



Sierra Nevada Geomorphic Province



The Sierra Nevada is a tilted fault block nearly 400 miles long. Its east face is a high, rugged fault scarp that contrasts sharply with its gentle western slope. The massive granites of the higher elevations are modified by glacial sculpting, forming such scenic features as Yosemite Valley. Many west-flowing rivers cut deeply into the western slope. The high crest of the range culminates in Mt. Whitney with an elevation of 14,495 feet above sea level. The older metamorphic bedrock, in places still partly capped by much younger Tertiary volcanic rocks, contains gold-bearing veins associated with the northwest-trending Mother Lode.

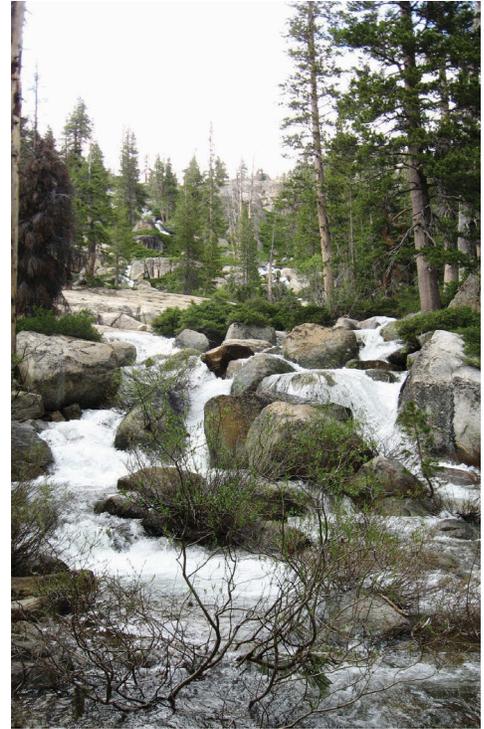
Tectonic Setting

The Sierra Nevada foothills, source of California's famous gold deposits, consist of ancient accreted terranes and one or more former subduction zones. The subduction zone(s) operated during the Mesozoic Era, 140 to 180 million years ago. The former Farallon oceanic tectonic plate was driven beneath the present day Sierra where it

melted into large molten bodies known as batholiths and plutons. The terranes and sediments that accumulated in the subduction zone of this former plate boundary have been metamorphosed by the heat and fluids that radiated off the molten batholiths and plutons that eventually cooled to become the Sierran granitic rocks.

Over the last five million years, faults developed along the eastern margin of the Sierra Nevada along which the range has risen to tower above the Basin and Range province to the east. Active faults and hot springs (characteristic of the Basin and Range) penetrate the Sierran monolith and demonstrate that the boundary zone is still evolving.

The uplift of the Sierra Nevada changed the climate in California and Nevada. The mountains became a barrier to storms originating in the Pacific Ocean that moved eastward over the land. In effect, California became wetter at the expense of Nevada. This increased precipitation allowed glaciers to cover the high Sierra during the Ice Ages of the past 100,000 years. The high Sierra parks (Emerald Bay State Park and Grover Hot Springs State Park) owe some of their majestic beauty to the effects of long gone glaciers.

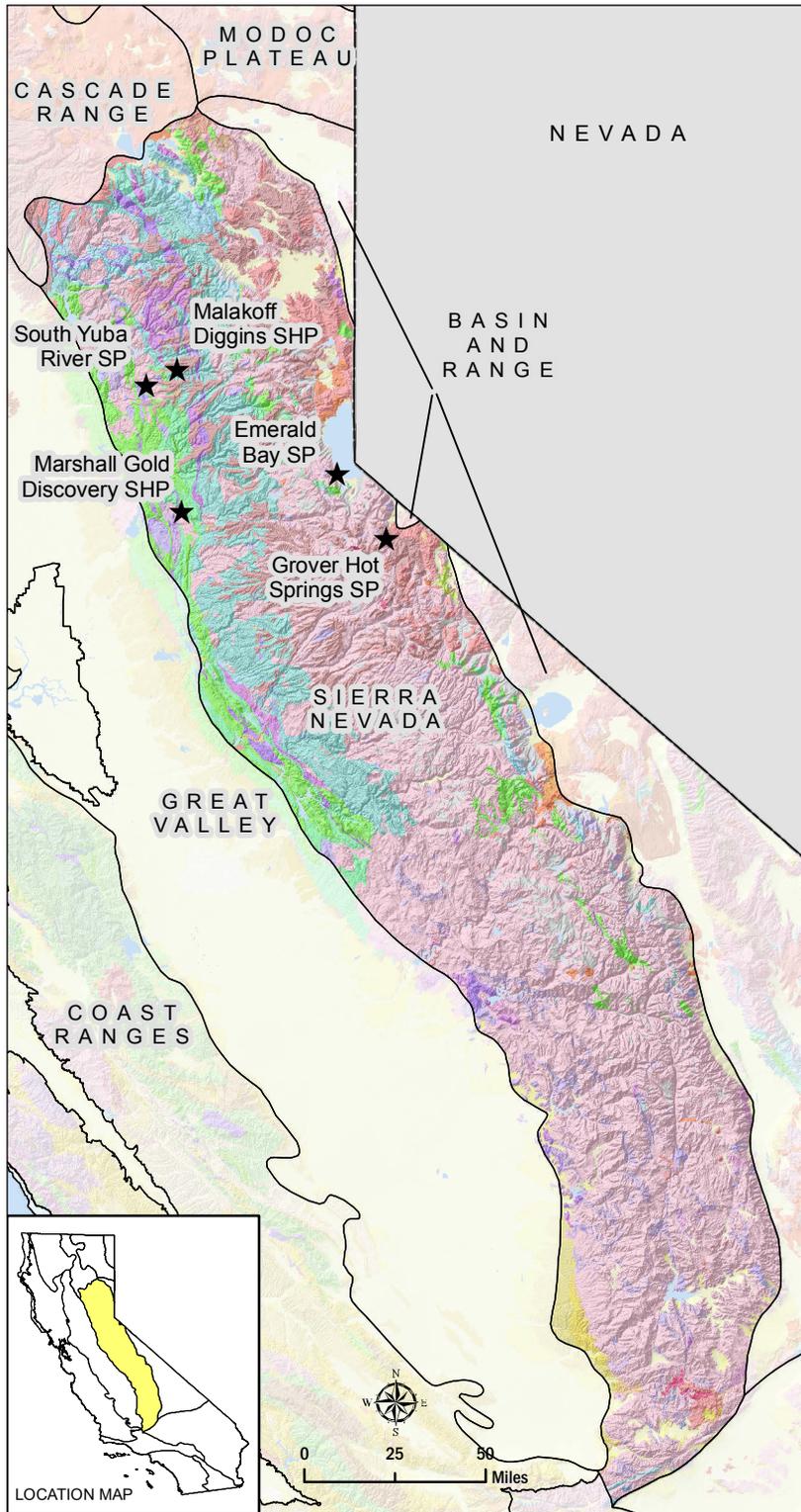


GeoGems

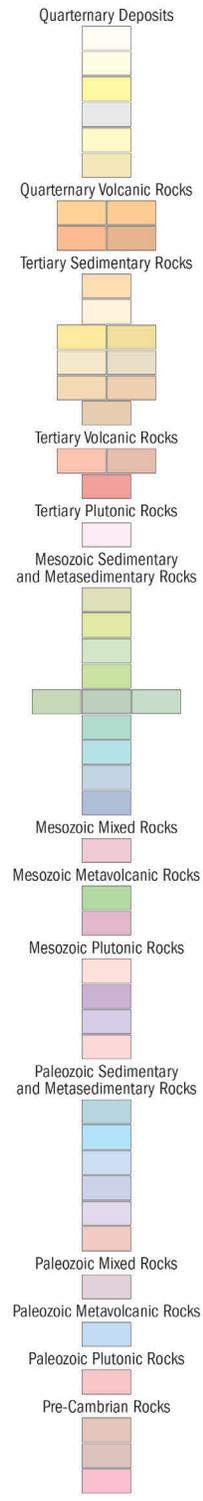
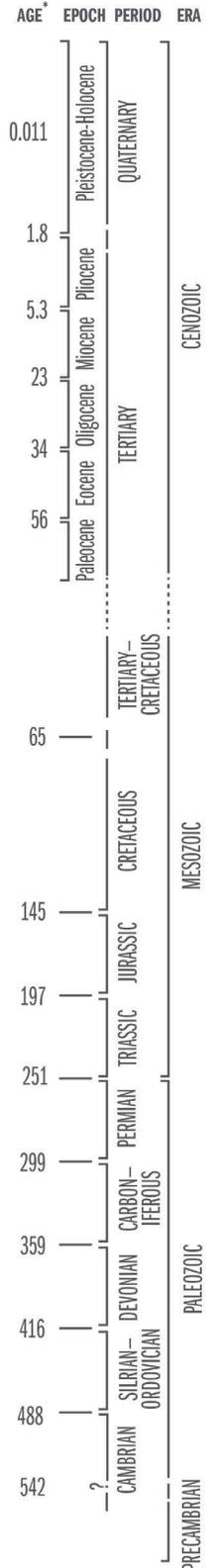
Malakoff Diggins State Historic Park, South Yuba River State Park, and Marshall Gold Discovery State Historic Park represent the Sierra foothills while **Emerald Bay State Park** and **Grover Hot Springs State Park** represent the exceptionally scenic eastern escarpment of the lofty Sierra. Emerald Bay State Park and Grover Hot Springs State Park lie along the current boundary with the Basin and Range geomorphic province.

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

Simplified Geologic Map | Sierra Nevada Geomorphic Province



GEOLOGIC TIMELINE



*in million years

