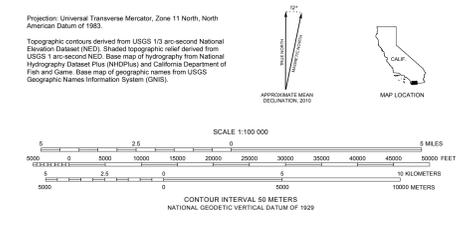


- MAP UNITS**
- Late Holocene (Surficial Deposits)**
- Qu: Undifferentiated Surficial Deposits - includes colluvium, slope wash, talus deposits, and other surface deposits of all ages generally unconsolidated but locally may contain consolidated layers
 - Qa: Landslide Deposits - may include debris flows and older landslides of various earth material and movement types, unconsolidated to moderately well-consolidated
 - Qv: Alluvial Valley Deposits - unconsolidated clay, silt, sand, and gravel recently deposited parallel to localized stream valleys and/or spaced more regularly cross alluvial fans of larger river valleys; sandy sediment generally more dominant than gravelly sediment
- Holocene to Late Pleistocene (Surficial Deposits)**
- Qya: Young Alluvial Valley Deposits - unconsolidated to slightly consolidated, highly dissected boulder, cobble, gravel, silt, sand, and gravel along stream valleys and alluvial fans of larger rivers
- Late to Middle Pleistocene (Surficial Deposits)**
- Qoa: Old Alluvial Valley Deposits - slightly to moderately consolidated, moderately dissected clay, silt, sand, and gravel along stream valleys and alluvial fans of larger rivers
- Middle to Early Pleistocene (Surficial Deposits)**
- Qoaf: Very Old Alluvial Fan Deposits - moderately to well-consolidated, highly dissected boulder, cobble, gravel, silt, sand, and gravel from a confined valley or canyon
 - Qotf: Very Old Terrace Deposits - moderately to well-consolidated, highly dissected marine and stream terrace deposits
 - Qool: Very Old Lacustrine, Playa, and Estuarine (Paralic) Deposits - moderately to well-consolidated, highly dissected fine-grained sand, silt, mud, and clay from lake, stream, and estuarine deposits of various types
- Quaternary (Bedrock)**
- Qm: Coarse-grained formations of Pleistocene age and younger - primarily sandstone and conglomerate
 - Qsh: Fine-grained formations of Pleistocene age and younger - includes fine-grained sandstone, siltstone, mudstone, shale, siliceous and calcareous sediments
- Tertiary (Bedrock)**
- Tm: Coarse-grained Tertiary age formations - primarily sandstone and conglomerate
 - Tsh: Fine-grained Tertiary age formations - includes fine-grained sandstone, siltstone, mudstone, shale, siliceous and calcareous sediments
 - Tv: Tertiary age formations of volcanic origin
- Mesozoic and Older (Bedrock)**
- Km: Coarse-grained Cretaceous age formations of sedimentary origin
 - Kv: Cretaceous age formations of volcanic origin
 - pKm: Cretaceous and pre-Cretaceous metamorphic formations of sedimentary and volcanic origin
 - P: Granitic and other intrusive crystalline rocks of all ages

- SYMBOL EXPLANATION**
- [For geologic line symbols: lines are solid where location is accurate, long-dashed where location is approximate, short-dashed where location is inferred, dotted where location is concealed. Queries added where identity or existence may be questionable.]
- Contacts
 - Contact
 - Reference contact - Used to delineate geologic units that were mapped as separate units on the original source map, but are consolidated on this map.
 - Fault - Includes strike-slip, normal, reverse, oblique, and unspecified slip
 - Folds - Showing direction of plunge where appropriate
 - Anticline
 - Syncline
 - Stream
 - Spring
 - Road
 - County boundary
 - National boundary



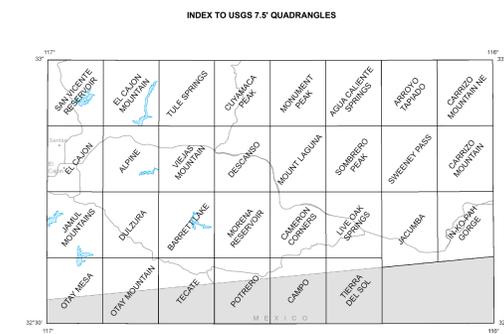
GEOLOGIC COMPILATION OF QUATERNARY SURFICIAL DEPOSITS IN SOUTHERN CALIFORNIA EL CAJON 30' X 60' QUADRANGLE

A Project for the Department of Water Resources by the California Geological Survey

Compiled from existing sources by
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MAP EXPLANATION

The map of Quaternary surficial deposits in the El Cajon 30' x 60' quadrangle was compiled by the California Geological Survey (CGS) for the Department of Water Resources (DWR) to assist in identifying where flooding and deposition of sediment occurred in the geologically recent past. The focus of this project is on Quaternary (Q) surficial deposits (less than 1.8 million years) on alluvial fans, floodplains, and in basins where such deposits are subject to a number of geologic hazards including flooding, amplification of seismic shaking, liquefaction, and collapsible soils. In general, areas of more recent deposition during Late Holocene time (within the last 500 years) have a greater potential to be areas of future flooding and deposition than those underlain by older surficial deposits.

Project Overview

The El Cajon 30' x 60' quadrangle represents one of several 100,000-scale quadrangles included in the detailed Geographic Information System (GIS) based geologic data set compiled by CGS from recent high resolution geologic mapping available for southern California. The GIS database merges more than 2100 geologic units from source maps published primarily by the U.S. Geological Survey (USGS) and by CGS (Source GIS Database) into a common format that depicts 40 derivative categories of surficial deposits and bedrock for the entire area (Derivative GIS Database). Quaternary surficial deposits are divided into 28 categories modified from the methodology of Matti and Cossette (2007), the Southern California Areal Mapping Project (SCAMP, 2000), and the USGS and California Division of Mines and Geology (2000). While specific variations in age and physical properties exist within units on each source map, CGS retained the basic premise of Matti and Cossette (2007) that surficial deposits within each of the Quaternary derivative map units formed during a particular range of geologic time, have a similar origin, and have generally similar physical properties. Within the 28 derivative units, progressively older surficial deposits are typically better consolidated and more highly dissected by erosion, have more developed and/or eroded soil profiles with stronger degrees of weathering and surface armoring, and occupy a higher topographic position within alluvial fan and floodplain terraces. Geologic bedrock formations from the source geologic maps are divided into 12 categories on the derivative maps, based on age and rock type. CGS rectified inconsistencies along the boundaries of mapped areas to create a seamless Derivative GIS Database, but retained links to the original mapping in the Source GIS Database so that the more detailed basic geologic information can be retrieved. Correlation of equivalent deposits across the whole southern California project area is represented in the GIS table entitled Correlation of Derivative and Source Geologic Map Units.

MAP REFERENCES

DIGITAL GEOLOGIC DATA FILE USED IN GIS COMPILATION OF QUATERNARY UNITS

Todd, V. R., 2004. Preliminary geologic map of the El Cajon 30' x 60' quadrangle, southern California. <http://pubs.usgs.gov/of/2004/1361/>; U.S. Geological Survey, Open-File Report 2004-1361, scale 1:100,000.

REFERENCES USED IN PREPARING LEGENDS AND MAPS FOR QUATERNARY UNITS

Matti, J. C., and Cossette, P. M., 2007. Classification of surficial materials, Inland Empire Region, southern California: conceptual and operational framework. U.S. Geological Survey, Open-File Report (in progress).

Southern California Areal Mapping Project (SCAMP), 2000. A proposed classification for surficial geologic materials in southern California, version 1.0.

U.S. Geological Survey and California Division of Mines and Geology, 2000. Classification of Quaternary deposits, Southern California Areal Mapping Project (SCAMP), a working model, version 1.0: (09/10/2000).

In preparing this derivative map of the El Cajon 30' x 60' quadrangle, CGS used geologic source data compiled in digital format by Todd (2004). CGS retained the boundaries of Quaternary age surficial deposits shown on the source map with very few revisions. Quaternary surficial deposits on the source map are represented on this map by 8 of the 28 generalized project derivative units. Bedrock units identified by Todd (2004) are represented on this map by 9 of the 12 project derivative bedrock units (see Map Units and Correlation of Map Units). Quaternary surficial deposits and geologic formation names originally compiled by Todd (2004) are correlated with derivative categories used by CGS in the Geologic Labels GIS spreadsheet for the El Cajon quadrangle.

This map, along with others in the Geologic Compilation of Quaternary Surficial Deposits in Southern California Derivative GIS Database, is regional in nature and should not be used as a substitute for detailed geologic studies in any specific area. It is intended only for rapid identification of areas subject to previous and potential future flooding and other geologic hazards on alluvial fans and floodplains.

CORRELATION OF MAP UNITS*

* Boundaries of Quaternary units are gradational and time transgressive in a regional sense.

**DEPARTMENT OF WATER RESOURCES
STATE OF CALIFORNIA**

**CALIFORNIA
CONSERVATION**

1850 2010
ANNIVERSARY

www.conservation.ca.gov/cgs

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Information on this map is not sufficient to serve as a substitute for the geologic and geotechnical site investigations required under Chapters 7.5 and 7.8 of Division 2 of the California Public Resources Code.