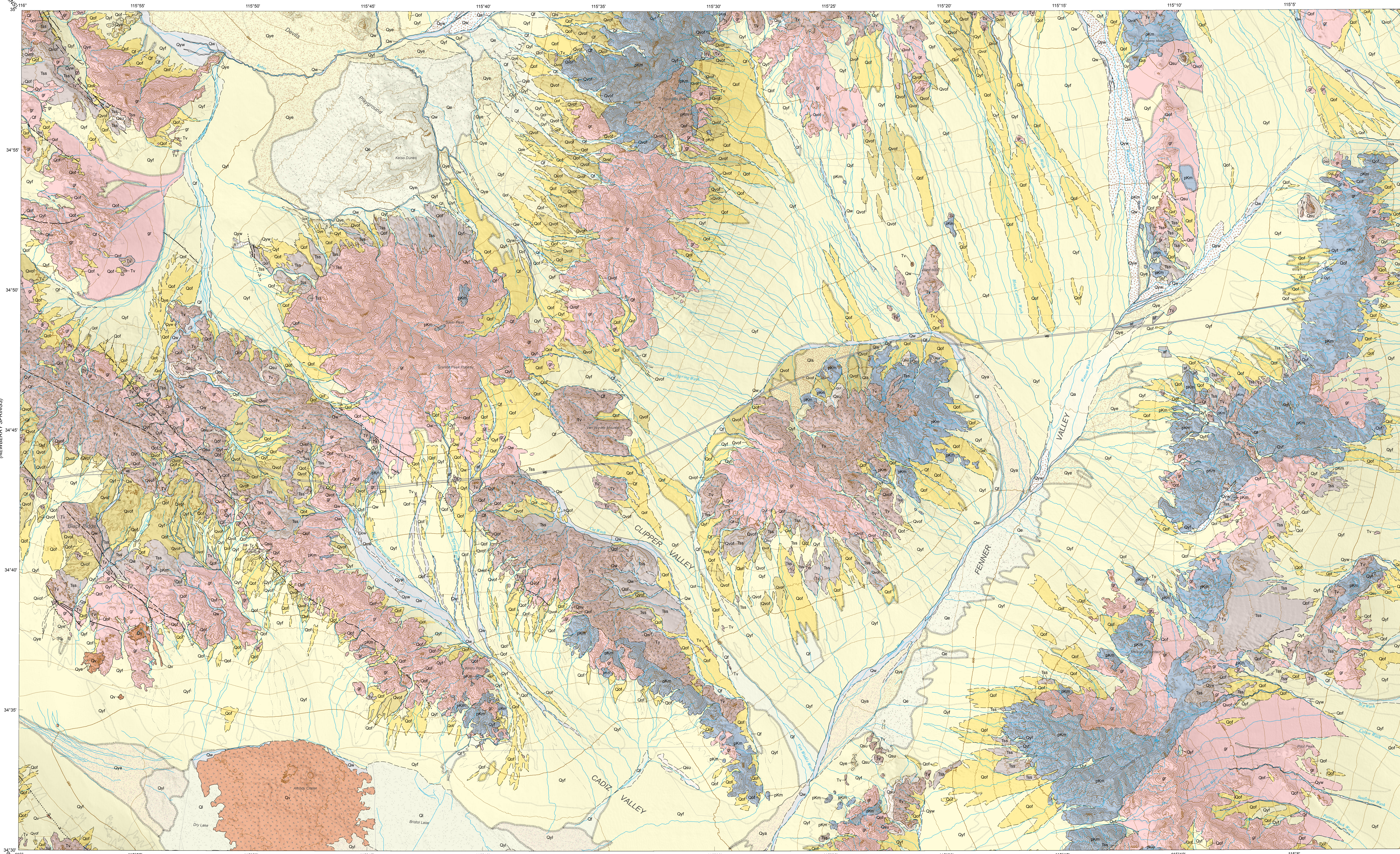


MAP UNITS

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)

- Qow — **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
- 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)

- Qv — **Pleistocene age and younger formations of volcanic origin**

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.]

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.
- Gradational contact
- Reference gradational contact

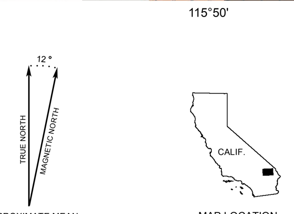
- Fault -- Includes strike-slip, normal, reverse, oblique, and unspecified slip
- Stream
- Spring
- Road
- County boundary

AMBOY 30' X 60' QUADRANGLE REVISIONS

Revisions were made to the Amboy 30' x 60" quadrangle based primarily on new data published by Bedford, Miller, and Phelps (2010). Minor adjustments to unit boundaries along northern and western edges of the map were also made based on new mapping by Miller (2012) and Phelps and others (2011), respectively.

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

AMBOY 30' X 60' QUADRANGLE

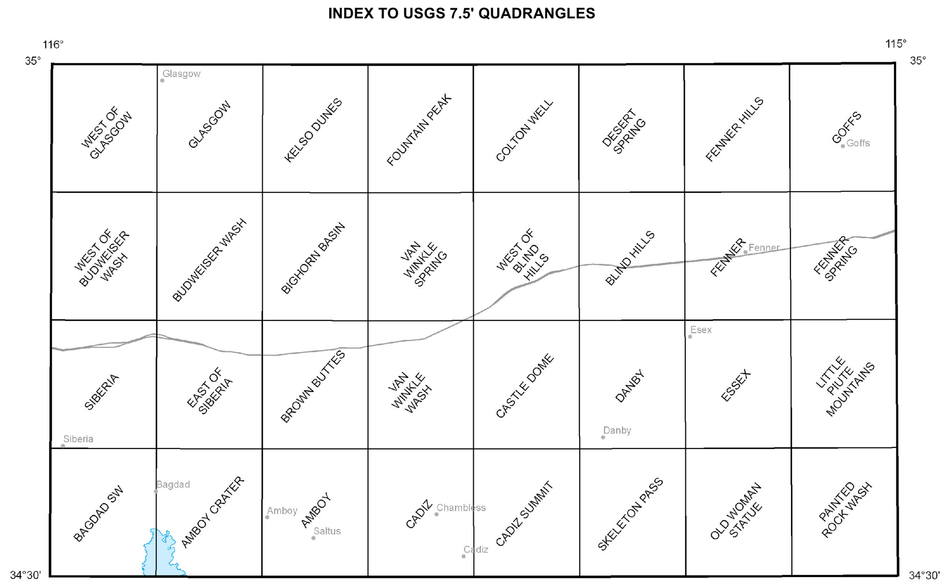
A Project for the Department of Water Resources by the California Geological Survey

Compiled from existing sources by
Trinda L. Bedrossian, CEG and Michelle A. Myers, Graduate Student Assistant

Digital preparation by
Solomon McCrea, Jim Thompson, and Michelle A. Myers

July 2012

INDEX TO USGS 7.5' QUADRANGLES



MAP EXPLANATION

This map of Quaternary surficial deposits in the Amboy 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 Amboy 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 derivative bedrock categories can be used to provide a general understanding 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.

Amboy Quadrangle

The Amboy quadrangle lies within the eastern Mojave Desert of southern California. The area encompasses several mountain ranges with numerous piedmonts, or sloping plains, extending from the base of the mountains between Kelso Wash, in the northwest corner of the quadrangle, and Fenner Valley, in the eastern third of the quadrangle (Bedford, Miller, and Phelps, 2010). Elevations range from 180 meters to 2182 meters. A series of faults, known to be active during Quaternary time, have influenced the formation of linear mountains in the western quarter of the quadrangle. The mountains exhibit asymmetrical topography, with low-gradient, deeply embayed piedmonts on the northeast and steep mountain fronts with narrow canyons and little embayment to the southwest (Bedford, Miller, and Phelps, 2010). The northeastern part of the quadrangle is characterized by non-linear mountains, broad pediments and pediment-controlled piedmonts, and deep embayment of mountain fronts which indicate the lack of recent tectonic influence on landforms in this area. The southwest portion of the quadrangle is traversed by the Bristol-Danby trough, a structural depression that includes the Bristol Basin in this quadrangle and the Cadiz and Danby basins to the south. Small playa (short-lived or ephemeral) lakes occupy the axial valleys of these basins. Salt, gypsum, and calcium carbonate groundwater discharge deposits are also present in the Bristol Basin. Volcanic rocks of Quaternary age crop out where volcanic ejecta and flows from Amboy Crater were deposited over the playa deposits of Bristol Lake.

Quaternary surficial deposits in the quadrangle represent a series of alluvial, lacustrine, eolian, and mass-wasting depositional processes primarily related to fluctuations in climate. Surficial units commonly exist as veneers generally 2 meters or less over older bedrock units or may be intermixed with other surficial deposits. Holocene alluvium is the most widespread surficial deposit in the area. Active alluvial fan and wash deposits typically form in discrete channels that are prone to flooding and sheet flow during intense or long-lasting precipitation events (Bedford, Miller, and Phelps, 2010). A fairly large eolian system consisting of active, modern and mid-Holocene eolian deposits is present east of Fenner Wash. Eolian deposits are increasingly younger to the south and become gradually more active along the margin of the wash. Extensive eolian and mixed eolian and alluvial deposits are also present in the northwest portion of the quadrangle in the vicinity of Devil's Playground. Mixed eolian and volcanic deposits are present near Amboy Crater.

In preparing this revised derivative map of the Amboy 30' x 60'quadrangle, CGS used geologic source data compiled in digital format by Bedford, Miller, and Phelps (2010). 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 17 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 Qyf (young alluvial fan 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 Bedford, Miller, and Phelps (2010) 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 Bedford, Miller, and Phelps (2010) are correlated with derivative categories used by CGS in the Geologic Labels GIS spreadsheet for the Amboy 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

Bedford, D.R., Miller, D.M., and Phelps, G.A., 2010, Surficial geologic map of the Amboy 30' x 60' quadrangle, San Bernardino County, California: U.S. Geological Survey, Scientific Investigations Map 3109, 26 p., scale 1:100,000, http://pubs.usgs.gov/sim/3109/index.html.

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.

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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

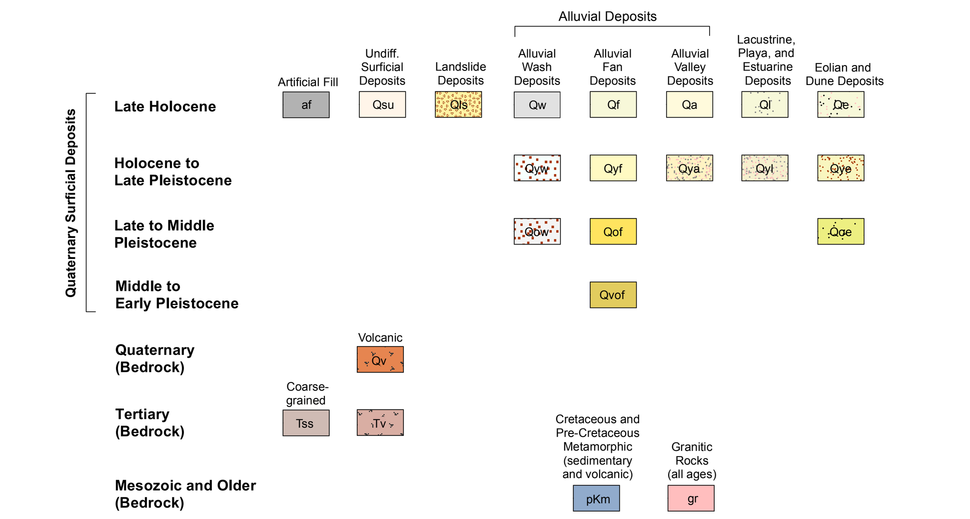
Bishop, C.C. (compiler), 1963, Geologic map of California, Olaf P. Jenkins edition, Needles sheet: California Division of Mines and Geology, scale 1:250,000.

Howard, K.A, 2002, Geologic map of the Sheep Hole 30' x 60' quadrangle, San Bernardino and Riverside counties, California: U.S. Geological Survey, Miscellaneous Field Investigations MF-2344, scale 1:100,000.

Miller, D.M., 2012, Surficial geologic map of the Ivanpah 30' x 60' quadrangle, San Bernardino County, California, and Clark County, Nevada: U.S. Geological Survey, Scientific Investigations Map 3206, 31 p., scale 1:100,000.

Phelps, G.A., Bedford, D.R., Lidke, D.J., Miller, D.M., and Schmidt, K.S., 2011, Surficial geologic map of the Newberry Springs 30' x 60' quadrangle, California: U.S. Geological Survey, Open-File Report 2011-1044,103 p., scale 1:100,000.

CORRELATION OF MAP UNITS*



* 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.