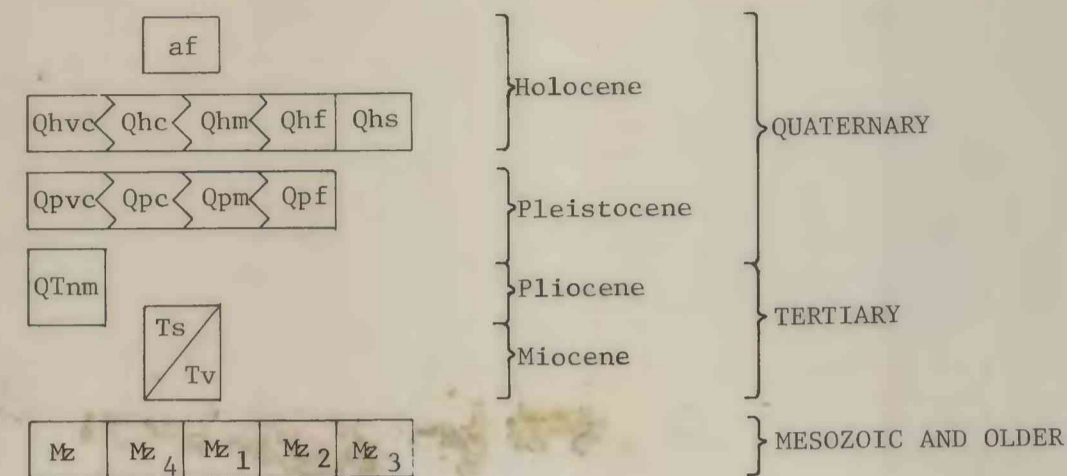


EXPLANATION

CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

MANMADE DEPOSITS AND MODIFICATIONS

af ARTIFICIAL FILL.--Areas modified by construction of airports, housing developments, earth-fill dams, quarries, and furnace slag heaps. Includes areas of cut-and-fill. Most highway and railroad grades have been omitted. Texture and induration vary greatly between sites, depending on filling materials and type of treatment (grouting, tamping) applied, if any

HOLOCENE SEDIMENTS

Nonmarine sedimentary deposits of Holocene age (less than about 10,000 years). Consist of relatively unconsolidated, undeformed deposits in which soil-forming processes have not yet produced a distinct B horizon. Form a series of large, coalescing alluvial fans along south fronts of San Gabriel and San Bernardino Mountains and occupy active channels and low stream terraces along Santa Ana River and its tributaries. Become progressively finer grained downstream away from the mountain fronts

Qhvc VERY COARSE GRAINED HOLOCENE ALLUVIUM.--Unconsolidated gravel containing abundant boulders, together with cobbles, pebbles, and variable amounts of sand and silt. Very permeable. Restricted to parts of alluvial fans and stream valleys that are near mountain fronts

Qhc COARSE-GRAINED HOLOCENE ALLUVIUM.--Unconsolidated gravel consisting of variable proportions of pebbles and cobbles in a sandy matrix. Very permeable. Particularly characteristic of middle and lower regions of large alluvial fans

Qhm MEDIUM-GRAINED HOLOCENE ALLUVIUM.--Unconsolidated deposits consisting principally of fine- to coarse-grained sand, but locally containing thin beds of pebble gravel or silt. Moderately permeable to very permeable. Areally widespread, but occurs most extensively on lower parts of alluvial fans and in parts of stream valleys far removed from mountain fronts

Qhf FINE-GRAINED HOLOCENE ALLUVIUM.--Unconsolidated to compact deposits of clay and silty clay containing variable amounts of fine-grained sand and organic material. Moderately permeable to impermeable. Found in low-lying areas; often associated with a high ground-water table. Restricted mainly to the southwestern part of the area, south of Chino

Qhs EOLIAN SAND.--Unconsolidated fine- to medium-grained wind-deposited sand. Moderately permeable to very permeable. Most deposits stabilized by vegetation. Restricted to west-central part of the area, between Ontario and Colton

LATE PLEISTOCENE SEDIMENTS

Alluvial deposits of late Pleistocene age (about 10,000 to several hundred thousand years). Weakly to moderately consolidated; generally undeformed. Distinguished from Holocene alluvium by the presence of pedogenic soils that have a poorly to well-developed textural B horizon. Tend to be better consolidated and slightly less permeable than Holocene alluvial deposits, due to advanced sediment compaction and redistribution of binding agents such as clays. Preserved as dissected remnants of old alluvial fans along range fronts and as terrace deposits situated tens to hundreds of feet above modern stream courses. Also form extensive alluvial plain in Edgemont-Sunnymead area, near the southeast margin of the area

Qpvc VERY COARSE GRAINED LATE PLEISTOCENE ALLUVIUM.--Boulder gravel. Restricted to small dissected alluvial fan north of Yucaipa, at eastern margin of area. Notably uncommon compared to Holocene deposits in this textural class

Qpc COARSE-GRAINED LATE PLEISTOCENE ALLUVIUM.--Pebble and cobble gravel. Restricted to dissected alluvial fans and terrace deposits near Corona, Rialto, and Yucaipa

Qpm MEDIUM-GRAINED LATE PLEISTOCENE ALLUVIUM.--Fine- to coarse-grained sand. Areally widespread

Qpf FINE-GRAINED LATE PLEISTOCENE ALLUVIUM.--Clay and silty clay. Deposits located south of Chino near fine-grained Holocene alluvium

PLIOCENE AND PLEISTOCENE SEDIMENTS

Nonmarine sedimentary deposits of middle(?) Pleistocene to earliest Pliocene age (several hundred thousand to 5 or 6 million years). Well consolidated in some areas due to compaction and (or) weak cementation; however, many exposures virtually indistinguishable from unconsolidated to moderately consolidated late Pleistocene and Holocene sediments. Locally tilted, folded and faulted. Texturally similar to younger Quaternary deposits, although the very coarse grained textural class is uncommon. Form hilly terrain south of Redlands

PLIOCENE AND PLEISTOCENE NONMARINE SEDIMENTS

TERTIARY ROCKS

Marine and nonmarine sedimentary rocks, and volcanic rocks, of Miocene and Pliocene age. Typically strongly folded and faulted

Ts TERTIARY SEDIMENTARY ROCKS, UNDIVIDED.--Range from well-consolidated sediments to indurated rocks. Wide range in texture. Restricted to hilly and mountainous areas near northeast and southwest margins of area. Deposits in San Bernardino Mountains consist of nonmarine rocks that are particularly well indurated, although fractured and cut by abundant landslides. Deposits southwest of Chino consist of marine rocks that vary widely in degree of induration

Tv TERTIARY VOLCANIC ROCKS.--Volcanic flow rocks and pyroclastic rocks ranging widely in texture and induration. Generally as well or better indurated than the Tertiary sedimentary rocks. Restricted to hilly areas northwest and southwest of Pomona, near west margin of area

PRE-TERTIARY CRYSTALLINE ROCKS WITH WIDELY SPACED FRACTURES

Mesozoic granitoid rocks, predominantly quartz monzonite to quartz diorite in composition. Fractures relatively widely spaced, consisting mainly of joints related to cooling and (or) unloading. Tectonically induced fractures appear to be minimal. Characteristic rocks of Peninsular Ranges province (south half of area)

Mz GRANITOID ROCKS, RELATIVELY UNWEATHERED.--Areas dominated by large exposures of coherent rock. Found in hilly and mountainous areas

Mz4 GRANITOID ROCKS, DEEPLY WEATHERED.--Areas mantled with a thick residual layer of weathered granitic rock. Found in low-lying sites near south margin of area

PRE-TERTIARY CRYSTALLINE ROCKS WITH CLOSELY SPACED FRACTURES

Primarily of Mesozoic and pre-Mesozoic age, but including minor areas of Tertiary intrusive rocks. Compositionally and texturally diverse. Closely and irregularly fractured, probably reflecting high degree of tectonic disturbance. Characteristic basement rocks of San Bernardino and San Gabriel Mountains

Mz1 GRANITOID ROCKS.--Intrusive rocks. Predominantly structurally massive, or nearly so, but varying widely in composition and texture. Found along northeast margin of area in San Bernardino and San Gabriel Mountains

Mz2 HIGH-GRADE METAMORPHIC ROCKS.--Strongly foliated medium- to coarse-grained rocks with schistose to gneissic structure. Compositionally diverse. Widely distributed in San Bernardino and San Gabriel Mountains

Mz3 LOW-GRADE METAMORPHIC ROCKS.--Moderately to strongly foliated fine- to medium-grained schist and quartzite. Found in eastern San Gabriel Mountains and in low hills along south-west front of San Bernardino Mountains

DERIVATION OF MAPPED DATA

This map is based almost entirely on previous geologic and soil mapping. Previous mapping has been modified in only a few places on the basis of spot checks in the field.

Pre-late Pleistocene materials and their boundaries with late Pleistocene and Holocene sediments are based on geologic mapping (Shelton, J. S., 1955; Morton, D. M., 1974; Gray, C. H., unpublished data, 1977; Morton, D. M., 1978a, 1978b, 1978c, 1978d).

Subdivision of Quaternary deposits is based on soil mapping and soil profile descriptions prepared by the U.S. Soil Conservation Service (Eckmann, E. C., and Zinn, C. J., 1917; Knecht, A. A., 1971; Soil Conservation Service Staff, unpublished data, 1969). Textural class and age of Quaternary deposits have been assigned according to the following criteria:

TEXTURAL CLASSIFICATION OF QUATERNARY DEPOSITS.-- The texture of the C horizon, as provided in soil profile descriptions, is assumed to characterize the grain size of underlying sedimentary deposits. Deposits containing abundant boulders (stony C horizon) are classified as very coarse grained; deposits with abundant pebbles or cobbles (gravelly or cobbly C horizon) are classified as coarse grained; deposits of sand and (or) silt (C horizon of sand, loamy sand, sandy loam, sandy clay loam, loam, silt loam, or silt) are classified as medium grained; deposits dominated by clay-size material (C horizon of clay, sandy clay, silty clay, clay loam, or silty clay loam) are classified as fine grained.

AGE ASSIGNMENT OF QUATERNARY DEPOSITS.-- Deposits overlain by a pedogenic textural B soil horizon are inferred to be late Pleistocene. Deposits lacking such a B horizon are inferred to be Holocene.

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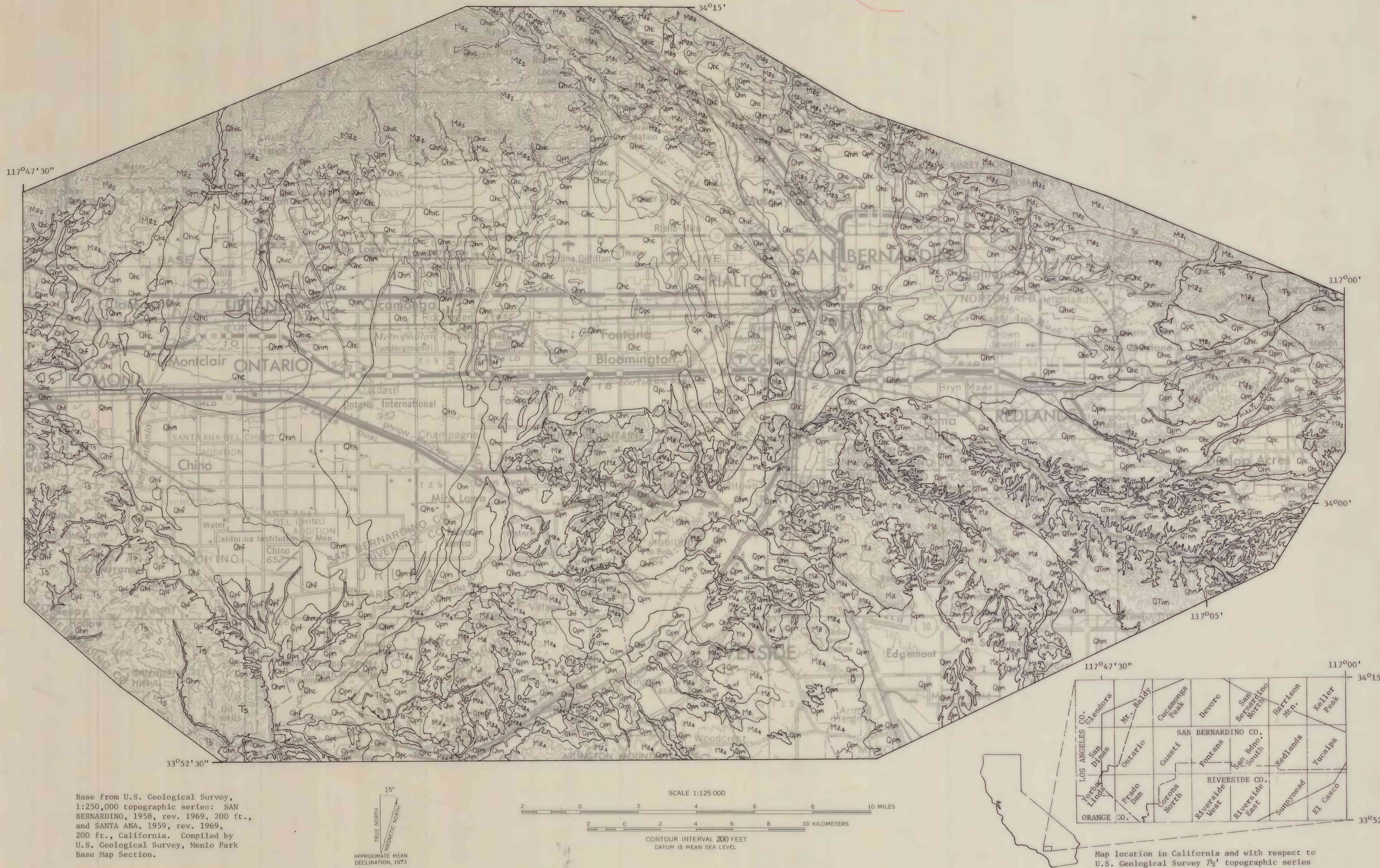
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GENERALIZED MAP OF SURFICIAL MATERIALS IN NORTHWESTERN RIVERSIDE AND SOUTHWESTERN SAN BERNARDINO COUNTIES, CALIFORNIA

Compiled by B. F. Cox and D. M. Morton

1978

This report is preliminary and has not been edited or reviewed for conformity with Geological Survey standards and nomenclature.