

# GEOLOGIC COMPILATION OF QUATERNARY SURFICIAL DEPOSITS IN SOUTHERN CALIFORNIA

## LEGEND AND CORRELATION OF DERIVATIVE GEOLOGIC MAP UNITS

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

Compiled from existing sources by

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### MAP UNITS

**Late Holocene (Surficial Deposits)**

af	<b>Artificial Fill</b> - 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
Qsu	<b>Undifferentiated Surficial Deposits</b> - includes colluvium, slope wash, talus deposits, and other surface deposits of all ages; generally unconsolidated but locally may contain consolidated layers
Qls	<b>Landslide Deposits</b> - may include debris flows and older landslides of various earth material and movement types; unconsolidated to moderately well-consolidated
Qb	<b>Beach Deposits</b> - unconsolidated marine beach sediments consisting mostly of fine- and medium-grained, well-sorted sand
Qw	<b>Alluvial Wash Deposits</b> - 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	<b>Alluvial Fan Deposits</b> - 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	<b>Alluvial Valley Deposits</b> - 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	<b>Terrace Deposits</b> - 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	<b>Lacustrine, Playa, and Estuarine (Paralic) Deposits</b> - 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	<b>Eolian and Dune Deposits</b> - unconsolidated, generally well-sorted wind-blown sand; may occur as dune forms or sheet sand

**Holocene to Late Pleistocene (Surficial Deposits)**

Qyw	<b>Young Alluvial Wash Deposits</b> - unconsolidated to slightly consolidated, undissected to slightly dissected sandy and gravelly stream bed sediments in marginal parts of active and recently active washes and river channels
Qyf	<b>Young Alluvial Fan Deposits</b> - unconsolidated to slightly consolidated, undissected to slightly dissected boulder, cobble, gravel, sand, and silt deposits issued from a confined valley or canyon
Qya	<b>Young Alluvial Valley Deposits</b> - unconsolidated to slightly consolidated, undissected to slightly dissected clay, silt, sand, and gravel along stream valleys and alluvial flats of larger rivers
Qyt	<b>Young Terrace Deposits</b> - unconsolidated to slightly consolidated, undissected to slightly dissected marine and stream terrace deposits
Qyl	<b>Young Lacustrine, Playa, and Estuarine (Paralic) Deposits</b> - unconsolidated to slightly consolidated, undissected to slightly dissected fine-grained sand, silt, mud, and clay from lake, playa, and estuarine deposits of various types
Qye	<b>Young Eolian and Dune Deposits</b> - unconsolidated to slightly consolidated, undissected to slightly dissected wind-blown sands

**Late to Middle Pleistocene (Surficial Deposits)**

Qow	<b>Old Alluvial Wash Deposits</b> - slightly to moderately consolidated, moderately dissected sand and gravel; typically elevated above modern washes
Qof	<b>Old Alluvial Fan Deposits</b> - slightly to moderately consolidated, moderately dissected boulder, cobble, gravel, sand, and silt deposits issued from a confined valley or canyon
Qoa	<b>Old Alluvial Valley Deposits</b> - slightly to moderately consolidated, moderately dissected clay, silt, sand, and gravel along stream valleys and alluvial flats of larger rivers
Qot	<b>Old Terrace Deposits</b> - slightly to moderately consolidated, moderately dissected marine and stream terrace deposits
Qol	<b>Old Lacustrine, Playa, and Estuarine (Paralic) Deposits</b> - slightly to moderately consolidated, moderately dissected fine-grained sand, silt, mud, and clay from lake, playa, and estuarine deposits of various types
Qoe	<b>Old Eolian and Dune Deposits</b> - slightly to moderately consolidated, moderately dissected wind-blown sands

**Middle to Early Pleistocene (Surficial Deposits)**

Qov	<b>Very Old Alluvial Wash Deposits</b> - moderately to well-consolidated, highly dissected sand and gravel; typically elevated above modern washes
Qvof	<b>Very Old Alluvial Fan Deposits</b> - moderately to well-consolidated, highly dissected boulder, cobble, gravel, sand, and silt deposits issued from a confined valley or canyon
Qvoa	<b>Very Old Alluvial Valley Deposits</b> - moderately to well-consolidated, highly dissected clay, silt, sand, and gravel along stream valleys and alluvial flats of larger rivers; generally uplifted and deformed
Qvot	<b>Very Old Terrace Deposits</b> - moderately to well-consolidated, highly dissected marine and stream terrace deposits
Qvol	<b>Very Old Lacustrine, Playa, and Estuarine (Paralic) Deposits</b> - moderately to well-consolidated, highly dissected fine-grained sand, silt, mud, and clay from lake, playa, and estuarine deposits of various types
Qvoe	<b>Very Old Eolian and Dune Deposits</b> - moderately to well-consolidated, highly dissected wind-blown sands

**Quaternary (Bedrock)**

Qss	<b>Coarse-grained formations of Pleistocene age and younger</b> - primarily sandstone and conglomerate
Qsh	<b>Fine-grained formations of Pleistocene age and younger</b> - includes fine-grained sandstone, siltstone, mudstone, shale, siliceous and calcareous sediments
Qv*	<b>Pleistocene age and younger formations of volcanic origin</b>

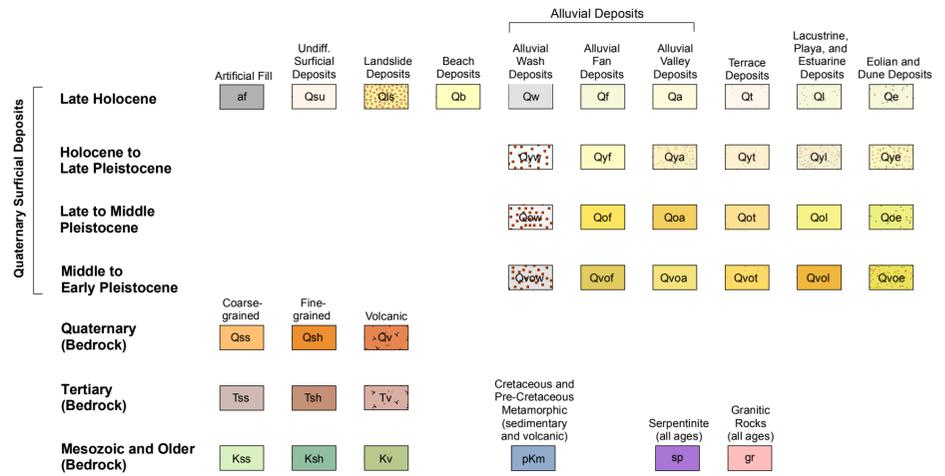
**Tertiary (Bedrock)**

Tss	<b>Coarse-grained Tertiary age formations</b> - primarily sandstone and conglomerate
Tsh	<b>Fine-grained Tertiary age formations</b> - includes fine-grained sandstone, siltstone, mudstone, shale, siliceous and calcareous sediments
Tv*	<b>Tertiary age formations of volcanic origin</b>

**Mesozoic and Older (Bedrock)**

Kss	<b>Coarse-grained Cretaceous age formations of sedimentary origin</b>
Ksh	<b>Fine-grained Cretaceous age formations of sedimentary origin</b>
Kv	<b>Cretaceous age formations of volcanic origin</b>
pKm	<b>Cretaceous and pre-Cretaceous metamorphic formations of sedimentary and volcanic origin</b>
sp	<b>Serpentine of all ages</b>
gr	<b>Granitic and other intrusive crystalline rocks of all ages</b>

### CORRELATION OF MAP UNITS\*



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

### 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.]

<b>Contacts</b>	
	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
<b>Folds -- Showing direction of plunge where appropriate</b>	
	Anticline
	Antiform or structural high
	Overturned anticline
	Syncline
	Synform or structural low
	Overturned syncline
	Monocline
	Generic fold
<b>Scarps</b>	
	Scarp on fault
	Scarp on landslide
	Incised scarp of sedimentary contact
	Erosional scarp
	Fluvial terrace scarp
	Subsidence scarp
	Outline of slip surface of landslide
	Closed depression
	Dike
	Fissure
	Dune crest
	Former shoreline or marine limit
	Stream
	Spring
	Wet area
	Road
	County boundary
	State boundary
	National boundary

### 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).



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