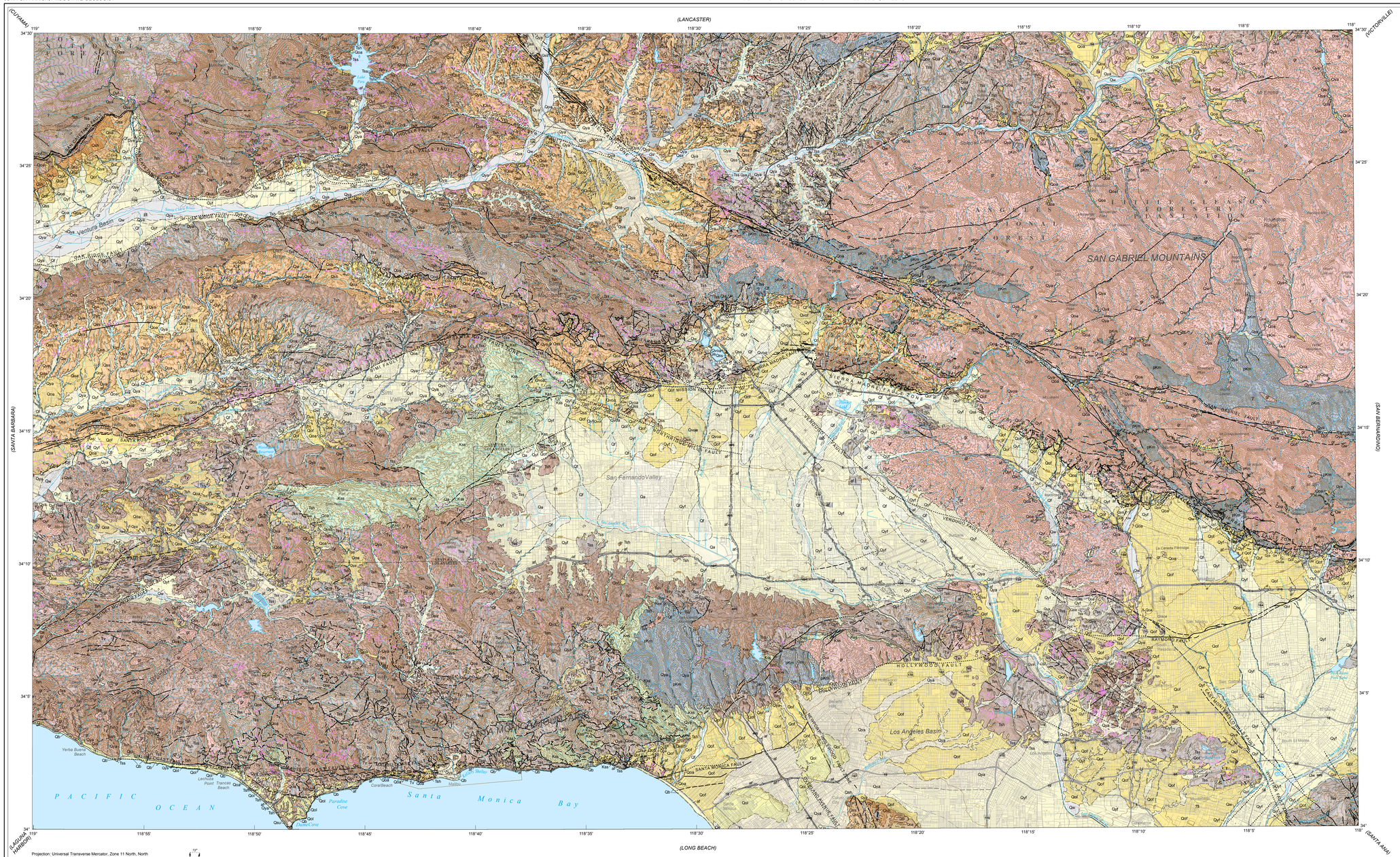

Projection: Universal Transverse Mercator, Zone 11 North, North American Datum of 1983.

Topographic contours derived from USGS 1/3 arc-second National Elevation Dataset (NED). Shaded topographic relief derived from USGS 1 arc-second NED. Base map of hydrography from National Hydrography Dataset Plus (NHDPlus) and California Department of Fish and Game. Base map of geographic names from USGS Geographic Names Information System (GNIS).

SCALE 1:100 000

5 2.5 0 5 MILES

5000 0 5000 10000 15000 20000 25000 30000 35000 40000 45000 50000 FEET

5 2.5 0 5 10 KILOMETERS

5000 0 5000 10000 METERS

CONTOUR INTERVAL 50 METERS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

GEOLOGIC COMPILATION OF QUATERNARY SURFICIAL DEPOSITS IN SOUTHERN CALIFORNIA
LOS ANGELES 30' X 60' QUADRANGLE

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

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MAP UNITS

Late Holocene (Surficial Deposits)

af — **Artificial Fill** - deposits of fill resulting from human construction, mining, or quarrying activities; includes engineered fill for buildings, roads, dams, airport runways, harbor facilities, and waste landfills

Qtu — **Undifferentiated Surficial Deposits** - includes colluvium, slope wash, talus deposits, and other surface deposits of all ages; generally unconsolidated but locally may contain consolidated layers

Qls — **Landslide Deposits** - may include debris flows and older landslides of various earth material and movement types; unconsolidated to moderately well-consolidated

Qb — **Beach Deposits** - unconsolidated marine beach sediments consisting mostly of fine- and medium-grained, well-sorted sand

Qw — **Alluvial Wash Deposits** - unconsolidated sandy and gravelly sediment deposited in recently active channels of streams and rivers; may contain loose to moderately loose sand and silty sand

Qf — **Alluvial Fan Deposits** - unconsolidated boulders, cobbles, gravel, sand, and silt recently deposited where a river or stream issues from a confined valley or canyon; sediment typically deposited in a fan-shaped cone; gravelly sediment generally more dominant than sandy sediment

Qa — **Alluvial Valley Deposits** - unconsolidated clay, silt, sand, and gravel recently deposited parallel to localized stream valleys and/or spread more regionally onto alluvial flats of larger river valleys; sandy sediment generally more dominant than gravelly sediment

Qt — **Terrace Deposits** - includes marine and stream terrace deposits; marine deposits include slightly to moderately consolidated and bedded gravel and conglomerate, sand and sandstone, and silt and siltstone; river terrace deposits consist of unconsolidated thin- to thick-bedded gravel

Ql — **Lacustrine, Playa, and Estuarine (Paralic) Deposits** - mostly unconsolidated fine-grained sand, silt, mud, and clay from fresh water (lacustrine) lakes; saline (playa) dry lakes that are periodically flooded, and estuaries; deposits may contain salt and other evaporites

Qe — **Eolian and Dune Deposits** - unconsolidated, generally well-sorted wind-blown sand; may occur as dune forms or sheet sand

Holocene to Late Pleistocene (Surficial Deposits)

Qyf — **Young Alluvial Fan Deposits** - unconsolidated to slightly consolidated, undissected to slightly dissected boulder, cobble, gravel, sand, and silt deposits issued from a confined valley or canyon

Qya — **Young Alluvial Valley Deposits** - unconsolidated to slightly consolidated, undissected to slightly dissected clay, silt, sand, and gravel along stream valleys and alluvial flats of larger rivers

Late to Middle Pleistocene (Surficial Deposits)

Qof — **Old Alluvial Fan Deposits** - slightly to moderately consolidated, moderately dissected boulder, cobble, gravel, sand, and silt deposits issued from a confined valley or canyon

Qoa — **Old Alluvial Valley Deposits** - slightly to moderately consolidated, moderately dissected clay, silt, sand, and gravel along stream valleys and alluvial flats of larger rivers

Qot — **Old Terrace Deposits** - slightly to moderately consolidated, moderately dissected marine and stream terrace deposits

Qol — **Old Lacustrine, Playa, and Estuarine (Paralic) Deposits** - slightly to moderately consolidated, moderately dissected fine-grained sand, silt, mud, and clay from lake, playa, and estuarine deposits of various types

Middle to Early Pleistocene (Surficial Deposits)

Qvof — **Very Old Alluvial Fan Deposits** - moderately to well-consolidated, highly dissected boulder, cobble, gravel, sand, and silt deposits issued from a confined valley or canyon

Qvoa — **Very Old Alluvial Valley Deposits** - moderately to well-consolidated, highly dissected clay, silt, sand, and gravel along stream valleys and alluvial flats of larger rivers; generally uplifted and deformed

Quaternary (Bedrock)

Qas — **Coarse-grained formations of Pleistocene age and younger** - primarily sandstone and conglomerate

Qah — **Fine-grained formations of Pleistocene age and younger** - includes fine-grained sandstone, siltstone, mudstone, shale, siliceous and calcareous sediments

Tertiary (Bedrock)

Tss — **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)

Kss — **Coarse-grained Cretaceous age formations of sedimentary origin**

Ksh — **Fine-grained Cretaceous age formations of sedimentary origin**

pKm — **Cretaceous and pre-Cretaceous metamorphic formations of sedimentary and volcanic origin**

sp — **Serpentinite of all ages**

gr — **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
- Gradational 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
- Lineament
- Folds -- Showing direction of plunge where appropriate
  - Anticline
  - Overturned anticline
  - Syncline
- Dike
- Stream
- Spring
- Road
- County boundary

LOS ANGELES 30' X 60' QUADRANGLE REVISIONS

Revisions were made to the Los Angeles 30' x 60' quadrangle based on new mapping along the northern edge of the map by Lancaster and others (2012). Changes include minor adjustments to unit boundaries. All other geologic map details remain the same as the version of the Los Angeles quadrangle issued in July 2010.

CORRELATION OF MAP UNITS*

	Artificial Fill	Undiff. Surficial Deposits	Landslide Deposits	Beach Deposits	Alluvial Wash Deposits	Alluvial Fan Deposits	Alluvial Valley Deposits	Terrace Deposits	Lacustrine, Playa, and Estuarine Deposits	Eolian and Dune Deposits
Quaternary Surficial Deposits: Late Holocene	af	Qtu	Qls	Qb	Qw	Qf	Qa	Qt	Ql	Qe
Holocene to Late Pleistocene						Qyf	Qya			
Late to Middle Pleistocene						Qof	Qoa	Qot	Qol	
Middle to Early Pleistocene						Qvof	Qvoa			

	Quaternary (Bedrock)	Tertiary (Bedrock)	Mesozoic and Older (Bedrock)				
	Coarse-grained	Fine-grained	Volcanic	Cretaceous and Pre-Cretaceous Metamorphic (sedimentary and volcanic)	Serpentinite (all ages)	Granitic Rocks (all ages)
	Qas	Qah	Tv	pKm	sp	gr
	Tss	Tsh				
	Kss	Ksh				

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

INDEX TO USGS 7.5' QUADRANGLES

MAP EXPLANATION

This map of Quaternary surficial deposits in the Los Angeles 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 most 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 Los Angeles 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 1400 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 CGS (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 terrains. Geologic bedrock formations from the source geologic maps are divided into 12 categories on the derivative maps, based on age and rock type. The bedrock categories can provide a general understanding of the relative erodibility of the upland materials and the general character of the derived sediments. 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.

Los Angeles Quadrangle

The majority of the Los Angeles quadrangle lies within a band of west-trending mountain ranges and valleys within the Transverse Ranges geomorphic province. The southeastern corner of the quadrangle includes the northern part of the oil-bearing Los Angeles Basin, which lies at the northern end of the Peninsular Ranges geomorphic province and includes the active northwest-trending Newport-Inglewood and Whittier fault zones and associated hills (Yerkes and Campbell, 2005). The oil-bearing Ventura Basin lies in the northwestern part of the quadrangle. Elevations range from sea level in the southwest to more than 2,000 meters in the San Gabriel Mountains in the northeastern part of the quadrangle. Although a small segment of the active San Andreas Fault crosses the extreme northeast corner of the quadrangle, most of the local uplift and deformation in the area is related to movement along numerous recently active or potentially active, predominantly east-west-trending faults throughout the mapped area. Uplift and erosion of steep, rugged slopes composed of highly fractured granitic and metamorphic bedrock within the San Gabriel Mountains has resulted in the development of widespread landslides and extensive Quaternary-age alluvial fans along the southern range front. These areas are particularly subject to devastating debris flows and debris-laden floods when seasonal wildfires are followed by heavy rainfall. Landslides are also widespread in the complexly folded and faulted sedimentary and volcanic rocks exposed in the western and northern parts of the quadrangle. In addition to the alluvial fan deposits south of the San Gabriel Mountains, extensive alluvial fan deposits cover the valley floor and flanks of the mountains surrounding the heavily populated San Fernando Valley in the center of the quadrangle and are also present on the coastal plain southeast of the Santa Monica Mountains. Other areas with significant active wash, alluvial-valley, and young and older alluvial fan deposits of Quaternary age include the Soledad Canyon-Santa Clara River area in the north and the Simi Valley and Arroyo Las Posas areas in the west.

In preparing this derivative map of the Los Angeles 30' x 60'quadrangle, CGS used geologic source data compiled in digital format by the California Geological Survey (2009). 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 18 of the 28 generalized project derivative units; boundaries of more detailed source map subdivisions are shown without label within the generalized derivative unit. This indicates more detailed geologic information is available in the Source GIS Database. For example, an area designated Qvof (very old paralic deposits) on this map may have been further divided on the source map into several units to distinguish different depositional surfaces and compositions. Bedrock units identified by the California Geological Survey (2009) are represented on this map by 10 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 the California Geological Survey (2009) are correlated with derivative categories used by CGS in the Geologic Labels GIS spreadsheet for the Los Angeles 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.

MAP REFERENCES

DIGITAL GEOLOGIC DATA FILE USED IN GIS COMPILATION OF QUATERNARY UNITS

California Geological Survey, 2009 (in progress), Preliminary geologic map of the Los Angeles 30' x 60' quadrangle: A digital database: California Geological Survey, Preliminary Regional Geologic Map, version 12/22/09, 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.

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).

OTHER SELECTED PUBLICATIONS USED AS REFERENCES

Lancaster, J.T., Hernandez, J.L., Haydon, W.D., Dawson, T.E., and Hayhurst, C.A., 2012, Geologic map of Quaternary surficial deposits in southern California, Tehachapi 30' x 60' quadrangle: California Geological Survey, Special Report 217 (Revised 2012), scale 1:100,000.

Yerkes, R.F. and Campbell, R.H., 2005, Preliminary geologic map of the Los Angeles 30' x 60' quadrangle, southern California: U.S. Geological Survey, Open-File Report 05-1019, scale 1:100,000, http://pubs.usgs.gov/of/2005/1019/.

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.