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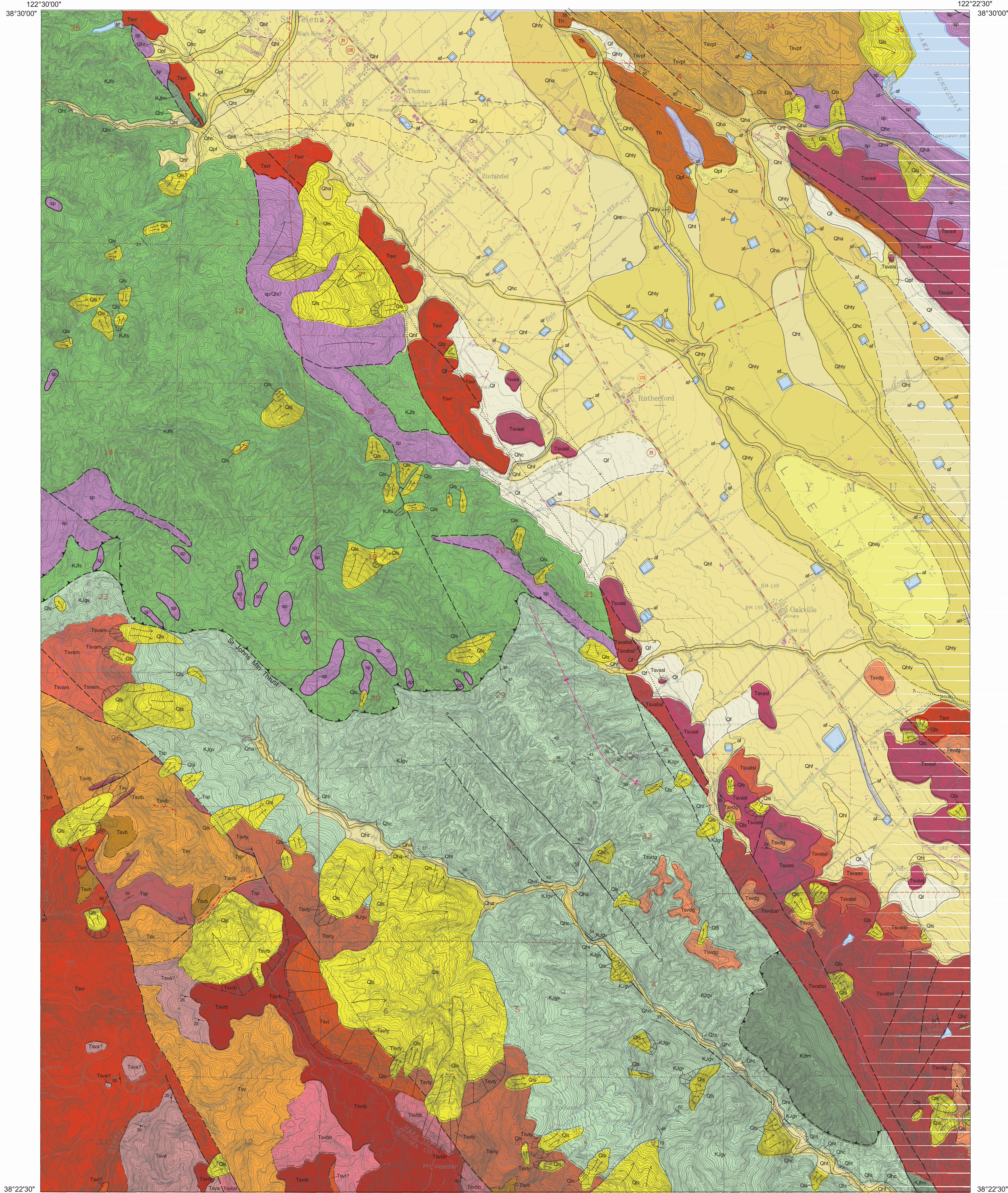
# GEOLOGIC MAP OF THE RUTHERFORD 7.5' QUADRANGLE SONOMA AND NAPA COUNTIES, CALIFORNIA: A DIGITAL DATABASE

VERSION 1.0

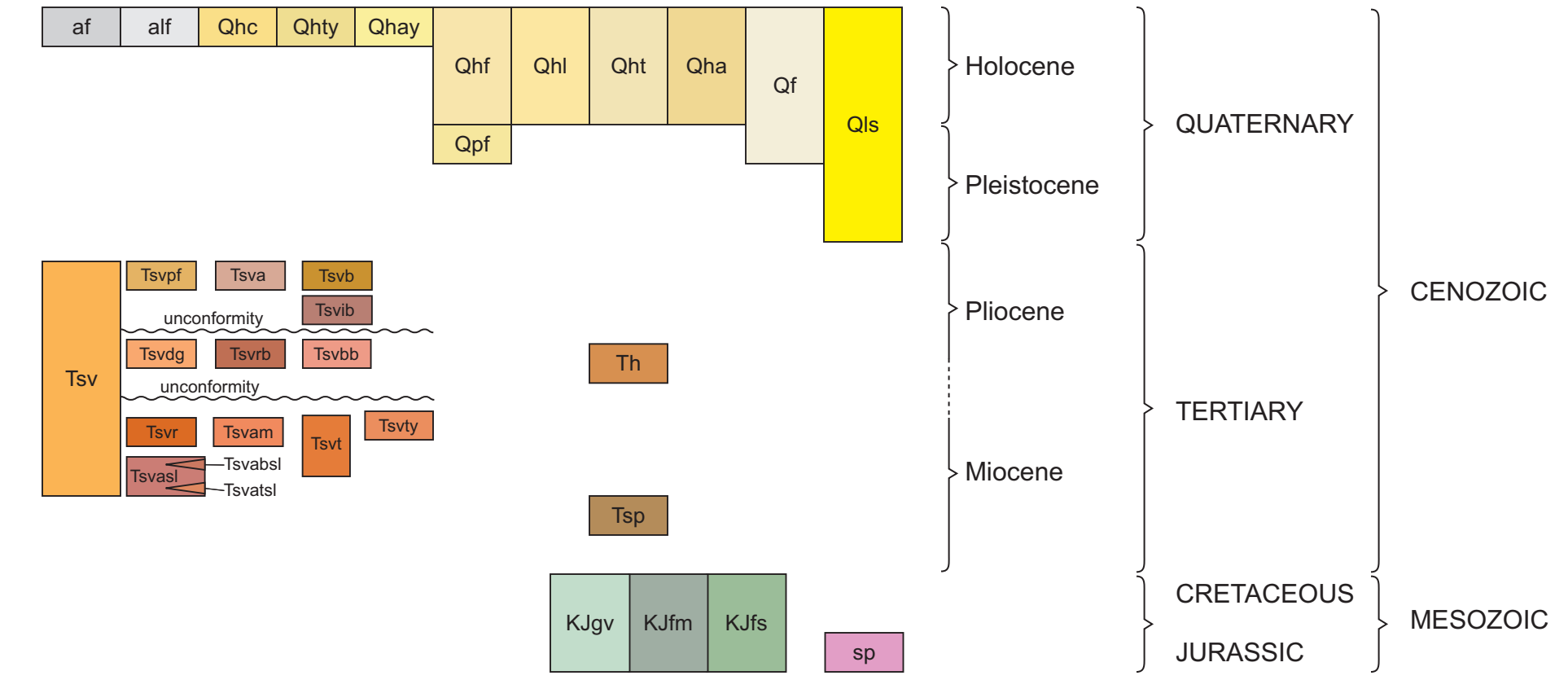
By  
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Digital Database  
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 2005

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### 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.
  - alf** Artificial levee fill (Holocene, historic) - May be engineered and/or non-engineered.
  - 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 the Napa River and Conn Creek; composed of moderately sorted clayey sand and sandy clay with gravel.
  - Qhay** Alluvial deposits (latest Holocene <1,000 years) - Fluvial sediment deposited on the modern flood plains.
  - Qhf** Alluvial fan deposits (Holocene <10,000 years) - Alluvial fan sediment deposited by streams emanating from mountain drainages onto alluvial valleys; composed of moderately to poorly sorted sand, gravel, silt and clay.
  - Qhl** Fan levee deposits (Holocene) - Fan sediments deposited as long, low ridges oriented down fan.
  - Qht** Stream terrace deposits (Holocene) - Stream terraces deposited as point bar and overbank deposits; 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.
  - Qf** Alluvial fan deposits (latest Pleistocene <30,000 years to Holocene) - Sand, gravel, silt and clay mapped on gently sloping, fan-shaped, relatively undifferentiated alluvial surfaces.
  - Qpf** Fan deposits (Pleistocene) - Sand, gravel, silt, and clay that is moderately to poorly sorted and bedded. Mapped on alluvial fans where greater dissection indicates latest Pleistocene age.
  - Qls** Landslide deposits (Holocene and Pleistocene) - Includes debris flows and block slides.
  - Th** Huichica Formation (Pliocene) - Gravel, sand, reworked tuff, and clay. A tuff interbed yields a K-Ar date of 4.09±0.19 Ma (Fox and others, 1985).
- Sonoma Volcanics (Pliocene to Miocene)
- Tsv** - Undifferentiated Sonoma volcanics consisting of mafic lava flows and tuffs, rhyolite to dacite ash flow tuff, lava flows, intrusions, breccia; also includes tuffaceous sediment.
  - Tsvpf** - Ash flow tuff and welded ash flow tuff, locally perlitic. Includes the 3.34-3.19 tuff of Petrified Forest (Fox and others, 1985; McLaughlin and others, 2005).
  - Tsvb** - Olivine basalt lava flows.
  - Tsva** - Andesite lava flows of Mt. Veeder.
  - Tsvib** - Basalt plugs and dikes.
  - Tsvdg** - Dacite of Mt. George - Flows, domes and shallow intrusions of gray to tan porphyritic dacite. The dacite is typically strongly flow banded. The upper surfaces of flows and the margins of domes and intrusions are commonly perlitic. The base of the flows is a black porphyritic pitchstone and pitchstone breccia. K-Ar ages for the dacite are 4.3±0.2 and 3.7±1.23 Ma (Mankinen, 1972; Fox and others, 1985).
  - Tsvrd** - Rhyolite of Bismark Knob - Plagioclase phyric, bluish-gray rhyolite and/or dacite tuff. Often has near-source breccia; some water-laid deposits.
  - Tsvbb** - Basalt of Bismark Knob - Plagioclase, pyroxene, olivine phyric, flow basalt. Pyroxene phenocrysts have distinctive yellow alteration.
  - Tsvam** - Andesite of Mission Highlands - Gray, plagioclase phyric, andesite interbedded with tuff. Locally has a platy foliation.
  - Tsvty** - Tuffy - White pumiceous tuff; locally contains mudstone clasts from underlying Great Valley Sequence. Contains an ashflow tuff similar to or equivalent to 4.83 Ma Lawlor tuff (Andrei Sarna-Wojcicki and Elmira Wan, personal communication, 2005).
  - Tsvt** - Light colored tuff, lithic rich in places. Locally includes tuffaceous, diatomaceous lacustrine sediments.
  - Tsvr** - Rhyolite lava flows and flow breccias, undifferentiated, light colored.
  - Tsvsl** - Andesite flows of Stags Leap.
  - Tsvsbl** - Andesite flow breccia of Stags Leap.
  - Tsvsals** - Andesite ash flow tuff and tuff breccia of Stags Leap.
  - Tsp** - San Pablo (Miocene) - Marine sedimentary mudstone and sandstone. Locally contains Neroly Formation sandstone, light-colored to bluish-gray.
  - KJgv** - Great Valley Sequence (Early Cretaceous and Late Jurassic) - Sandstone, pebble conglomerate, siltstone, and shale.
  - KJfm** - Franciscan Complex melange (Early Cretaceous and Late Jurassic) - Tectonic mixture of masses of resistant rock including sandstone, altered mafic volcanics (greenstone), chert, gabbro, and exotic metamorphic rocks imbedded in a sheared shaly matrix.
  - KJfs** - Franciscan graywacke (Jurassic-Cretaceous). Thick-bedded graywacke with minor interbedded shale. The graywacke is moderately to intensely sheared but lacks tectonic blocks characteristic of Franciscan melange.
  - sp** - Serpentinite.

### Symbol Explanation

- Contact between map units - Solid where accurately located, dashed where approximately located, queried where uncertain, dotted where concealed.
- Fault - Solid where accurately located, dashed where approximately located, dotted where concealed, queried where uncertain.
- ▲▲▲▲ Thrust fault - bars on upper plate; dashed where approximately located.
- Syncline - Dashed where approximately located.
- Dike - Dashed where approximately located.
- ↗ Strike and dip of inclined bedding.
- ↘ Strike and dip of inclined foliation.
- Landslide - Arrows indicate principal direction of movement, queried where existence is questionable; hachures indicate headscarp (source area).

### References

Huffman, M.E., and Armstrong, C.F., 1980. Geology for planning in Sonoma County, California: California Division of Mines 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, 82 p.

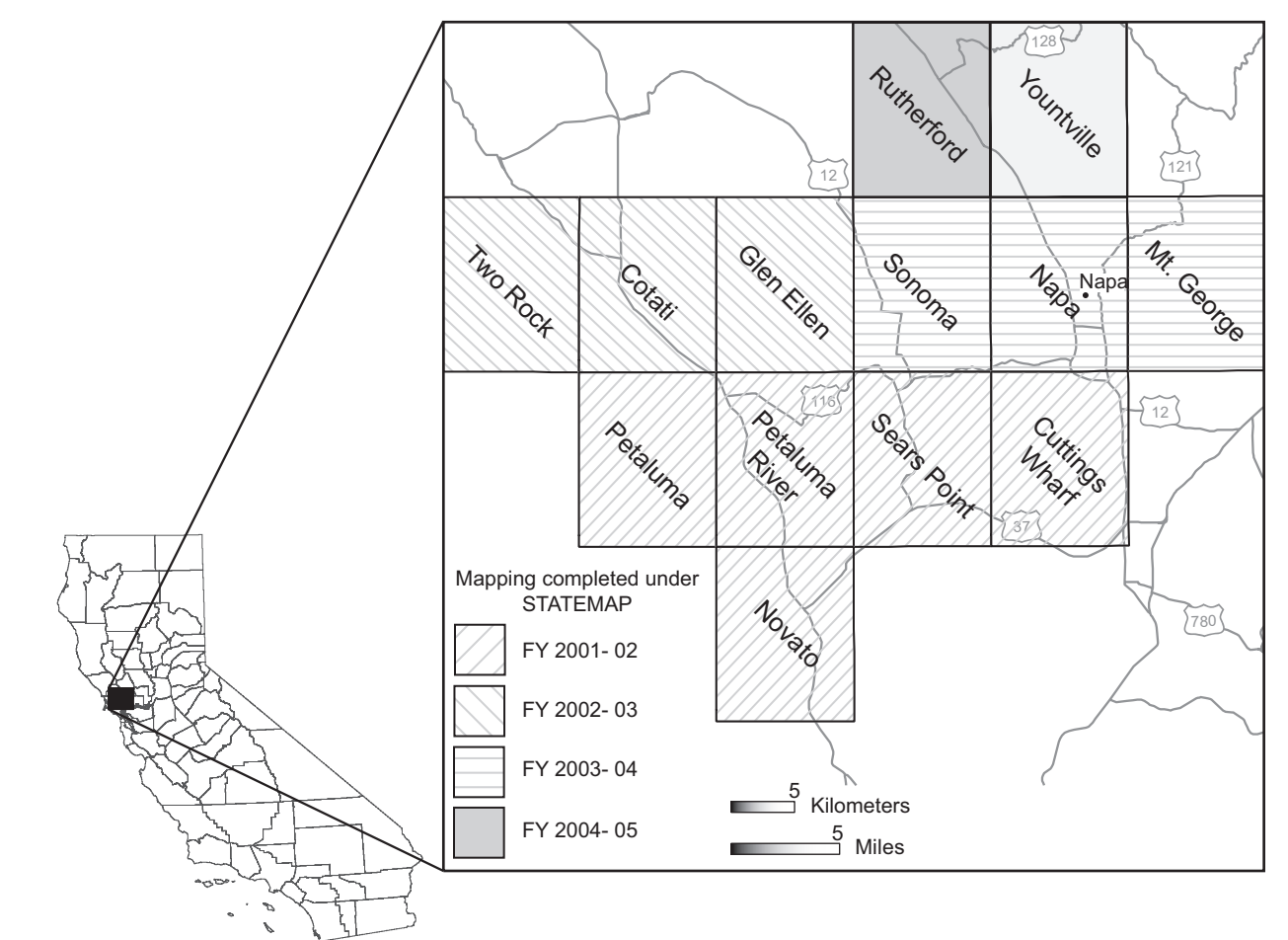
Fox, K.F. Jr., Fleck, R.J., Curtis, G.H., and Meyer, C.M., 1985. Potassium-Argon and fission track ages of the Sonoma Volcanics in an area north of San Pablo Bay, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1753, scale 1:250,000.

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.

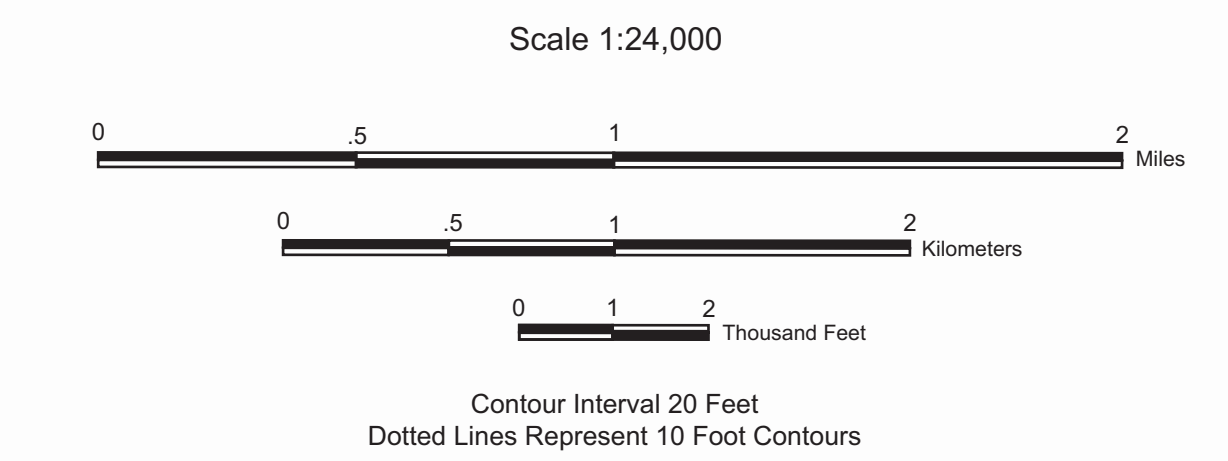
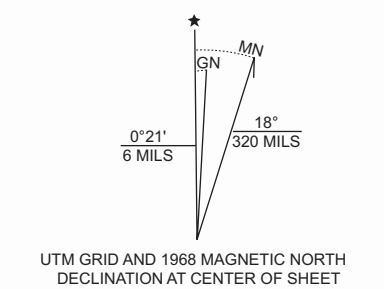
Mankinen, E.A., 1972. Paleomagnetism and Potassium-Argon Ages of the Sonoma Volcanics, California: Geological Society of America Bulletin, v. 83, p. 2063-2072.

McLaughlin, R.J., Sarna-Wojcicki, A.M., Fleck, R.J., Langenheim, V., Jachens, R.C., and Delino, A., 2005. Framework Geology and Structure of the Sonoma Volcanics and Associated Sedimentary Deposits of the Right-Stepped Rodgers Creek-Mascara Fault System and Concoiled Basins Beneath Santa Rosa Plain, in Late Neogene Transition from Transform to Subduction Margin East of the San Andreas Fault in the Wine Country of the Northern San Francisco Bay Area, California: Field Trip Guidebook to accompany the 2005 Geological Society of America Cordilleran Section Meeting, San Jose, California, April 29 - May 1, 52 p.

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 1:82,500.



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



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