

# **PS Updates to the Regional Geologic Map of the Los Angeles 30' x 60' Quadrangle\***

**C.J. Wills<sup>1</sup>, R.H. Campbell<sup>2</sup>, P.J. Irvine<sup>3</sup>, and B. J. Swanson<sup>3</sup>**

Search and Discovery Article #30339 (2014)

Posted July 7, 2014

\*Adapted from poster presentation given at Pacific Section AAPG, SEG and SEPM Joint Technical Conference, Bakersfield, California, April 27-30, 2014

<sup>1</sup>California Geological Survey, Sacramento CA, ([chris.wills@conservation.ca.gov](mailto:chris.wills@conservation.ca.gov))

<sup>2</sup>U.S. Geological Survey

<sup>3</sup>California Geological Survey, Los Angeles, CA

## **Abstract**

This year, the California Geological Survey will release an updated geologic map of the Los Angeles 30'×60' quadrangle. Like previous maps in the CGS Regional Geologic Map series, the map will be on a 100,000-scale base map, but preserve as much detail as possible from original mapping at 1:24,000 or larger scale. The new map updates the one by Yerkes and Campbell published by the USGS in 2005. In updating this map, CGS has incorporated all new mapping of Quaternary units in valleys and basins throughout the region. This mapping, conducted for the CGS seismic hazard-zoning program as part of the process of defining liquefaction hazard zones, provides new detail that helps to delineate late Quaternary depositional and tectonic processes in addition to seismic hazards. CGS has also completely updated the mapping of crystalline bedrock units in the San Gabriel Mountains, Verdugo Mountains, and San Rafael Hills. This update used the most detailed available source maps and attempted to reconcile maps with differing interpretations and nomenclature. This new compilation represents a complete and consistent interpretation where the detailed mapping and unit descriptions are from a single source, such as in the anorthosite complex mapped by Carter (1980), but in other areas, units described by one author may be extended based on contacts mapped by another. Additional mapping is needed to ensure that interpretations made for this compilation are correct and to fill in areas where the existing mapping is inadequate. In addition to the major updates noted above, CGS has updated numerous other areas based on map sources not used in the map by Yerkes and Campbell (2005). These local updates include new mapping of parts of the active Hollywood, San Cayetano and Simi faults, updates to mapping and stratigraphy of the Plio-Pleistocene sedimentary rocks of the Ventura basin, updates to Tertiary units in the Soledad basin, and a complete revision of the way landslides are

depicted on these regional maps. The density of landslides on some maps in this series made interpretation of the underlying geologic units and structures very difficult. To improve map clarity, only larger or more prominent landslides are shown; readers needing a more complete landslide map are referred to CGS 1:24,000-scale landslide maps. The map will be released for review and comments on the CGS web page: [http://www.conservation.ca.gov/cgs/rghm/rgm/Pages/preliminary\\_geologic\\_maps.aspx](http://www.conservation.ca.gov/cgs/rghm/rgm/Pages/preliminary_geologic_maps.aspx).



# Updates to the regional geologic map of the Los Angeles 30'x60' quadrangle

C.J. Wills<sup>1</sup>, R.H. Campbell<sup>2</sup>, P.J. Irvine<sup>3</sup> and B. J. Swanson<sup>3</sup>,

1. California Geological Survey, 801 K Street, ms 12-32, Sacramento CA, 95814, [chris.wills@conservation.ca.gov](mailto:chris.wills@conservation.ca.gov)
2. U.S. Geological Survey (retired)
3. California Geological Survey, Los Angeles, CA 90017,

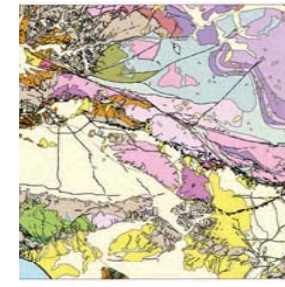
## Abstract

This year, the California Geological Survey will release an updated geologic map of the Los Angeles 30'x60' quadrangle. Like previous maps in the CGS Regional Geologic Map series, the map will be on a 100,000-scale base map, but preserve as much detail as possible from original mapping at 1:24,000 or larger scale. The new map updates the one by Yerkes and Campbell published by the USGS in 2005. In updating this map, CGS has incorporated all new mapping of Quaternary units in valleys and basins throughout the region. This mapping, conducted for the CGS seismic hazard zoning program as part of the process of defining liquefaction hazard zones, provides new detail that helps to delineate late Quaternary depositional and tectonic processes in addition to seismic hazards. CGS has also completely updated the mapping of crystalline bedrock units in the San Gabriel Mountains, Verdugo Mountains, and San Rafael Hills. This update used the most detailed available source maps and attempted to reconcile maps with differing interpretations and nomenclature. This new compilation represents a complete and consistent interpretation where the detailed mapping and unit descriptions are from a single source, such as in the anorthosite complex mapped by Carter (1980), but in other areas, units described by one author may be extended based on contacts mapped by another. Additional mapping is needed to ensure that interpretations made for this compilation are correct and to fill in areas where the existing mapping is inadequate. In addition to the major updates noted above, CGS has updated numerous other areas based on map sources not used in the map by Yerkes and Campbell (2005). These more local updates include new mapping of parts of the active Hollywood, San Cayetano and Simi faults, updates to mapping and stratigraphy of the Plio-Pleistocene sedimentary rocks of the Ventura basin, updates to Tertiary units in the Soledad basin, and a complete revision of the way landslides are depicted on these regional maps. The density of landslides on some maps in this series made interpretation of the underlying geologic units and structures very difficult. To improve map clarity, only larger or more prominent landslides are shown, readers needing a more complete landslide map are referred to CGS 1:24,000-scale landslide maps. The map will be released for review and comments on the CGS web page: [http://www.conservation.ca.gov/cgs/rghm/rqm/Pages/preliminary\\_geologic\\_maps.aspx](http://www.conservation.ca.gov/cgs/rghm/rqm/Pages/preliminary_geologic_maps.aspx).

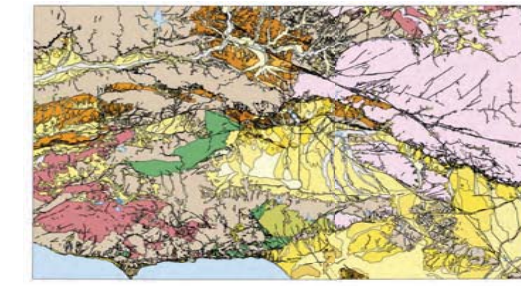
Images below show the most extensive updates between the map by Yerkes and Campbell (2005) and the current map. The maps on the left below show the changes to the Quaternary deposits. The maps on the right below show the changes to the crystalline rocks in the San Gabriel Mountains. Oval inset maps show options for display of landslides, which have been re-mapped by CGS. The left map shows all landslides from the 1:24,000 scale maps. The right map shows only selected larger landslides to make interpretation of bedrock geology easier. See the poster by Swanson and Irvine for details of changes to the Plio-Pleistocene nomenclature and mapping in the Ventura basin.



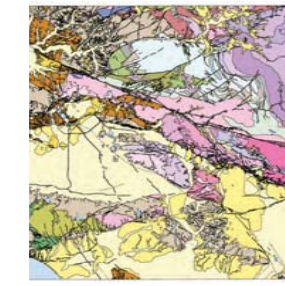
Quaternary deposits compiled by Yerkes and Campbell (2005), surrounding units simplified for clarity



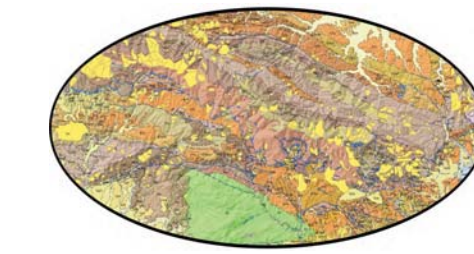
Crystalline bedrock in San Gabriel Mountains as compiled by Yerkes and Campbell (2005), surrounding units simplified for clarity



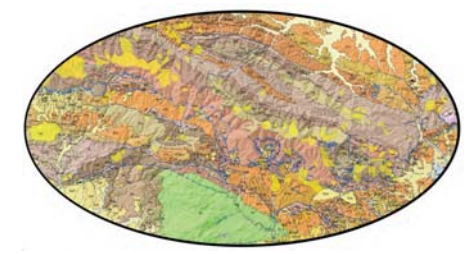
Quaternary deposits on current compilation, surrounding units simplified for clarity



Crystalline bedrock in San Gabriel Mountains on current compilation, surrounding units simplified for clarity



Landslides from 1:24,000 maps



Selected larger landslides for display on 30' x 60' quadrangle

CALIFORNIA GEOLOGICAL SURVEY  
JOHN G. PARRISH, PH.D., STATE GEOLOGIST

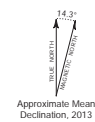
STATE OF CALIFORNIA - EDMUND G. BROWN, JR., GOVERNOR  
NATURAL RESOURCES AGENCY - JOHN LAIRD, SECRETARY  
DEPARTMENT OF CONSERVATION - MARK NECHOOM, DIRECTOR

PRELIMINARY GEOLOGIC MAP OF THE LOS ANGELES 30' X 60' QUADRANGLE, CALIFORNIA



Coordinate System:  
Universal Transverse Mercator, Zone 10N,  
North American Datum 1927.  
Topographic base from U.S. Geological Survey  
Los Angeles 30' x 60-minute Quadrangle, 190X.  
Shaded relief image derived from USGS 1/3 arc-second  
National Elevation Dataset (NED).

Printed larger than final scale for this poster  
SCALE 1:100,000  
1 2 3 4 5 6 7 8 9 10 MILES  
0 1 2 3 4 5 6 7 8 9 10 KILOMETERS  
Contour Interval: 50 meters (approximately 164 feet)  
Bathymetric Contour Interval: 10 meters (approximately 33 feet)

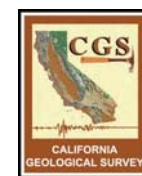


Approximate Mean  
Declination, 2013

## PRELIMINARY GEOLOGIC MAP OF THE LOS ANGELES 30' x 60' QUADRANGLE, CALIFORNIA

Compiled by  
Russell H. Campbell<sup>1</sup>, Chris J. Wills<sup>2</sup>, Pamela J. Irvine<sup>2</sup> and Brian J. Swanson<sup>2</sup>  
2014

Digital preparation by  
Carlos I. Gutierrez<sup>2</sup> and Matt D. O'Neal<sup>2</sup>



Copyright © 2014 by the California Department of Conservation.  
All rights reserved. No part of this publication may be reproduced  
without written consent of the California Geological Survey.  
The Department of Conservation makes no warranties as to the  
suitability of this product for any particular purpose.

1. U.S. Geological Survey (retired)
2. Department of Conservation, California Geological Survey

### ABBREVIATED EXPLANATION

Approximate stratigraphic relationships only  
see pamphlet for more detailed information

Artificial fill	Aluminum	Alluvial fan deposits	Wash deposits	Eolian deposits	Beach deposits	Landslide deposits
Young alluvium Undivided Unit 4 Unit 3 Unit 2 Unit 1	Young alluvium Undivided Unit 4 Unit 3 Unit 2 Unit 1	Young alluvial fan deposits Undivided Unit 5 Unit 3 Unit 2 Unit 1	Undivided Unit 4 Unit 3 Unit 2 Unit 1	Old alluvium Undivided Unit 3 Unit 2 Unit 1	Old alluvial fan deposits Undivided Unit 4 Unit 3 Unit 2 Unit 1	Very old alluvium Undivided Unit 2 Unit 1
Pico Formation Undivided	Groves Canyon detritic facies Green-grayed upper facies Mud shale member Sandstone and conglomerate	Saugus Formation Undivided Upper member Carnallito member Volcanic breccia Fernando Formation Conglomerate Sunshine Ranch Member upper facies lower facies Eltornio Canyon delta plain facies	San Pedro Formation Undivided Inglewood Formation Sedimentary rocks of the Pacific Palisades area Upper Member pebbly sandstone fossiliferous conglomerate	Juniper Hills Formation Undifferentiated Clay shale member Mixed clast member	Pointe Formation Undivided Siltstone Siliceous shale Diatomaceous shale Sandstone Sycamore Canyon Member conglomerate bed Yorta Member Sequel Member	Casale Formation, undivided Punch Bowl Formation Clay shale member Volcanic clast member Men Canyon Formation Undivided Lacustrine detritic (forested) facies Lacustrine bottomset facies Lacustrine and lake-marginal fluvial facies
Monterey Shale Undivided Deformed	Trancas Formation Undivided Quartz-bearing calcarenites	Topanga Group Undivided Oat Mountain unit 4 Oat Mountain unit 3 Oat Mountain unit 2 Oat Mountain unit 1	Topanga Group Undivided Oat Mountain unit 4 Oat Mountain unit 3 Oat Mountain unit 2 Oat Mountain unit 1	Topanga Group Undivided Oat Mountain unit 4 Oat Mountain unit 3 Oat Mountain unit 2 Oat Mountain unit 1	Topanga Group Undivided Oat Mountain unit 4 Oat Mountain unit 3 Oat Mountain unit 2 Oat Mountain unit 1	Topanga Group Undivided Oat Mountain unit 4 Oat Mountain unit 3 Oat Mountain unit 2 Oat Mountain unit 1
Zuma Volcanics	Conito Volcanics (along north flank of Santa Monica Mts.) Dacite-bearing epiclastic lenses Dacite-bearing upper zone Andesitic central zone Andesitic flows Andesitic agglomerate Andesite breccia Basaltic lower zone, basalt and andesitic basalt Basalt and andesitic basalt, basalt flows Basalt and andesitic basalt, basaltic breccia Basaltic lower zone, pillow basalt Andesitic central zone, andesitic agglomerate	Calabasas Formation (central and western Santa Monica Mts.) Undivided Volcanic conglomerate Dry Canyon Sandstone Member Sycamore Canyon Breccia Member Laguna Canyon Breccia Member Escondido Canyon Shale Member	Calabasas Formation (upper plate of Malibu Bowl detachment fault) Undivided Mesa Peak Breccia Member Newell Sandstone Member Dry Canyon Sandstone Member Sycamore Canyon Breccia Member Laguna Canyon Breccia Member Escondido Canyon Shale Member	Conito Volcanics (upper plate of Malibu Bowl detachment fault) Undivided Mesa Peak Breccia Member Newell Sandstone Member Dry Canyon Sandstone Member Sycamore Canyon Breccia Member Laguna Canyon Breccia Member Escondido Canyon Shale Member	Topanga Canyon Formation Undivided Cold Creek Member Fernwood Member Saddle Peak Member Big Sycamore Member Encinal Member	Vogadro Formation (Colabau basin and San Andreas fault zone) Undivided Andesitic volcanic rocks Basaltic volcanic rocks Non-marine conglomerate Sedimentary rocks
	Rincon Formation (Topanga Mts. and eastern Santa Ynez Range) Undivided Marine shale and mudstone Vogadro Formation (western Sta. Monica Mts., Ojai Ridge, & eastern Ventura Basin) Undivided	Sage Formation (western Sta. Monica Mts., Ojai Ridge, & eastern Ventura Basin) Undivided Puma Member	Coastwater Formation Undivided Cozy Dell Formation Marilla Formation Undivided Siltstone and shale	Lajas Formation Undivided Conglomerate	Santa Susana Formation Undivided Conglomeratic member Shale member Sandstone member	Sedimentary rocks in the San Gabriel fault zone
	Tuna Canyon Formation (central and western Santa Monica Mts.) Undivided Informal member "a" Informal member "b" Informal member "c" Informal member "d"	Chatsworth Formation Undivided Spotted slate Phyllite	Trabuco Formation Undivided Pelona Schist	Granitic rocks Tonalite Granodiorite Tonalite (Wilson Diorth of Miller, 1934)	Leucocratic granodiorite Tonalite and quartz diorite Granodiorite Tonalite Alaskite	Porphyritic biotite monzogranite Biotite-hornblende quartz diorite, diorite, and gabbro Hornblende diorite
	Mount Lowe Intrusive Suite Undivided Biotite-orthoclase facies Porphyritic facies Orthoclase-hornblende facies Metamorphosed	Echo granite	Mount Lowe Intrusive Suite Undivided Biotite-orthoclase facies Porphyritic facies Orthoclase-hornblende facies Metamorphosed	Granite complex	Granite complex	Granite complex
	Anorthosite-gabbro complex of Oakeshot (1958) Data is a composite of subsurface mapped and described by Carter (1980) including: Johannesburg-north-gabbro diorite Gabbroic to anorthositic gneiss Gabbro Hornblende-biotite gabbro Anorthositic inclusion-rich gabbro	Granite complex	Granite complex	Granite complex	Granite complex	Granite complex
	Granite complex	Granite complex	Granite complex	Granite complex	Granite complex	Granite complex

Current draft geologic map of the Los Angeles 30' x 60' quadrangle. Please let us know if you know of sources of geologic mapping for this area that we may have missed or if any part of this map shows units or structures that are contrary to your observations or maps that you consider to be authoritative.