



# San Joaquin Geological Society

**Date:** Tuesday, April 11, 2017

**Time:** 6:00 PM Social Hour  
7:00 PM Dinner  
8:00 PM Lecture

**Place:** Eagles Lodge  
1718 17<sup>th</sup> Street, Bakersfield, CA 93302

**PSAAPG Members & Mesozoics**  
\$25 with reservation  
\$30 without reservation

**Non PSAAPG Members**  
\$30 with reservation

**Full-time Students with ID:**  
\$10 - Courtesy of Chevron &  
California Resources Corp.

**\* RSVP \***

**By: Sunday, April 9, 2017**

PayPal on the Website:  
<http://www.SanJoaquinGeologicalSociety.org/>

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## Mapping Protected Aquifers in Kern County

Presented by: Jan Gillespie, Senior Research Scientist for the US Geological Survey

**Abstract:** The California State Water Resources Control Board and the California Division of Oil, Gas and Geothermal Resources are collaborating with the U.S. Geological Survey to map groundwater resources near oil fields and to assess potential interactions between oil and gas development and groundwater resources. Groundwater resources having salinity less than 10,000 mg/L total dissolved solids may be classified as Underground Sources of Drinking Water (USDW) and subject to protection under the federal Safe Drinking Water Act. In this study, we use information from oil well borehole geophysical logs, oilfield produced water and groundwater chemistry data, and three-dimensional geologic surfaces to map the spatial distribution of salinity in aquifers near oil fields.

Salinity in the southern San Joaquin Valley is controlled primarily by depth and location. The base of protected waters occurs at very shallow depths, often < 300 meters, in the western part of the valley where aquifer recharge is low in the rain shadow of the Coast Ranges. The base of protected water is much deeper, often >1,500 meters, in the eastern part of the San Joaquin Valley where higher runoff from the western slopes of the Sierra Nevada provide relatively abundant aquifer recharge. Stratigraphy acts as a secondary control on salinity within these broader areas. Formations deposited in non-marine environments are generally fresher than marine deposits. Layers isolated vertically between confining beds and cut off from recharge sources may be more saline than underlying aquifers that outcrop in upland areas on the edge of the valley with more direct connection to regional recharge areas. The role of faulting is more ambiguous. In some areas, abrupt changes in salinity may be fault controlled but, more commonly, the faults serve as traps separating oil-bearing strata that are exempt from USDW regulations, from water-bearing strata that are not exempt.

**Biography:** Jan Gillespie is a former Development Geologist for Tenneco Oil E&P and a Professor of Geology at CSUB specializing in petroleum, groundwater and computer mapping in the subsurface. She recently served on the Lawrence Livermore expert panel tasked with establishing groundwater monitoring protocol for SB 4--the California Well Stimulation bill. She is currently on research assignment as a Senior Research Scientist for the US Geological Survey mapping groundwater quality of the aquifers in the oil-bearing basins of California as part of the California Regional Aquifer Monitoring program.

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