71-53
OPEN FILE MAP
SHEET 2 OF 2

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH THE
DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

EXPLANATION

Qls | Qd | Qaf | Qal | Qsr

Surficial deposits

Qls, landslide debris
Qd, sand dunes. Includes Oakley Sand of Cosby (1941) and Carpenter and Cosby (1939), and Piper Fine Sandy Loam of Cosby (1941)
Qsf, artificial fill. Includes only areas obvious on topographic maps, such as dikes and dams
Qal, alluvium; gravel, sand, silt, and clay. Grades into Qf; probably also includes areas of Qsr and Qt
Qsr, slope wash and ravine fill or colluvium; gravel, sand, silt, and clay

Qf | Q1 | Qc

Alluvial fan deposits

Qf, alluvial fan deposits undifferentiated. Generally consists of clay and silt with interbeds of sand and gravel at depth. Grades into Qal, contact arbitrary
Q1, predominantly loam to a depth of at least 5 ft. Deposited in the upper part of fan systems and along natural levees in the lower part. Some Q1 probably derived from sand dunes and is not related to fan deposits. Other Q1 grades into Qal; contact arbitrary. Includes Brentwood and Rincon Clay Loam, Zamora Loam and Piper Fine Sandy Loam of Cosby (1941), and Zamora Loam, Sorrento Clay Loam of Carpenter and Cosby (1939)
Qc, predominantly clay to a depth of at least 5 ft. Deposited between natural levee systems during flood conditions. Includes Brentwood Clay of Cosby (1941) and Rincon Clay of Carpenter and Cosby (1939)

Qt

Terrace deposit

Predominantly sand; some silt, clay, and gravel

Qsjl | Qsjc | Qpm | Qp

Surficial deposits in the San Joaquin River delta system

Qsjl, loam; sand, silt and clay. Includes Byde, Burns and Sacramento Clay loam, Byde Silty Clay Loam, and Columbia Loam of Cosby (1941) and Piper Fine Sandy Loam of Cole and others (1943)
Qsjc, clay. Includes Sacramento Adobe Clay, Marcuse Clay, and Solano Silty Clay of Cosby (1941); Pescadero and Sacramento Clay of Cole and others (1943)
Qpm, peaty muck, mixture of organic matter, sand, silt, and clay. Generally water saturated. Includes Egbert Muck of Cosby (1941) and Roberts Muck of Cole and others (1943)
Qp, peat, generally water saturated. Includes Correira Peat and Ventice and Staten Peaty Muck of Cosby (1941)

UNCONFORMITY

Tw

Wolfskill Formation

Poorly consolidated shale, sandstone, and conglomerate, minor tuff. 500 to 1000 ft thick. Nonmarine

Tol

Oro Loma Formation(?) of Briggs (1953)

Poorly consolidated reddish silt, sand, and gravel. 350 ft thick. Nonmarine

UNCONFORMITY

Tl

Lawlor Tuff

Pumiceous andesitic tuff 50 to 100 ft thick. Nonmarine

To<Tot

Orinda Formation

To, conglomerate, sandstone, siltstone and claystone, minor limestone, lignite, and tuff. 9000 ft. thick. Nonmarine. Includes so-called Green Valley Formation of Condit (1938) and Tassajero Formation of Clark (1933). May be correlative, in part, with San Pablo Group
Tot, tuff, mapped locally

UNCONFORMITY

To | Tns

Neroly Sandstone

Tn, blue sandstone, minor shale, siltstone, tuff, and andesite conglomerate. Maximum thickness 2500 ft. Predominantly marine, but includes some non-marine beds. Includes so-called Diablo Formation of Weaver and others (1944, p. 585)
Tns, siltstone, mapped locally. 200 ft thick

Tsp

San Pablo Group

Briones, Cierbo, and Neroly Sandstones, undivided

Tc

Cierbo Sandstone

Brown, gray, and white sandstone, minor conglomerate, tuff, and shale. 200 to 2000 ft thick. Marine

UNCONFORMITY

Tbu | Tbm | Tbl

Briones Sandstone

Tbu, upper sandstone and shale member of Ham (1952, p. 12). 400 ft thick. Probably marine
Tbm, middle shell breccia or "reef" of Ham (1952, p. 12). Graywacke cemented by carbonate; minor shale. Abundant fossils. 600 to 800 ft thick. Marine
Tbl, lower sandstone member of Ham (1952, p. 12). "Salt and pepper" graywacke, minor shale. 800 ft thick. Probably marine

UNCONFORMITY

Ts

Sobrante Sandstone (restricted)

Used in sense of Lutz (1951). Brown sandstone, minor glauconitic sandstone, conglomerate, and tuff. 500 ft thick. Marine

UNCONFORMITY

Tkt | Tks

Kirker Formation of Primmer (1964)

Tkt, white tuff, minor tuffaceous sandstone. 100 ft thick
Tks, light-gray tuffaceous sandstone, minor conglomerate and siltstone. 200 ft thick. Marine

UNCONFORMITY

Tmu | Tsu | Tsl | Tmk | Tml | Tld | Tll

Markley Formation of Fulmer (1964)

Tmk, Markley Formation, undivided
Tmu, upper sandstone member of Fulmer (1964); thinly bedded sandstone and siltstone, some claystone. About 400 ft thick. Marine
Tsu, upper part of Sidney Flat Shale Member of Fulmer (1964); predominantly shale, some siltstone and sandstone. About 800 ft thick. Marine
Tsl, lower part of Sidney Flat Shale Member of Fulmer (1964). Interbedded shale and sandstone. About 900 ft thick. Marine
Tml, lower sandstone member of Fulmer (1964). Mainly thinly bedded sandstone, some massive sandstone, siltstone, and mudstone. About 2000 ft thick. Marine
Tld and Tll are upper and lower siltstone beds, mapped locally

Tmv

Mortonville Shale of Fulmer (1964)

Brown mudstone and grayish-green claystone, minor siltstone and sandstone. About 600 ft thick. Marine

Tdu | Td | Tdls | Tdl

Domegine Sandstone

Td, Domegine Sandstone, undivided
Tdu, upper brown sandstone member, minor interbedded mudstone and conglomerate. 1500 to 3500 ft thick. Marine
Tdl, lower siltstone and claystone member, minor sandstone. Basal conglomerate at most localities. 900 to 600 ft. thick. Marine
Tdls, white sandstone mapped locally. 50 to 200 ft. thick. Marine

UNCONFORMITY

Tmc

Division E of Megamos Formation of Clark and Woodford (1927)

Greenish-gray silty mudstone. 50 to 1300 ft thick. Marine. Probably correlative with so-called Capay shale in subsurface sections of Sacramento Valley

Tmd

Division D of Megamos Formation of Clark and Woodford (1927)

Light-gray sandstone. Carbonaceous laminations common. Pebble conglomerate occurs locally at base. 100 to 900 ft thick. Marine

UNCONFORMITY

Tmc<Tmsa

Division C of Megamos Formation of Clark and Woodford (1927)

Tmc, predominantly bluish-gray shale. Many sandstone interbeds. 50 to 1300 ft thick. Marine
Tmcs, sandstone interbed thick enough to map separately

Tmsa

Divisions A and B of Megamos Formation of Clark and Woodford (1927)

Predominantly grayish-brown sandstone. 600 to 800 ft. thick. Basal conglomerate 90 ft. thick maximum. Marine

UNCONFORMITY

Tmz | Tmzu | Tmzl

Martinez Formation (restricted)

Martinez Formation (restricted) of Merriam (1897). Correlative with Lower Vine Hill Sandstone of Weaver (1953)
Tmz, Martinez Formation (restricted); undivided
Tmzu, upper siltstone and shale. 700 ft thick. Marine
Tmzl, lower glauconitic sandstone. 300 ft thick. Marine

UNCONFORMITY

*Great Valley sequence*

Kdv

Deer Valley Sandstone of Colburn (1964)

Massive sandstone, minor conglomerate and sandstone. 50 to 500 ft thick. Marine

Kngu | Kngl <Tnga

Moreno Formation of Payne (1960)

Kngu, predominantly siltstone; minor shale, claystone, and sandstone. 300 to 1500 ft thick. Marine
Kngl, predominantly shale and claystone, minor siltstone and sandstone. 300 to 2000 ft thick. Marine. Kngs, sandstone interbeds thick enough to map separately

K1 <Kjs

Joaquin Ridge Sandstone of Goudkoff (1945)

Thin to massive beds of sandstone alternating with siltstone and shale. Maximum thickness 6000 ft. Marine. Kjs, shale interbeds thick enough to map separately

Knu <Kmsh | Kmh | Kml | Kmls

Marliff Shale of Payne (1960)

Kmu, upper shale and siltstone member. Minor sandstone. Maximum thickness about 2000 ft. Marine. Kmus, sandstone interbeds thick enough to map separately
Kmh, middle sandstone member; thin to massive beds of sandstone alternating with siltstone and shale. Minor conglomerate. Maximum thickness about 2000 ft. Marine
Kml, lower shale and siltstone member; minor sandstone. Maximum thickness about 1400 ft. Marine. Kmls, sandstone interbeds thick enough to map separately

<Kunh | Ku | Kus

Unnamed sandstone and shale

Ku, sandstone and shale, undivided; maximum thickness 9000 ft. Marine
Kunh, predominantly shale, minor sandstone
Kus, predominantly sandstone, minor shale

Ks<Kss

Unnamed shale

Ks, shale, at least 4000 ft thick. Marine. Kss, sandstone interbeds thick enough to map separately

Jk

Knoxville Formation

Mainly dark-gray mudstone, minor siltstone, sandstone and 2 to 3 inch thick beds of limestone. At least 3000 ft thick. Marine

KJf | fn

Franciscan Formation

KJf, undivided Franciscan Formation; largely sandstone and shale, some greenstone, chert, limestone, and conglomerate
fn, schist derived from rocks of the Franciscan Formation

INTRUSIVE AND EXTRUSIVE ROCKS

Tb | Tr

Tb, basalt
Tr, rhyodacite

db | sp | sc

db, diabase
sp, serpentine and ultramafic rocks
sc, silica carbonate rocks

Notes

1. Names used for surficial deposits, such as the Oakley Sand, are soils units defined in U.S. Soil Conservation Service reports.
2. Many of the stage ages are provisional and several are not well documented.
3. Formational usage is in sense of authors cited and not necessarily in original sense. Some formation names, such as Joaquin Ridge Sandstone of Goudkoff (1945), are not adequately defined in a published report. Other names, such as Martinez Formation, are used widely in a sense different from the original definition. Some new names are needed. Rather than use completely new nomenclature, such as Formations A, B, C, etc., the old names are retained in this compilation insofar as possible pending stratigraphic studies needed to resolve the problems. The application of these names is strictly provisional and informal and is not to be regarded as a published revision.

MAP SYMBOLS

Contact

Fault

Dashed where approximate; dotted where concealed. U, upthrown side; D, downthrown side. Arrows show relative horizontal movement. Query indicates that fault location is uncertain or that further extent of fault is unknown.

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

Anticline | Syncline

Overturned anticline | Overturned syncline

Fold axis showing trace of axial plane. Dashed where approximately located, dotted where concealed

Landslide deposit

Arrows show inferred direction of movement. Only in few of the more obvious landslides are mapped

Old stream channel

Inferred mainly from contour patterns and partly from distribution of clay and loam

Tuff

REFERENCES

Amundson, Burton, 1964, Bibliography of Mount Diablo and the surrounding area, in Guidebook to the Mount Diablo field trip, 1964: Davis, Calif., Geol. Soc. Sacramento, p. 108-110.

Berry, K. B., 1964, Tertiary micropaleontology, north side of Mount Diablo, in Guidebook to the Mount Diablo field trip, 1964: Davis, Calif., Sacramento, p. 48-53.

Berthiaume, S. A., 1938, Stratigraphy and foraminiferal fauna of the Megamos and Vacaville formations (Eocene) of California: Cornell Univ., unpub. Ph.D. thesis, 109 p.

Briggs, L. I., Jr., 1953, Geology of the Ortigalita Peak quadrangle, California: California Div. Mines and Geology Bull. 167, 61 p.

Carpenter, E. J., and Cosby, S. W., 1939, Contra Costa County of California: U.S. Soil Conserv. Service, Ser. 1933, no. 26, 83 p.

Clark, B. L., 1933, Pliocene sequence in the Berkeley Hills [abs.]: Geol. Soc. America Bull., v. 44, no. 1, p. 151.

Clark, B. B., and Woodford, A. O., 1927, The geology and paleontology of the type section of the Megamos Formation (Lower Middle Eocene) of California: California Univ. Pubs. Geol. Sci., v. 17, no. 3.

Colburn, I. P., 1961, The tectonic history of Mount Diablo, California: Stanford Univ., unpub. Ph.D. thesis, 234 p.

_____1964, The Mesozoic stratigraphy in the vicinity of Mount Diablo, California, in Guidebook to the Mount Diablo field trip, 1964: Davis, Calif., Geol. Soc. Sacramento, p. 9-22.

Cole, R. C., Koehler, L. F., Eggers, F. G., and Goff, A. M., 1943, The Tracy area, California: U.S. Soil Conserv. Service, Ser. 1938, no. 5, 95 p.

Condit, Carlton, 1938, The San Pablo flora of west central California: Carnegie Inst. Washington Pub. Contr. Paleontology, v. 478, p. 217-268.

Cosby, S. W., 1941, Soil survey of the Sacramento-San Joaquin Delta area, California: U.S. Soil Conserv. Service, Ser. 1934, no. 21, 48 p.

Palmer, C. V., 1956, Stratigraphy and paleontology of the typical Markley and Mortonville Formations: California Univ., Ph.D. thesis, 329 p.

_____1964, The type Markley and Mortonville Formations, in Guidebook to the Mount Diablo field trip, 1964: Davis, Calif., Geol. Soc. Sacramento, p. 54-59.

Geologic Society of Sacramento, 1964, Geologic map of the Mount Diablo area, in Guidebook to the Mount Diablo field trip, 1964: Davis, Calif., Geol. Soc. Sacramento, scale 1:18,000.

Goudkoff, P. P., 1945, Stratigraphic relations of Upper Cretaceous in Great Valley, California: Am. Assoc. Petroleum Geologists Bull., v. 29, no. 7, p. 956-1007.

Ham, C. K., 1952, Geology of Las Trampas Ridge, Berkeley Hills, California: California Div. Mines and Geology Spec. Rept. 22, 26 p.

Huey, A. S., 1948, Geology of the Tesla quadrangle, California: California Div. Mines Bull. 140, 75 p.

Johnson, W. S., 1964, Paleocene and Eocene geology of the north flank of Mount Diablo, in Guidebook to the Mount Diablo field trip, 1964: Davis, Calif., Geol. Soc. Sacramento, p. 23-32.

Kilmer, F. B., 1953, Stratigraphy of the "Diablo Formation:" California Univ., Berkeley, unpub. M.A. thesis, 68 p.

Kleinpell, R. M., 1938, Miocene stratigraphy of California: Tulsa, Okla., Am. Assoc. Petroleum Geologists, 450 p.

Lutz, G. C., 1951, The Sobrante Sandstone: California Univ. Pubs. Geol. Sci., v. 28, no. 13.

Merriam, J. C., 1897, The geologic relations of the Martinez group of California at the typical localities: Jour. Geology, v. 5, p. 767-775.

Oestreich, E. S., 1958, Geology of Tassajara quadrangle, California: California Univ., Berkeley, M.S. thesis, 80 p.

Pampeyan, E. H., 1963, Geology and mineral deposits of Mount Diablo, Contra Costa County, California: California Div. Mines and Geology Spec. Rept. 80, 34 p.

_____1964, Franciscan and related rocks of the Mount Diablo piercement, Contra Costa County, California, in Guidebook to the Mount Diablo field trip, 1964: Davis, Calif., Geol. Soc. Sacramento, p. 1-8.

Pattee, P. R., 1948, The San Pablo Formation north of Mount Diablo, California: California Univ, Berkeley, M.A. thesis, 67 p.

Payne, M. B., 1960, Type Panoche, Panoche Hills area, Fresno County, California, 1960 spring field trip, guidebook: Soc. Econ. Paleontologists and Mineralogists Pacific Sec., 18 p.

Preston, H. M., 1965, Geology of a portion of the Byron Hot Springs quadrangle, Contra Costa County, California: Southern California Univ., M.S. thesis, 144 p.

Primmer, S. R., 1964, Preliminary report on the type Kirker Formation, in Guidebook to the Mount Diablo field trip, 1964: Davis, Calif., Geol. Soc. Sacramento, p. 60-69.

_____1966, The type Kirker Formation: California Univ., Berkeley, M.A. thesis, 247 p.

Reiche, Perry, 1950, Geology of part of the Delta-Mendota Canal near Tracy, California: California Div. Mines and Geology Spec. Rept. 2, 12 p.

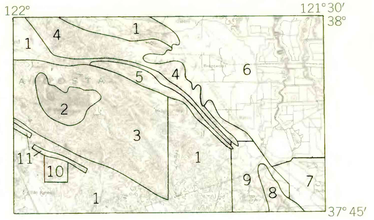
Snow, D. T., 1957, The geology of the northeast corner of Alameda County and adjacent portions of Contra Costa County, California: California Univ., Berkeley, M.A. thesis, 187 p.

Weaver, C. E., 1953, Eocene and Paleocene deposits at Martinez, California: Washington Univ. Pubs. Geol. Sci., v. 7.

Weaver, C. E., and others, 1944, Correlation of the marine Cenozoic formations of western North America: Geol. Soc. America Bull., v. 55, p. 569-598.

Webb, S. D., and Woodburne, M. O., 1964, The beginning of continental deposition in the Mount Diablo area, in Guidebook to the Mount Diablo field trip, 1964: Davis, Calif., Geol. Soc. Sacramento, p. 70-78.

INDEX OF DATA SOURCES




Sources of Compilation Data

1. H. S. Sonneman and J. R. Switzer, Jr., Humble Oil and Refining Company, 1961-2. Explanation by E. E. Brabb. See also Geological Society of Sacramento (1964), Oestreich (1958), Patten (1948), and Preston (1965).
2. Pampeyan (1963). See also Pampeyan (1964).
3. Source (1) above. See also Colburn (1961 and 1964).
4. Source (1) above. See also Fulmer (1956 and 1964), Berry (1964), Johnson (1964), and Primmer (1964 and 1966).
5. Source (1) above. See also Berthiaume (1938), Berry (1964), and Johnson (1964).
6. Carpenter and Cosby (1939) and Cosby (1941). Soils map reinterpreted from aerial photographs, from analysis of contours, and from 1 day of field checking by E. E. Brabb, 1971. Approximate location of surface trace of Davis and Sherman Island faults from subsurface data provided by Gerald E. Weber, Ferguson Bosworth Petroleum Co.
7. Cole and others (1943). Soils map reinterpreted from aerial photographs, from analysis of contours and from 1 day of field checking by E. E. Brabb, 1971.
8. Source (1) above. See also Reiche (1950).
9. Source (1) above. See also D. T. Snow (1957).
10. Source (1) above. See also Webb and Woodburn (1964).
11. Source (1) above. See also Kilmer (1953).

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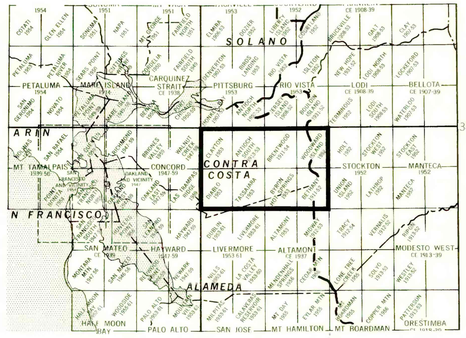
INDEX MAP




# PRELIMINARY GEOLOGIC MAP OF THE MOUNT DIABLO–BYRON AREA, CONTRA COSTA, ALAMEDA, AND SAN JOAQUIN COUNTIES, CALIFORNIA

Compiled by
Earl E. Brabb, Howard S. Sonneman, and John R. Switzer, Jr.
1971



QUATERNARY
Pleistocene and Holocene

TERTIARY
Pliocene
Miocene
Oligocene
Eocene
Relizian or Luisian Stage of Kleinpell (1938)
Narizian Stage of Mallory (1959)
Refugian Stage of Mallory (1959)
Ynezian Stage of Mallory (1959)
Bulitian Stage of Mallory (1959)
Penutian Stage of Mallory (1959)
Luisian Stage of Mallory (1959)

CRETACEOUS
Upper Cretaceous
Maestrichtian
Campanian and Santonian
Coniacian
Cenomanian and Turonian
Lower Cretaceous

JURASSIC

TERTIARY
MESOZOIC