# Great Valley Geomorphic Province

The **Great Valley** is an alluvial plain, about 50 miles wide and 400 miles long, located between the Coast Ranges and the Sierra Nevada. It is drained by the Sacramento and San Joaquin Rivers, which join and enter San Francisco Bay. To the north, the Sacramento Valley floodplain is interrupted by the Sutter (Marysville) Buttes, an isolated Plio-Pleistocene volcanic plug about 2,000 feet high. The valley is filled with nearly flat-lying sediments as much as 20,000 to 40,000 feet thick. Beneath the valley, Cretaceous and Cenozoic strata form a broad U-shaped cross-sectional profile (trough) that is steeper on the west than the east. The edges of the tilted layers of Great Valley sedimentary rock can be seen along the western margin of the trough adjacent to the Coast Ranges. In the southern part of the Great Valley, the San Joaquin Valley oil fields follow uplifts and fault warps that formed “traps” for petroleum, such as those found in the Kettleman Hills.

The Great Valley has become one of the leading agricultural regions in the world due to a mild climate and extensive, fertile soils. These soils formed in wetlands as floodplain deposits replenished by sediment carried in the Sierran rivers during periodic, large floods. The floods and vast wetlands delayed the development of the Great Valley. To a large extent the floods and the sediment are now cut off by flood control and water storage dams.

## Tectonic Setting

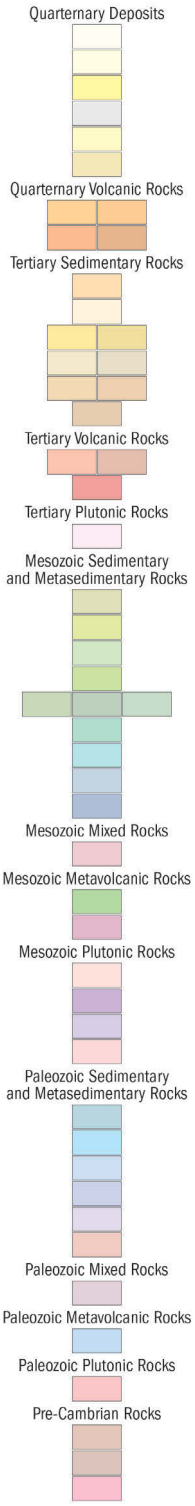
The trough is often interpreted as a fore-arc basin between the Sierra Nevada Mountains on the east and the accretionary wedge of the Coast Ranges on the west. Sediments eroded from the Sierra Nevada and the Coast Ranges were washed into the trough, at that time occupied by the sea. The shoreline ran along the eastern edge of the modern Great Valley where sediments were deposited in deltas at the mouths of Sierran rivers. These rivers carried the abundant outwash of the glacial erosion (as exemplified at Emerald Bay State Park) into the trough. The trough eventually filled with sediment and the seas retreated.

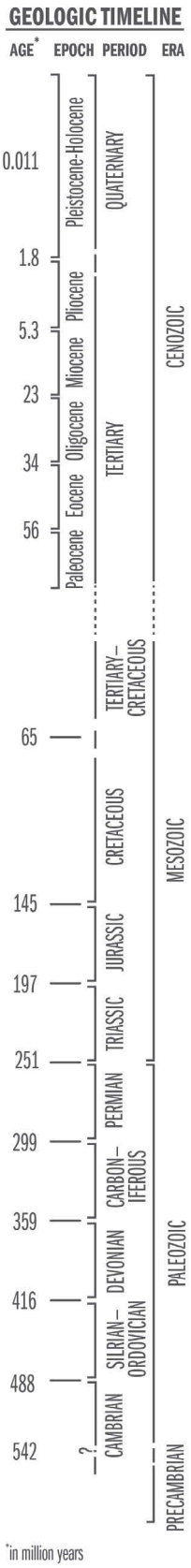
## GeoGem

**Sutter Buttes State Park** is the lone GeoGem representing the Great Valley. It is an anomaly that affords wonderful views of the Great Valley and the surrounding wetlands that are such an essential part of the Pacific Flyway. Along the flanks of the Sutter Buttes, the rock formations that underlie the Great Valley have been uplifted and tilted. Although the flat Great Valley lacks the dramatic topographic relief common to other geologic wonders, its expanse and proportion are unparalleled—the breadth and extent of the valley are evident from space, appearing as a broad planar feature, dissected by arrow-straight roads and patchworks of irrigated fields.

*Written by Mike Fuller and others, California Geological Survey*
*Photos: Mike Fuller*

## Simplified Geologic Map | Great Valley Geomorphic Province

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Prepared by California Geological Survey, Department of Conservation | www.conservation.ca.gov/cgs
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