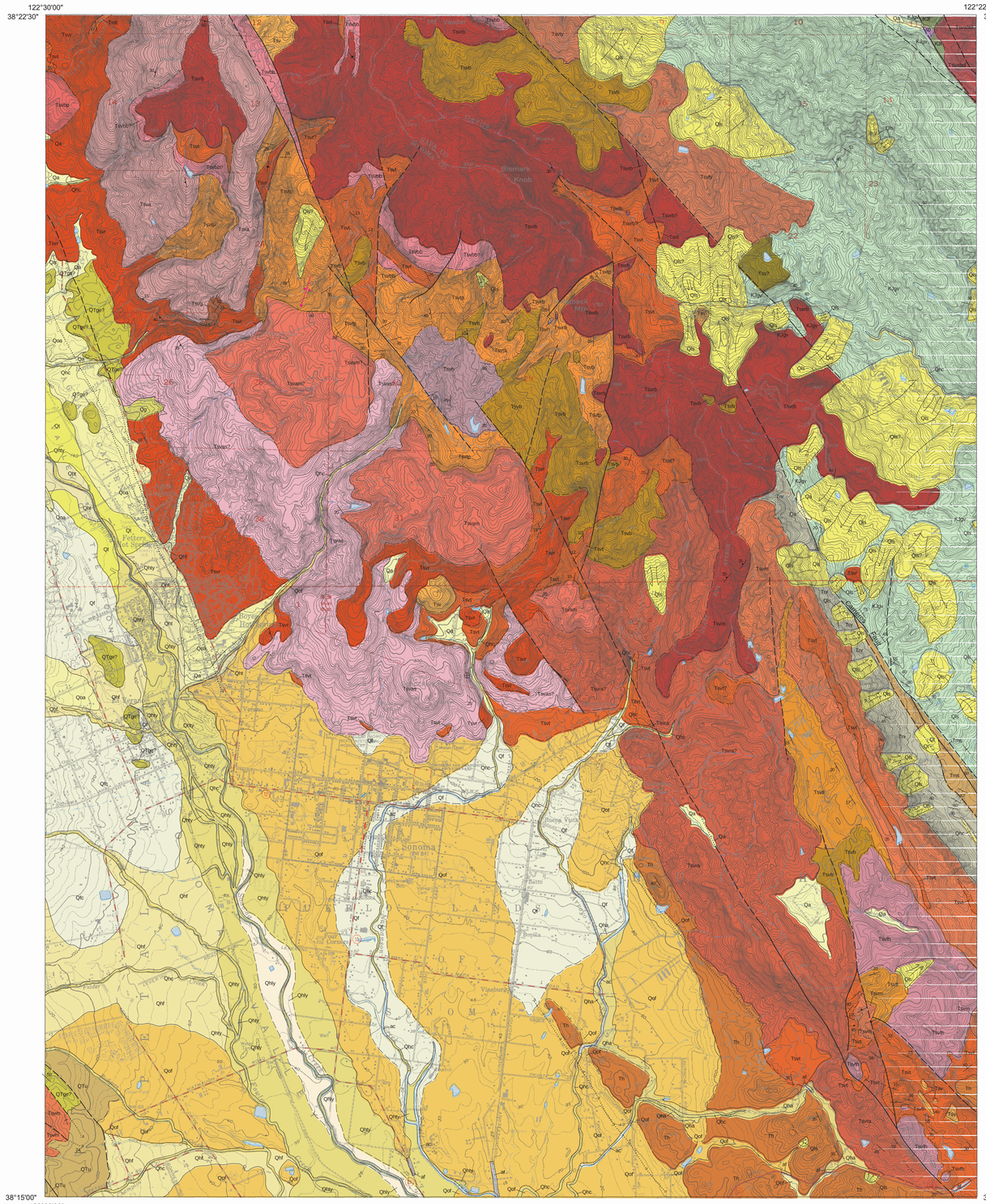
Preliminary Geologic Map available from:
http://www.conservation.ca.gov/cgs/rghm/rgm/preliminary_geologic_maps.htm

GEOLOGIC MAP OF THE SONOMA 7.5' QUADRANGLE SONOMA AND NAPA COUNTIES, CALIFORNIA: A DIGITAL DATABASE

VERSION 1.0
By
David L. Wagner[1], Kevin B. Clahan[2], Carolyn E. Randolph-Loar[3] and Janet M. Sowers[3]

Digital Database
By:
Carlos I. Gutierrez[1]
2004

1. California Geological Survey, 801 K St. MS 12-31, Sacramento, CA 95814
2. California Geological Survey, 185 Berry St., Suite 210, San Francisco, CA 94107
3. William Lettis & Associates, Inc., 1777 Botello Drive, Suite 262 Walnut Creek, CA 94596



Topographic base from the U.S. Geological Survey
UTM Projection, zone 10,
North American Datum 1927

UTM GRID AND 1980 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

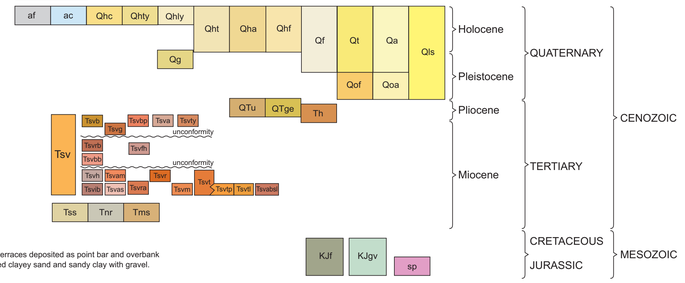
Scale 1:24,000

0 .5 1 2 Miles
0 .5 1 2 Kilometers
0 1 2 Thousand Feet

Contour Interval 20 Feet
Dotted Lines Represent 5 Foot Contours

This geologic map was funded in part by the USGS National Cooperative Geologic Mapping Program, Statemap Award no. 03HQAG0085

Unit Correlation



Unit Explanation

(See Knudsen and others (2000), for more information on Quaternary units).

- **af** — Artificial fill (Holocene, historic) - May be engineered and/or non-engineered.
- **ac** — Artificial stream channel (Holocene, historic).
- **Qhc** — Modern stream channel deposits (Holocene <150 years) - Deposits in active, natural stream channels; consists of loose alluvial sand, gravel, and silt.
- **Qhty** — Stream terrace deposits (latest Holocene <1,000 years) - Stream terraces deposited as point bar and overbank deposits along Somona Creek; composed of moderately sorted clayey sand and sandy clay with gravel.
- **Qhly** — Levee deposits (Holocene <1,000 years).
- **Qht** — Stream terrace deposits (Holocene <10,000 years) - Stream terraces deposited as point bar and overbank deposits along Sonoma Creek; composed of moderately to well-sorted and bedded sand, gravel, silt, and minor clay.
- **Qha** — Alluvium, undivided (Holocene) - Alluvium deposited on fans, terraces, or in basins; composed of sand, gravel, silt, and clay that are poorly sorted.
- **Qhf** — Alluvial fan deposits (Holocene) - Alluvial fan sediment deposited by streams emanating from mountain drainages onto alluvial valleys; composed of moderately to poorly sorted sand, gravel, silt and clay.
- **Qg** — Fluvial gravel (latest Pleistocene to Holocene) - Gravel deposits composed almost exclusively of Sonoma Volcanic clasts and fragments of diatomite 10 to 20 cm across.
- **Qa** — Alluvium, undivided (latest Pleistocene to Holocene) - Flat, relatively undissected fan, terrace, and basin deposits.
- **Qt** — Stream terrace deposits (latest Pleistocene to Holocene) - Sand, gravel, silt and minor clay. Relatively flat, undissected, stream terraces whose absolute age is uncertain.
- **Qf** — Alluvial fan deposits (latest Pleistocene <~30,000 years to Holocene) - Sand, gravel, silt and clay mapped on gently sloping, fan-shaped, relatively undissected alluvial surfaces. Qfc - Fan of Carriger Creek.
- **Qoa** — Alluvial deposits, undivided (early to late Pleistocene) - Alluvial fan, stream terrace, basin, and channel deposits. Topography is gently rolling with little or no original alluvial surfaces preserved; moderately to deeply dissected.
- **Qof** — Alluvial deposits (early to late Pleistocene) - Sandy gravel, silt, and clay.
- **Qls** — Landslide deposits (Holocene and Pleistocene) - Includes debris flows and block slides.
- **QTu** — Unnamed sedimentary deposits (early Pleistocene and Pliocene) - Gravel, sand, reworked tuff, and clay of uknown age. Sediment derived from Sonoma Volcanics.
- **QTge** — Glen Ellen Formation (early Pleistocene and Pliocene) - Gravel, sand, reworked tuff, and clay. Sediments are derived mostly from Sonoma Volcanics. Contains tephra correlated with the Putah Tuff that is about 3.3 Ma (A. Sama-Wojcicki, Personal communication, 2004).
- **Th** — Huichica Formation - (early Pleistocene and Pliocene) - Gravel, sand, reworked tuff and clay. Sediments derived mostly from the Sonoma Volcanics though there are common Franciscan clasts, with lesser amounts of clasts from the Great Valley Sequence and Tertiary marine formations. The Huichica Tuff occurs near the base of the formation along Huichica Creek.

Sonoma Volcanics - Mafic lava flows and tuffs, rhyolite to dacite ash flow tuff, lava flows, intrusions, breccia; also includes tuffaceous sediment, peperite, and hyaloclasite. The age range for the Sonoma Volcanics on this quadrangle is 7.9 to about 5 or 6 Ma (Fox and others, 1985). The Sonoma Volcanics are divided into the following subunits:

Tsv
- **Tsvb** - Olivine basalt lava flows.
- **Tsvbp** - Basalt flows of Boverie Preserve.
- **Tsva** - Andesite lava flows of Mt. Veeder.
- **Tsvty** - White pumiceous tuff; locally contains mudstone clasts from underlying Great Valley Sequence. Contains an ashflow tuff similar or equvalent to 4.83 Ma Lawlor tuff (Andrei Sarna-Wojcicki and Elmira Wan, personal communication, 2005).
- **Tsvg** - Fluvial gravel, sand, and silt, occurring beneath Tsva along Cavedale Road.
- **Tsvrb** - Rhyolite of Bismark Knob - Plagioclase phyric, bluish-gray rhyolite and/or dacite tuff. Often has near-source breccia; some water-laid deposits.
- **Tsvfh** - Lava flows of Huichica Creek - Dark glassy flow rock with highly variable phenocryst assemblage, including plagioclase, pale olivine, and possible amphibole or pyroxene. Appears to be interlayered with a plagioclase phyric dacite. Chemical analyses indicate a range of dacitic to trachydacite (Keith Piturka, personal communication, 2005). Dated by $^{40}Ar/^{39}Ar$ on plagioclase at 6.64 ± 0.06 Ma (Robert Fleck, personal communication, 2005).
- **Tsvbb** - Basalt of Bismark Knob - Plagioclase, pyroxene, olivine phyric, flow basalt. Pyroxene phenocrysts have distinctive yellow alteration.
- **Tsvh** - Hyaloclasite - Well-bedded deposit of angular, vesicular, mafic glass lapilli, with abundant lithic clasts of basalt, minor andesite and diatomite. Chemical analyses indicate an andesite to trachyandesite composition (Keith Piturka, personal communication, 2005).
- **Tsvam** - Andesite of Mission Highlands - Gray, plagioclase phyric, andesite interbedded with tuff. Locally has a platy foliation.
- **Tsvr** - Rhyolite, maybe part of or equivalent to Tsvrb or Tsvra.
- **Tsvt** - Light colored tuff, lithic rich in places. Locally includes tuffaceous, diatomaceous lacustrine sediments. Includes the tuff of Mt. Pisgah (Tsvtp) along the south fork of Agua Caliente Creek and the tuff of Lovall Valley (Tsvtl).
- **Tsvra** - Rhyolite of Arrowhead Mountain - Silicic lava flows, domes, and tuffs in the southwest portion of the quadrangle. A fission track age of 7.5 ± 1.8 Ma was reported by Fox and others (1985).
- **Tsvib** - Basalt plugs and dikes.
- **Tsvas** - Andesite of Schocken Hill - Gray, aphyric andesite lava flows; interbedded with tuff. A fission track age of 7.9 ± 0.8 Ma was reported by Fox and others (1985).
- **Tsvm** - Mafic flows and breccia - Basalt, andesite, and basaltic andesite.
- **Tsvabsl** - Andesite flow breccia of Stags Leap.

- **Tss** — Unnamed tuffaceous siltstone.
- **Tnr** — Neroly Formation (Miocene) - Light colored to bluish-gray medium-grained sandstone.
- **Tms** — Marine sandstone and mudstone (Miocene) - Light colored well-sorted sandstones, coarse-grained pumice-rich sandstone, chocolate brown siltstone.
- **KJgv** — Great Valley Sequence (Early Cretaceous and Late Jurassic) - Mostly greenish, silty mudstone with sandstone interbeds.
- **KJf** — Franciscan Complex (Cretaceous and Jurassic) - Tectonic mixture of masses of resistant rock including sandstone, altered mafic rocks (greenstone), an exotic metamorphic rocks embedded in a sheared shaley matrix.
- **sp** — Serpentinite.

Symbol Explanation

- Contact between map units - Solid where accurately located, dashed where approximately located, short dash where inferred, dotted where concealed.
- Fault - Solid where accurately located, dashed where approximately located, dotted where concealed, queried where uncertain. U = Upthrown block; D = Downthrown block.
- Axis of anticline - Solid where accurately located, dashed where approximately located, dotted where concealed; arrow indicates direction of plunge.
- Horizontal bedding.
- Strike and dip of inclined bedding.
- Vertical bedding.
- Strike and dip of overturned bedding.
- Estimated strike and dip of inclined bedding.
- Strike and dip of inclined foliation.
- Vertical foliation.
- Landslide - Arrows indicate principal direction of movement, queried where existence is questionable; hachures indicate headscarp (source area). For more detailed information on landslides in the Napa County portion of the Sonoma quadrangle, see Wills and Majmundar, 1999.

References

Huffman, M.E., and Armstrong, C.F., 1980, Geology for planning in Sonoma County, California: California Division of Mlnes and Geology Special Report 120, 31 p., plate 3A, scale 1:62,500.

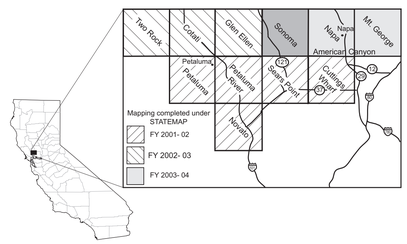
Fox, K.F. Jr., 1983, Tectonic setting of late Miocene, Pliocene and Pleistocene rocks in part of the Coast Range North of San Francisco, California: U.S. Geological Survey Professional Paper 1239, 92 p.

Fox, K.F. Jr., Fleck, R.J., Curtis, G.H., and Meyer, C.M., 1985, Potassium-Argon and fission track ages of the Sonoma Volcanics in an area north of San Pablo Bay, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1753, scale 1:250,000.

Knudsen, K.L., Sowers, J.M., Witter, R.C., Wentworth, C.M., Helley, E.J., 2000, Preliminary geologic maps of the Quaternary deposits and liquefaction susceptibility, nine-county San Francisco Bay Region, California: A digital database: U.S. Geological Survey Open-File Report 00-44, version 1.0, scale 1:52,500.

Weaver, C.E., 1949, Geology of the Coast Range immediately north of the San Francisco Bay Region, California: Geological Society of America Memoir 35, 242 p., plates 6, 10, scale 1:62,500.

Wills, C.J., and Majmundar, H.H., 1999, Landslide hazards in southwest Napa County, California: California Department of Conservation, Division of Mines and Geology Open-File Report 99-06, scale 1:24,000.



Revised: 03/15/2006