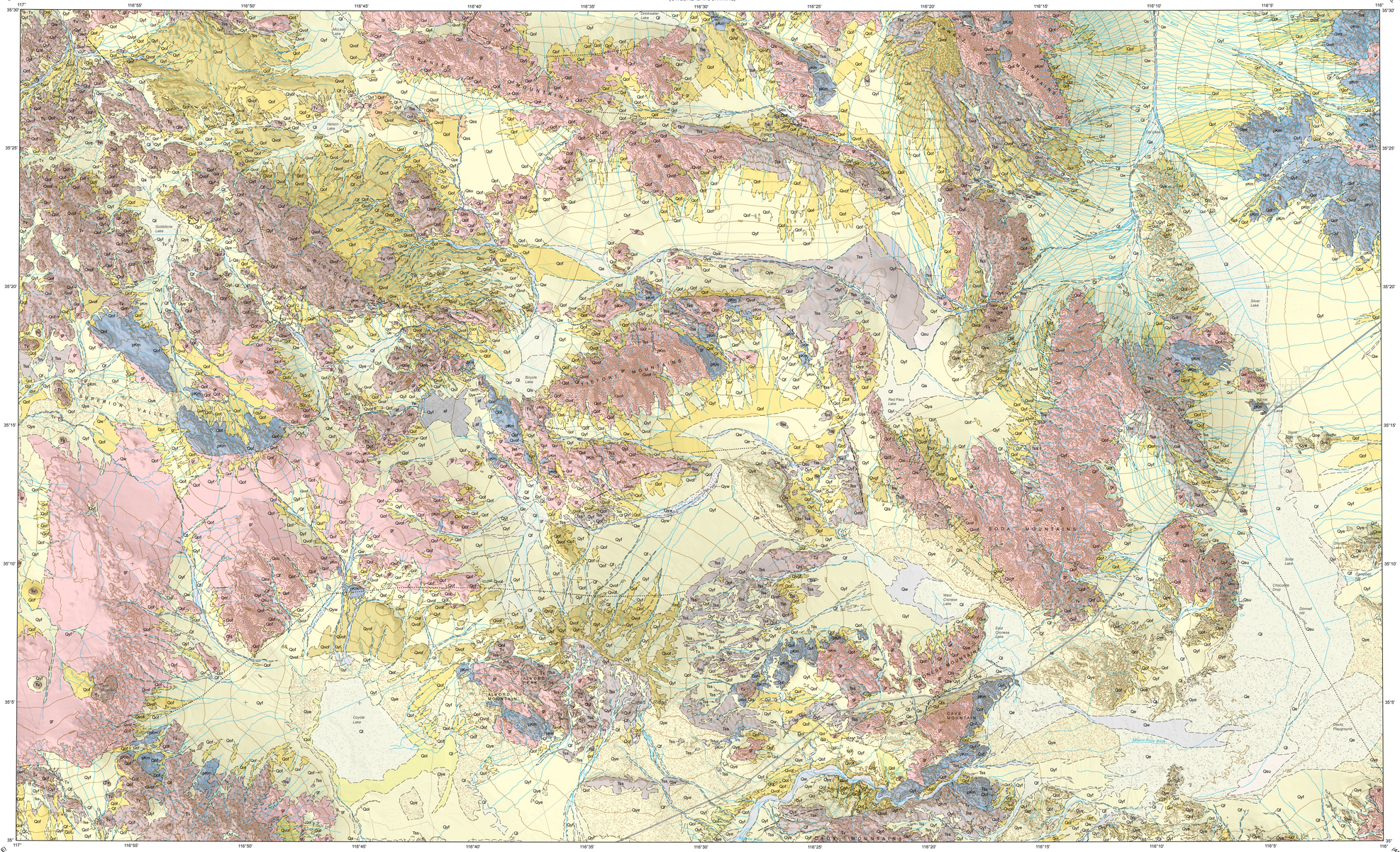


Projection: Universal Transverse Mercator, Zone 11 North, North American Datum of 1983.

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).

APPROXIMATE MEAN DECLINATION, 2011

MAP LOCATION

SCALE 1:100,000

5 2.5 0 5 MILES

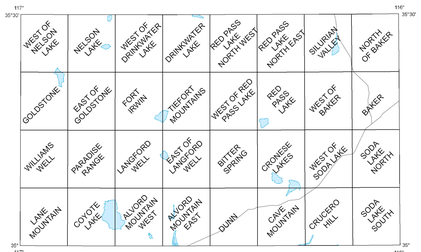
5000 0 5000 10000 15000 20000 25000 30000 35000 40000 45000 50000 FEET

5 2.5 0 5 10 KILOMETERS

5000 0 5000 10000 METERS

CONTOUR INTERVAL 50 METERS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

INDEX TO USGS 7.5' QUADRANGLES



GEOLOGIC COMPILATION OF QUATERNARY SURFICIAL DEPOSITS IN SOUTHERN CALIFORNIA
SODA MOUNTAINS 30' X 60' QUADRANGLE

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

December 2012

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MAP EXPLANATION

This map of Quaternary surficial deposits in the Soda Mountains 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 Soda Mountains 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). Published source geologic mapping at the 100,000 scale was not available for the Soda Mountains quadrangle, therefore CGS relied on in progress mapping by the USGS (Miller and Lidke, 2012) for this quadrangle. Quaternary surficial deposits for the statewide project 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 be used to provide a general understanding of the relative erodibility of the upland materials and the general character of the derived sediments. CGS also rectified inconsistencies along the boundaries of mapped areas to create a seamless Derivative GIS Database, but retained links to the original mapping (where available) 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.

Soda Mountains Quadrangle

The Soda Mountains quadrangle lies within the north-central portion of the Mojave Desert of southern California. The area encompasses several broad Quaternary-age alluvial basins that receive non-marine continental deposits from adjacent uplands and Tertiary-age and older strata of surrounding mountain ranges. Nearly every local internal drainage basin contains a playa (dry lake). Elevations vary from approximately 300 meters to 1200 meters (1000 to 4000 feet). The easternmost portion of the quadrangle is dominated by a chain of lower valleys that include East Cronese Lake, the Mojave River Wash, and Soda Lake to the south, and Silver Lake and the Silurian Valley to the north. These areas are characterized by late Holocene lakebed, eolian, and wash deposits surrounded by adjacent alluvial fan and eolian deposits of Holocene to Late Pleistocene age. To the west of these valleys, pre-Tertiary granitic rocks of the Avawatz, Soda, Cronese, and Cave Mountains are interspersed with Tertiary-age sedimentary and volcanic rocks and old to very old alluvial fan deposits ranging from Late to Early Pleistocene age. In the center of the quadrangle, four major east-west trending alluvial filled valleys that include West Cronese, Red Pass, Bicycle, Nelson and McLean Lakes and other Late Holocene playa deposits are separated by three dominant mountain ranges. These include, from north to south, the Granite, Tiefort, and Alvord Mountains. Late Holocene Coyote Lake playa deposits and older alluvial fan and eolian deposits dominate the southwest portion of the quadrangle, while smaller areas of playa, eolian and alluvial valley deposits exist to the north near Superior Valley and Goldstone Lake. North of Coyote Lake, bedrock units of volcanic, granitic, and metamorphic origin dominate the western portion of the quadrangle. Older alluvial fan deposits are present along the margins of the mountains and interspersed throughout the washes, particularly in the northwest corner of the quadrangle. Several Quaternary age faults lie within the Soda Mountains 30' x 60' quadrangle, but only one unnamed fault along the western side of Soda Mountains appears to have been active during Holocene time (Jennings and Bryant, 2010).

In preparing this derivative map of the Soda Mountains 30' x 60'quadrangle, CGS used preliminary geologic data compiled in digital format by Miller and Lidke (2012) and fault data from Jennings and Bryant (2010). CGS retained the boundaries of Quaternary age surficial deposits mapped Miller and Lidke (2012) with very few revisions. Quaternary surficial deposits shown on this map are represented by 18 of the 28 generalized project derivative units. Bedrock units identified by Miller and Lidke (2012) are represented on this map by 5 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 Miller and Lidke (2012) are correlated with derivative categories used by CGS in the Geologic Labels GIS spreadsheet for the Soda Mountains 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

Miller, D.M., and Lidke, D.J., 2012, Preliminary surficial geologic map of the Soda Mountains 30' x 60' quadrangle, San Bernardino County, California: Unpublished digital data provided by U.S. Geological Survey to California Geological Survey, August 28, 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).

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Jennings, C.W., and Bryant, W.A., 2010, Fault activity map of California: California Geological Survey, scale 1:750,000.

Jennings, C.W., Burnett, J.L., and Troxel, B.W. (compilers), 1962, Geologic map of California, Olaf P. Jenkins edition, Trona sheet: California Division of Mines and Geology, scale 1:250,000.

Miller, D. M., Dudash, S.L., Green, H.L., Lidke, D.J., Amoroso, L., Phelps, G.A., and Schmidt, K.M., 2007, A new Quaternary view of northern Mojave Desert tectonics suggests changing fault patterns during the late Pleistocene: in Miller, D.M., and Valin, Z.C., editors, Geomorphology and tectonics at the intersection of Silurian and Death Valleys, southern California: U.S. Geological Survey, Open-File Report 2007-1424, p. 157-171.

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

Qsu — **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

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

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)

Qyw — **Young Alluvial Wash Deposits** - 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 — **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

Qyl — **Young Lacustrine, Playa, and Estuarine (Paralic) Deposits** - 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 — **Young Eolian and Dune Deposits** - unconsolidated to slightly consolidated, undissected to slightly dissected wind-blown sands

Late to Middle Pleistocene (Surficial Deposits)

Qof — **Old Alluvial Wash Deposits** - slightly to moderately consolidated, moderately dissected sand and gravel; typically elevated above modern washes

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

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

Qoe — **Old Eolian and Dune Deposits** - slightly to moderately consolidated, moderately dissected wind-blown sands

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

Quaternary (Bedrock)

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

Tertiary (Bedrock)

Tss — **Coarse-grained Tertiary age formations** - primarily sandstone and conglomerate

Tv — **Tertiary age formations of volcanic origin**

Mesozoic and Older (Bedrock)

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

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.

Contact

Fault -- Includes strike-slip, normal, reverse, oblique, and unspecified slip

Stream

Spring

Road

CORRELATION OF MAP UNITS*

Quaternary Surficial Deposits	Artificial Fill	Undiff. Surficial Deposits	Landslide Deposits	Alluvial Deposits: Alluvial Wash Deposits	Alluvial Deposits: Alluvial Fan Deposits	Alluvial Deposits: Alluvial Valley Deposits	Alluvial Deposits: Lacustrine, Playa, and Estuarine Deposits	Alluvial Deposits: Eolian and Dune Deposits
Late Holocene	af	Qsu	Qls	Qw	Qf	Qa	Ql	Qe
Holocene to Late Pleistocene				Qyw	Qyf	Qya	Qyl	Qye
Late to Middle Pleistocene				Qow	Qof		Qol	Qoe
Middle to Early Pleistocene					Qvof			

	Coarse-grained	Volcanic	Cretaceous and Pre-Cretaceous Metamorphic (sedimentary and volcanic)	Granitic Rocks (all ages)
Quaternary (Bedrock)	Qss			
Tertiary (Bedrock)	Tss	Tv		
Mesozoic and Older (Bedrock)			pKm	gr

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

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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.