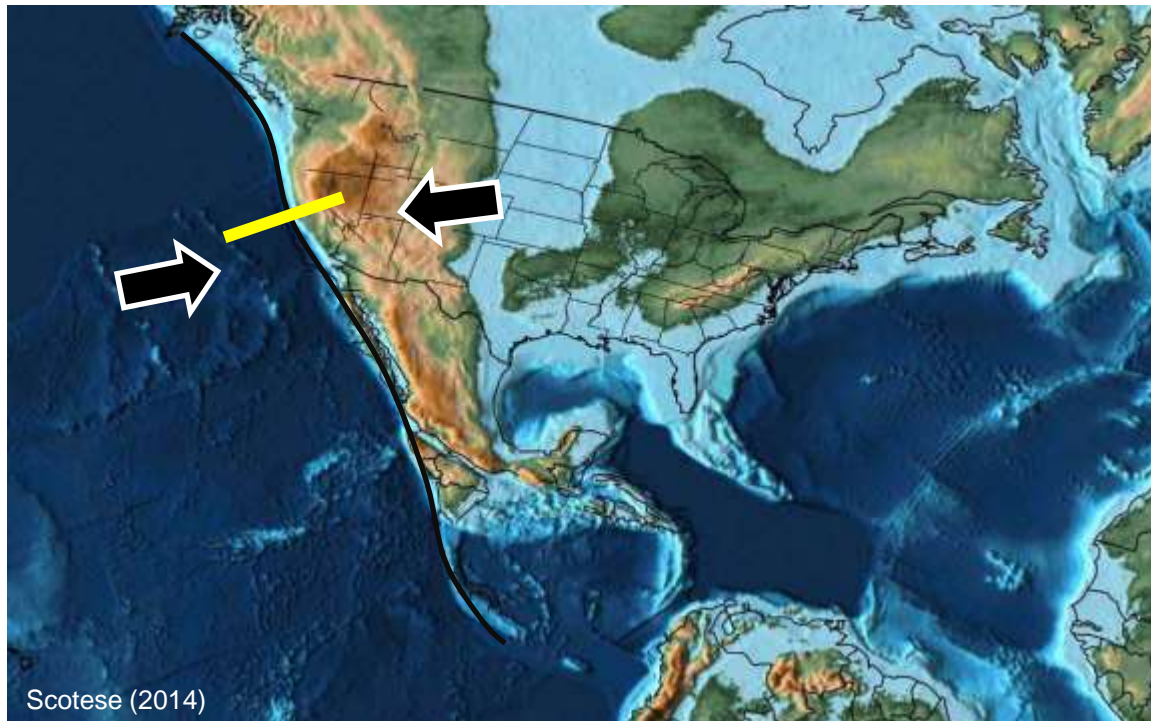


Geology of Alameda Creek Watershed

John Niles and Janet Sowers, Fugro USA Land, Inc.

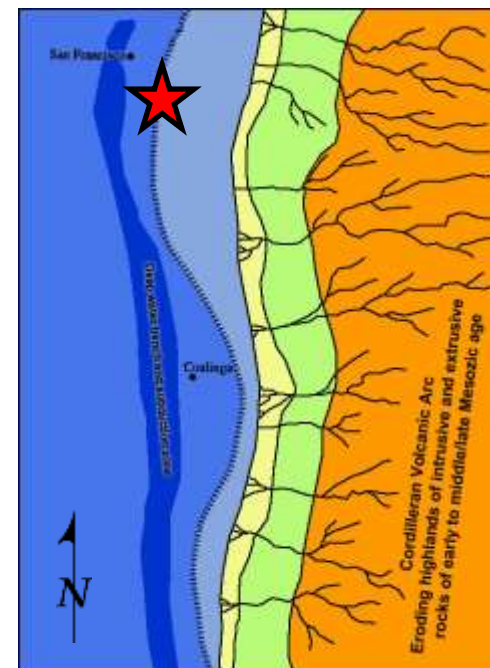
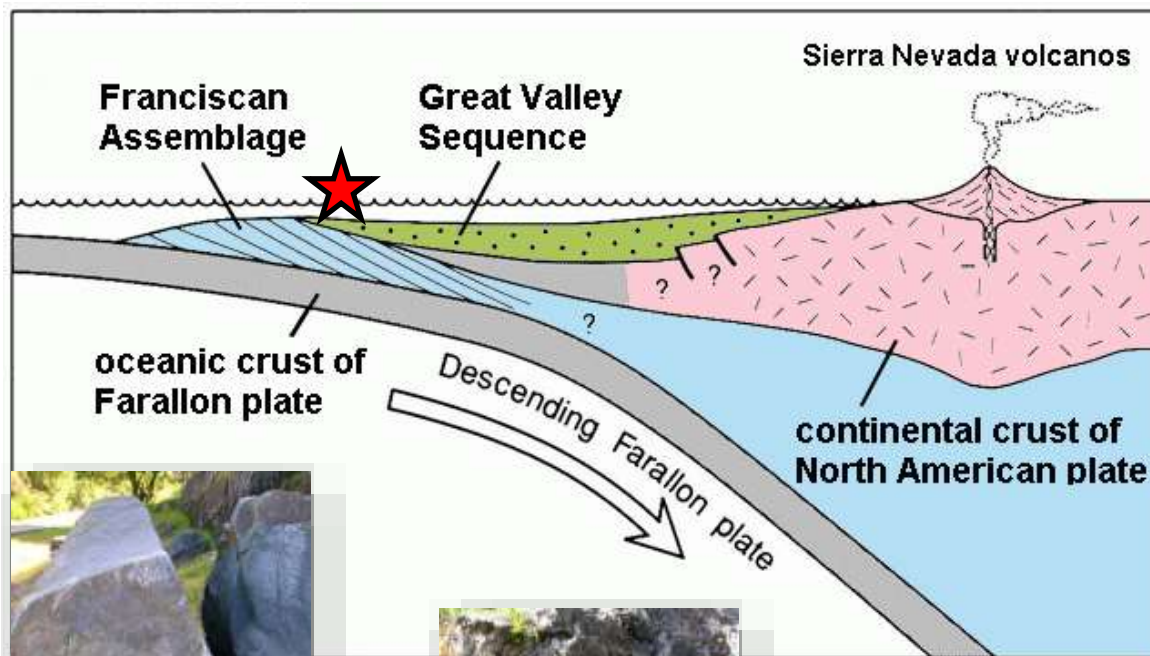
Introduction

- Geology of the Alameda County Watersheds
 - Geologic history of the Diablo Range
 - Dominant geologic units
 - Structural geology
 - Evidence for active tectonics and affect on hydrology



Late Cretaceous ~75 MA

Late Cretaceous - Farallon Plate Subduction (100 to 65 MA)



USGS (1991)



Franciscan Complex



Great Valley turbidites

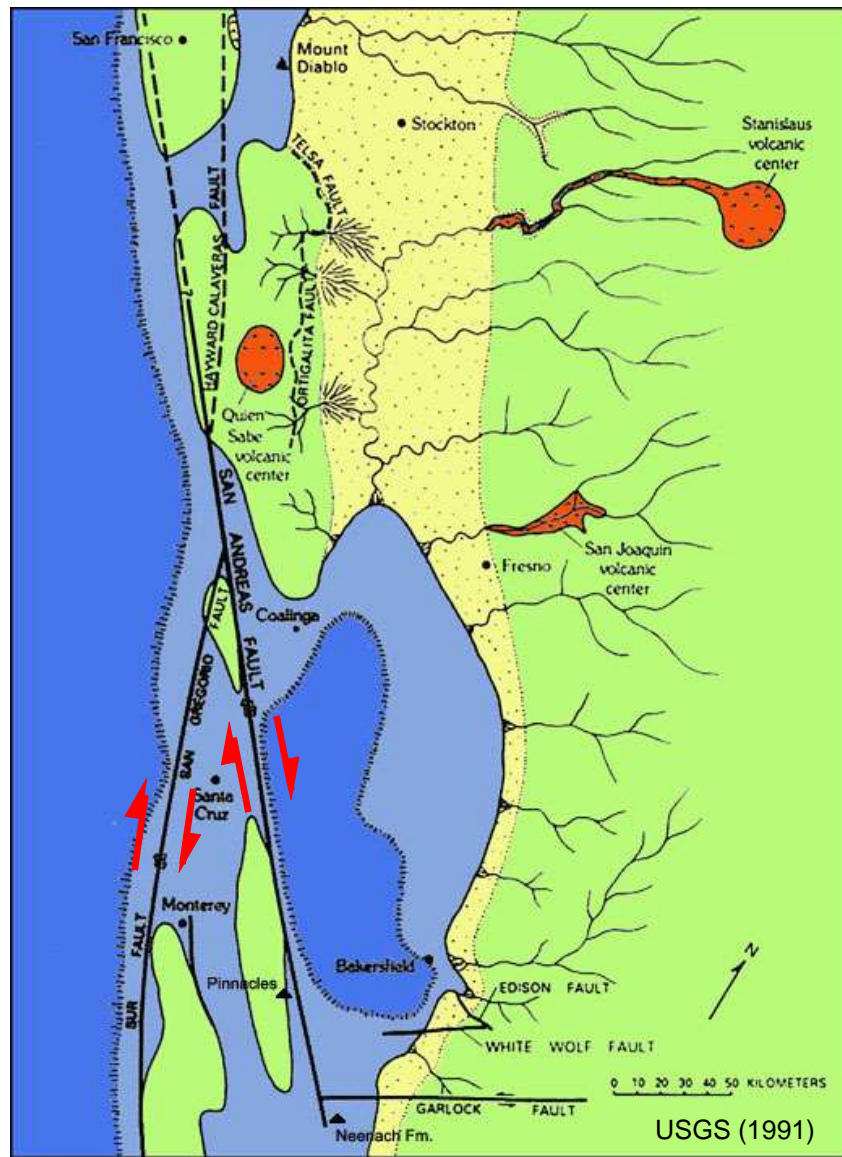
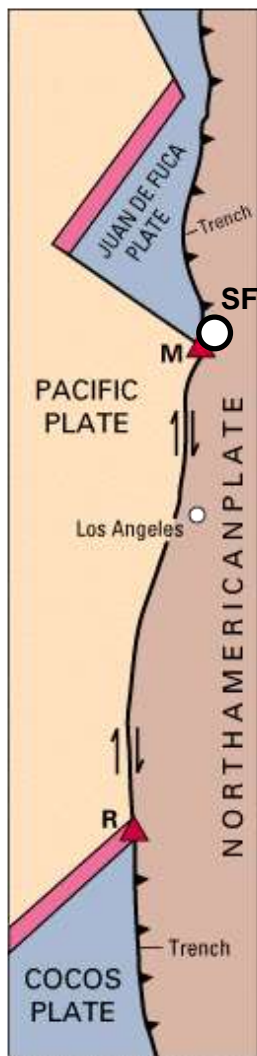
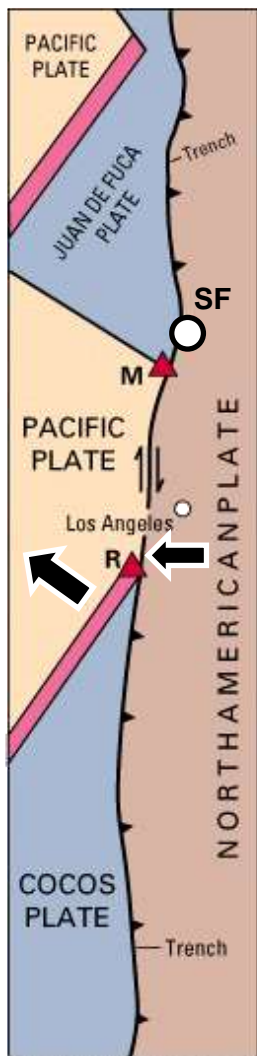
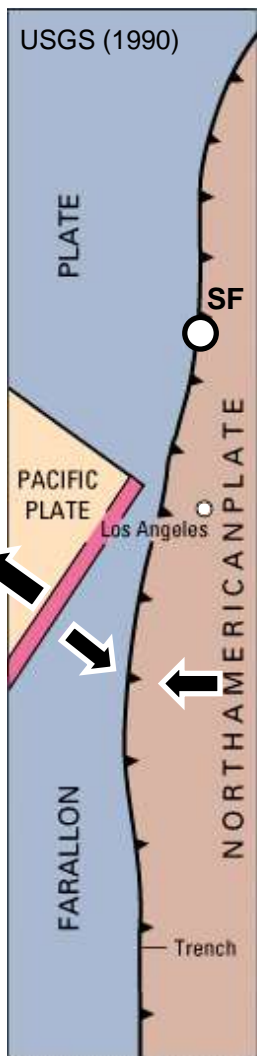
Mikesclark, 2013

Initiation and Northward Migration of the San Andreas Fault

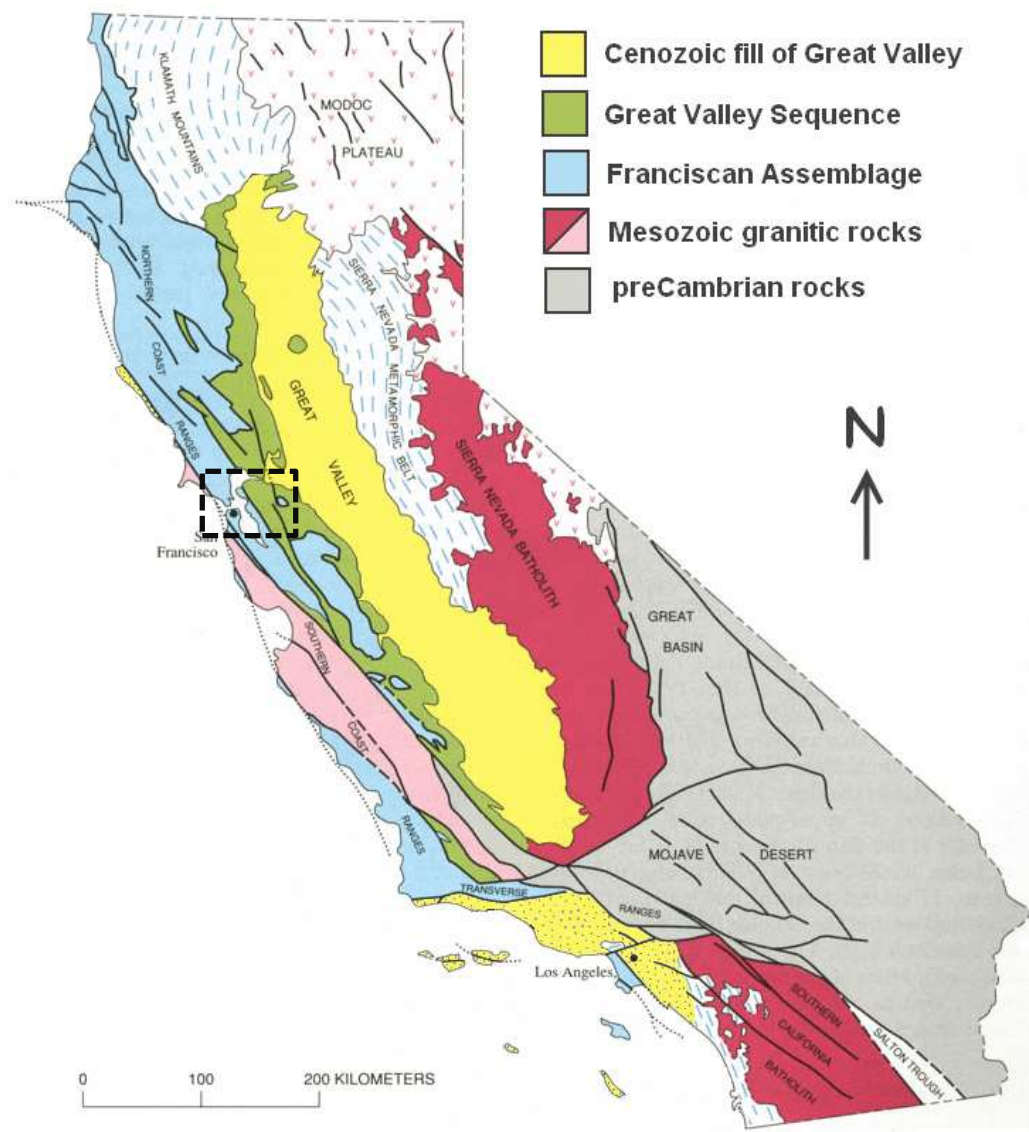
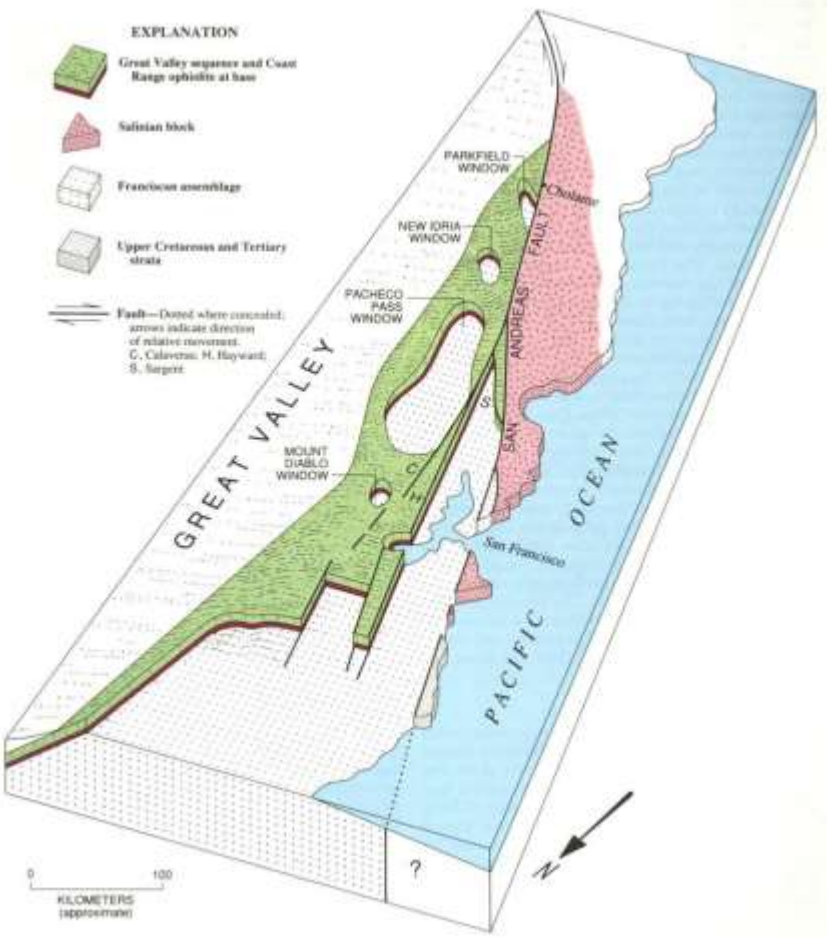
30 million years ago

20 million years ago

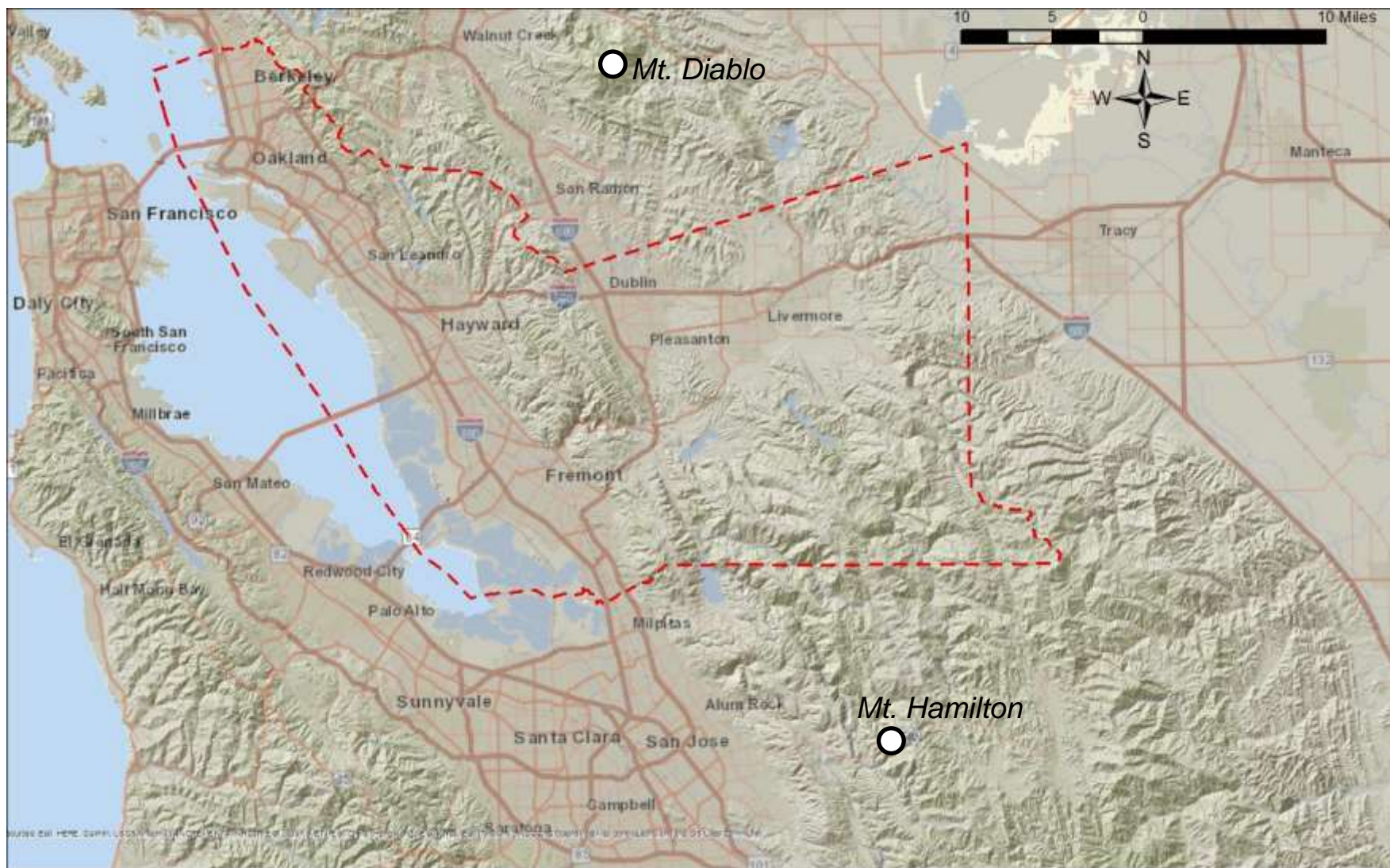
10 million years ago



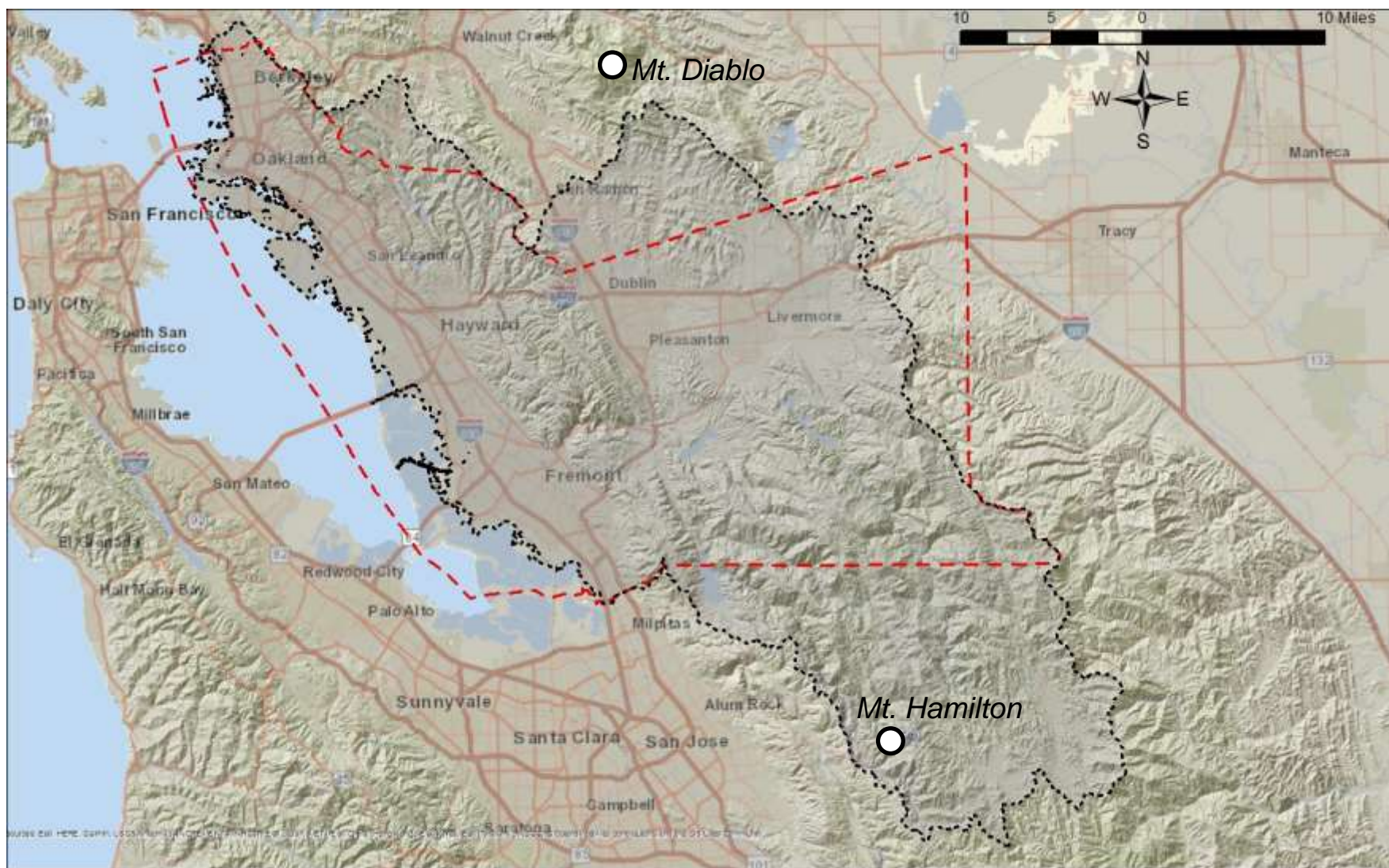
Geologic Terranes of California



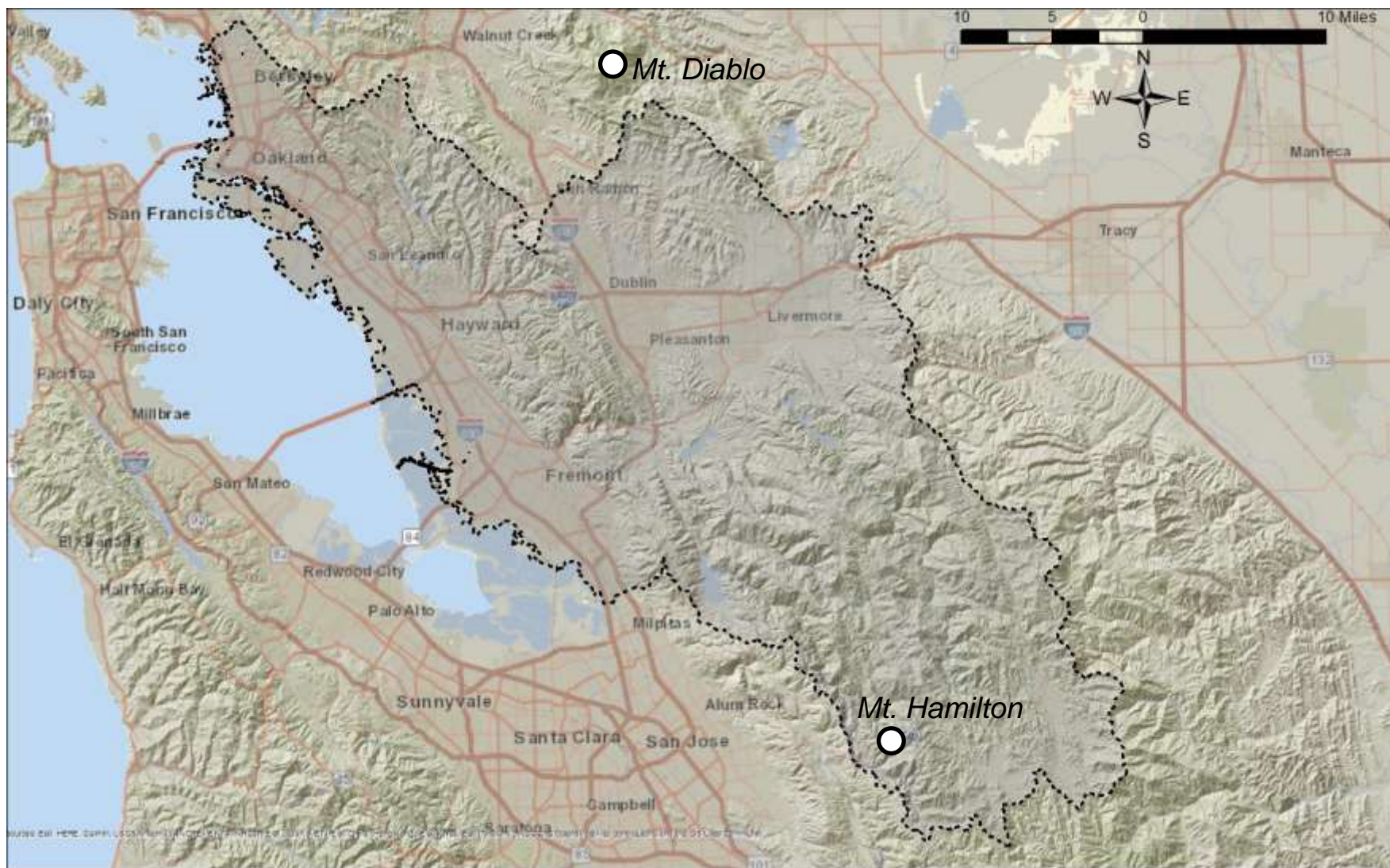
Geology of Alameda County Watersheds



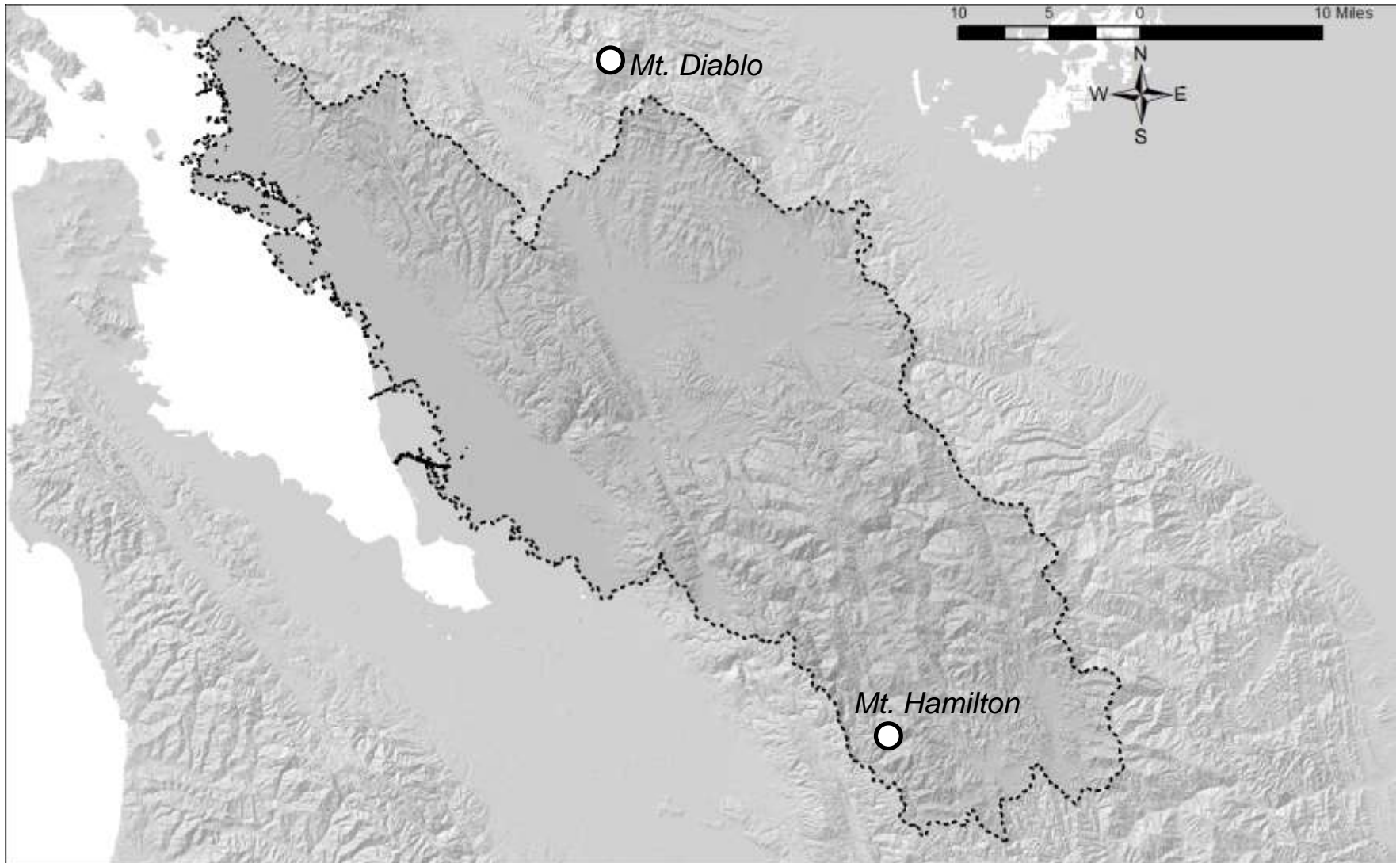
Geology of Alameda County Watersheds



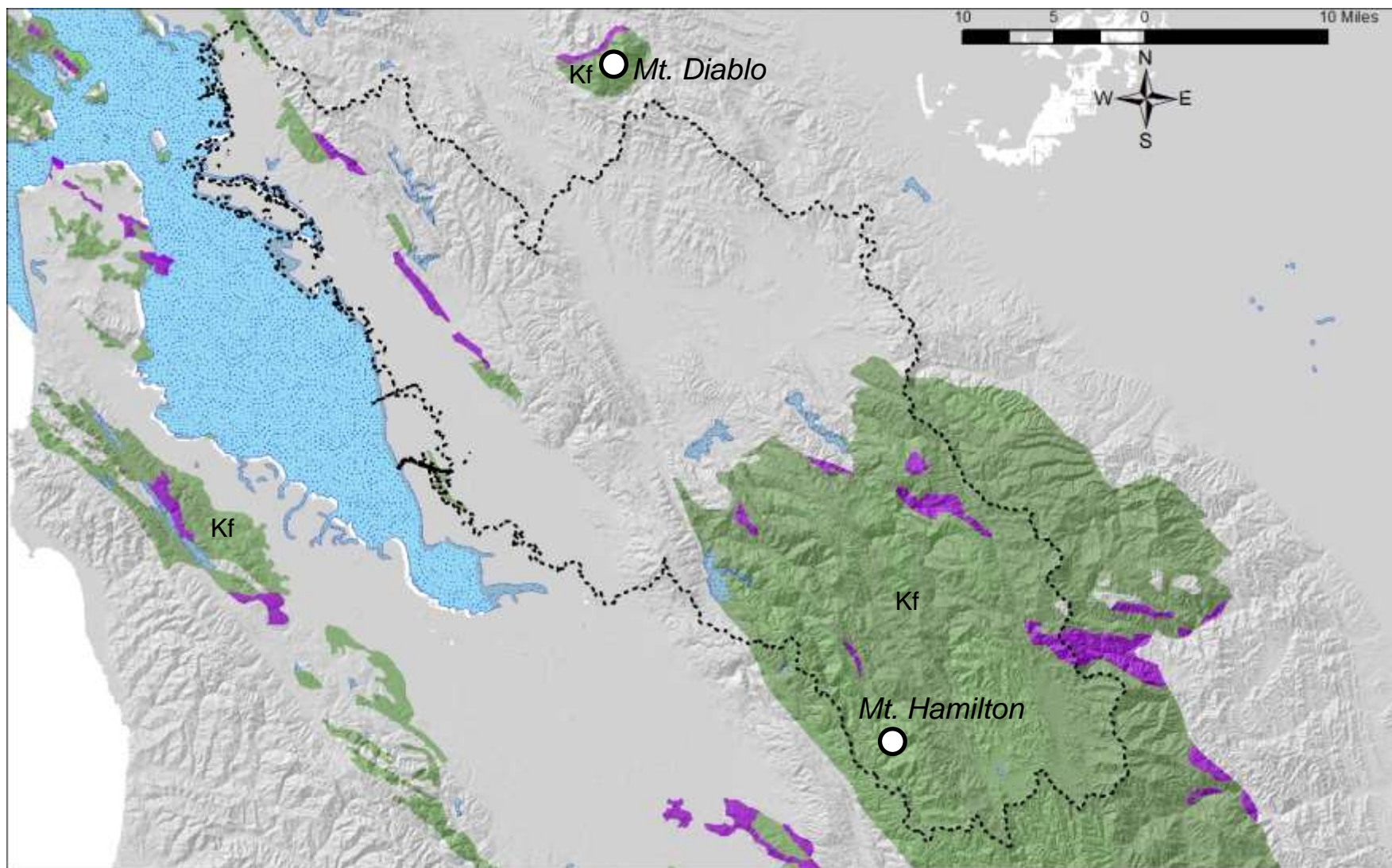
Geology of Alameda County Watersheds



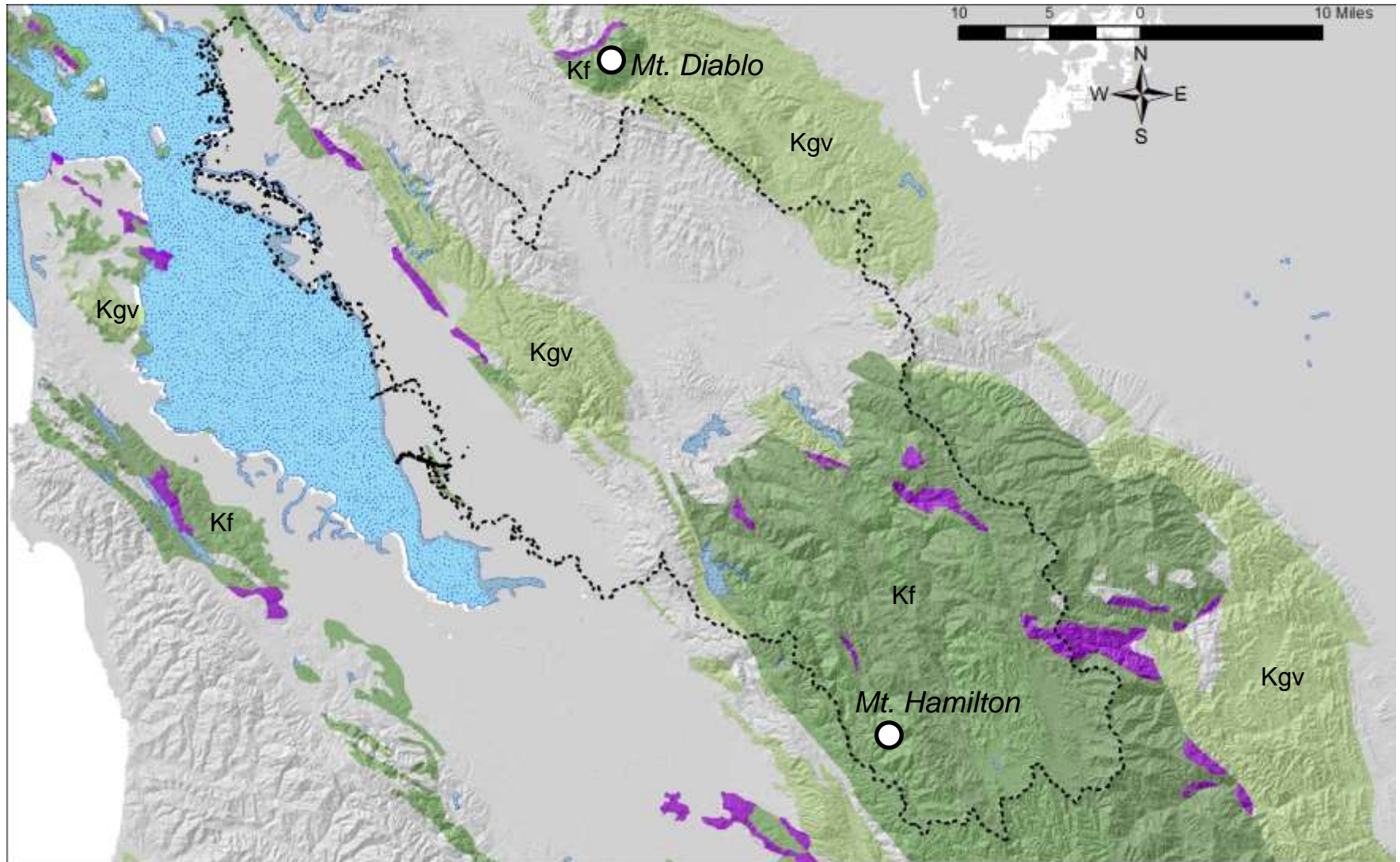
Geology of Alameda County Watersheds



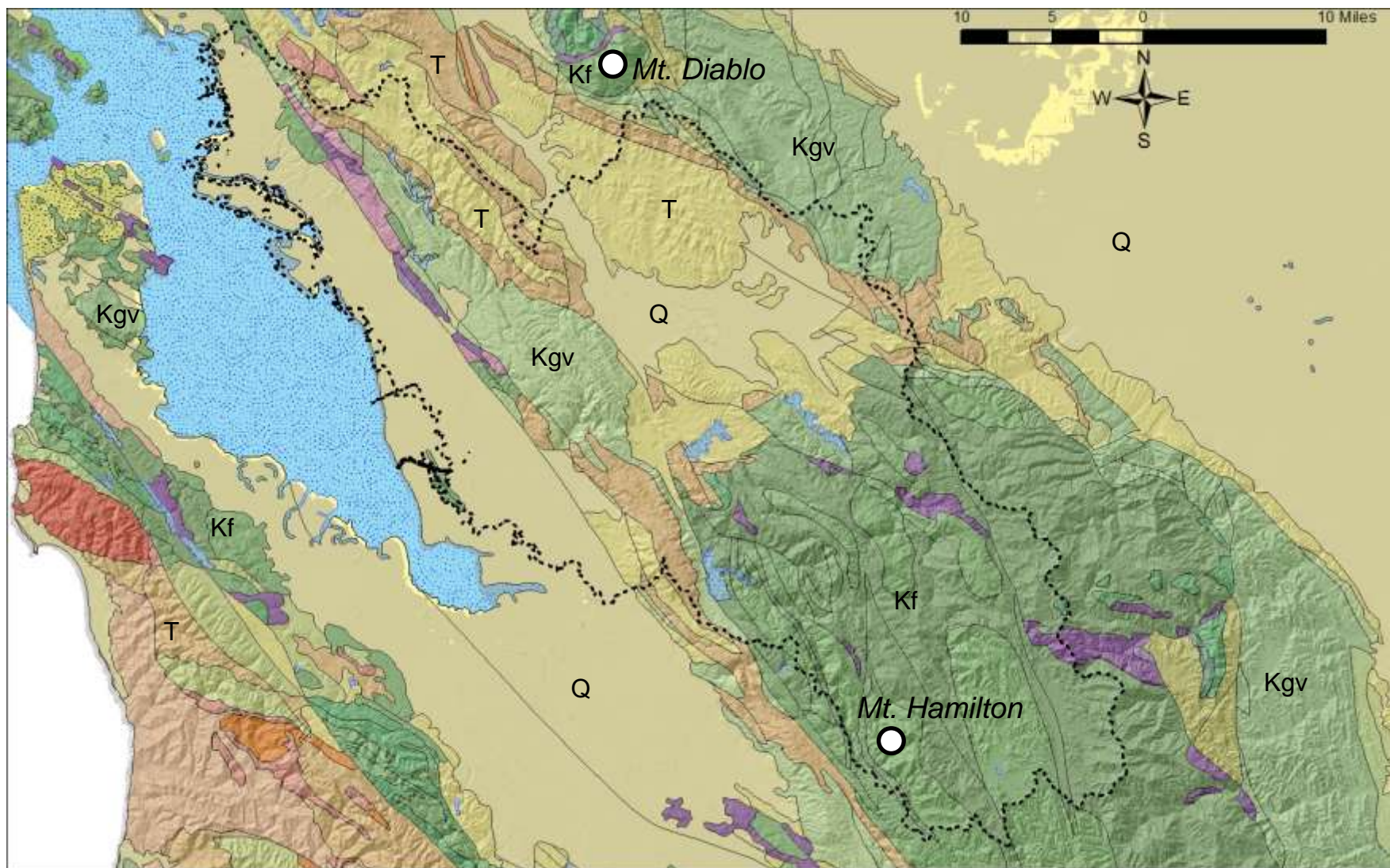
Geology of Alameda County Watersheds – Franciscan Complex



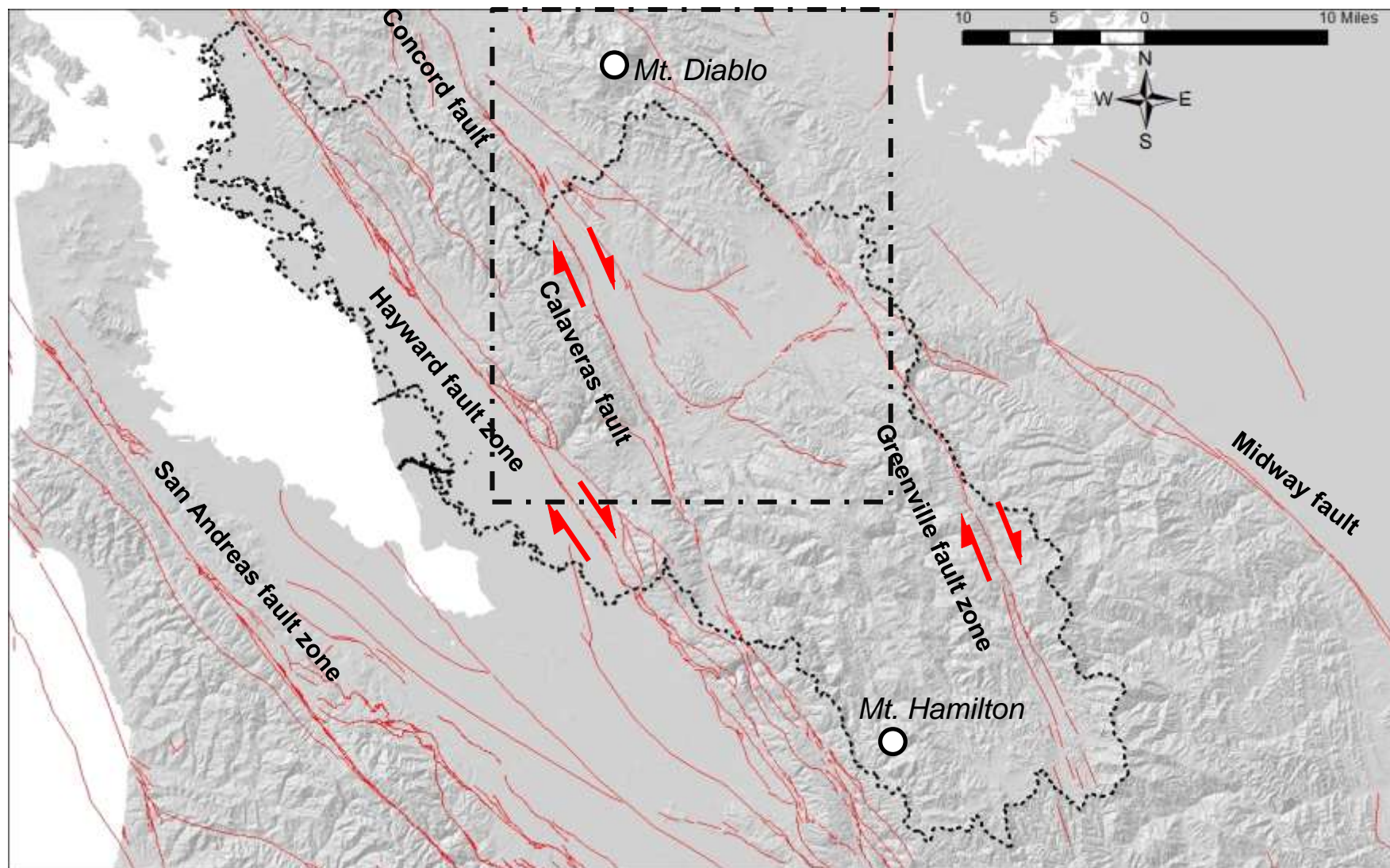
Geology of Alameda County Watersheds – Great Valley Sequence



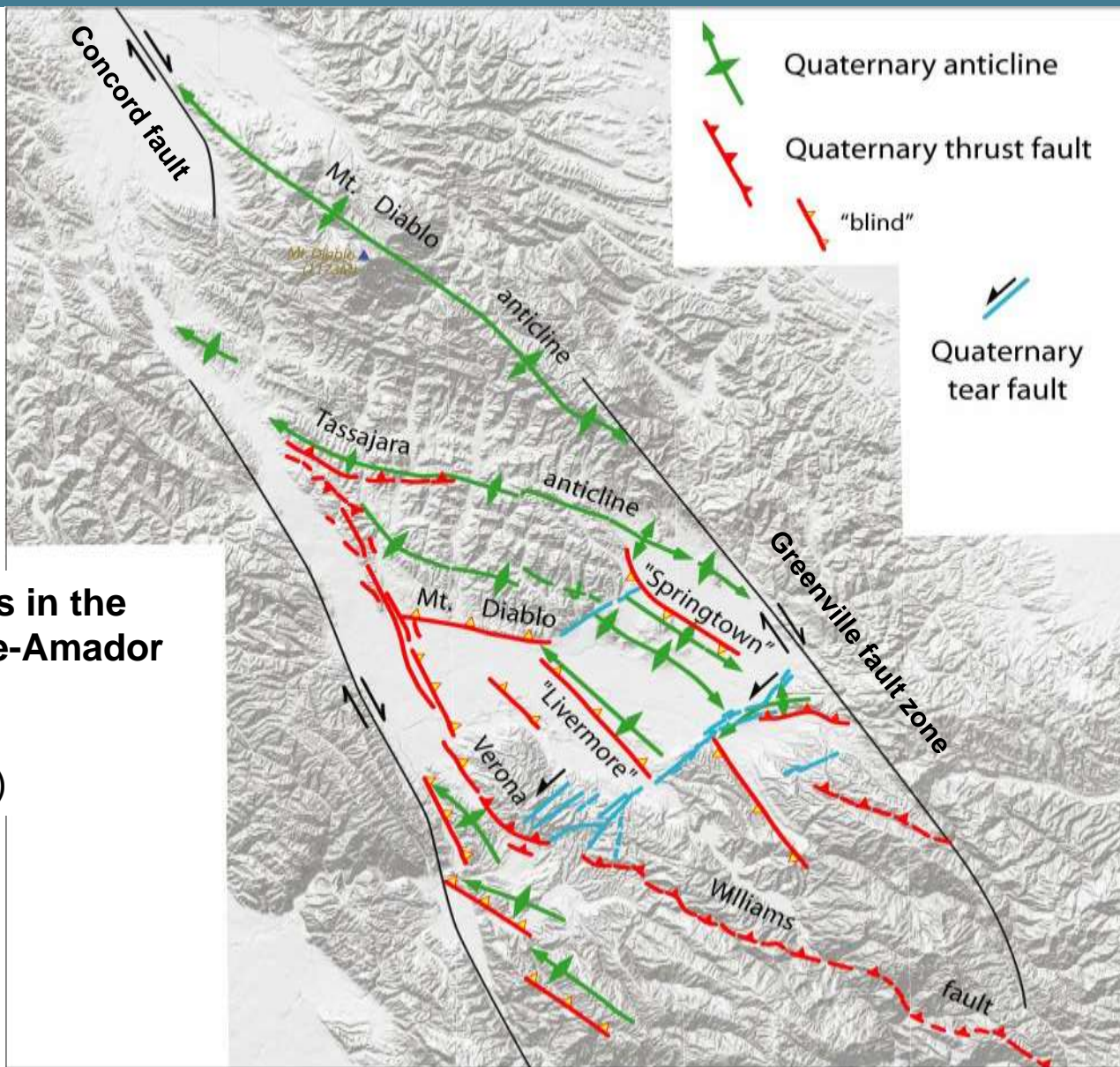
Alameda Creek Watershed Geology - Geology



Alameda Creek Watershed Geology



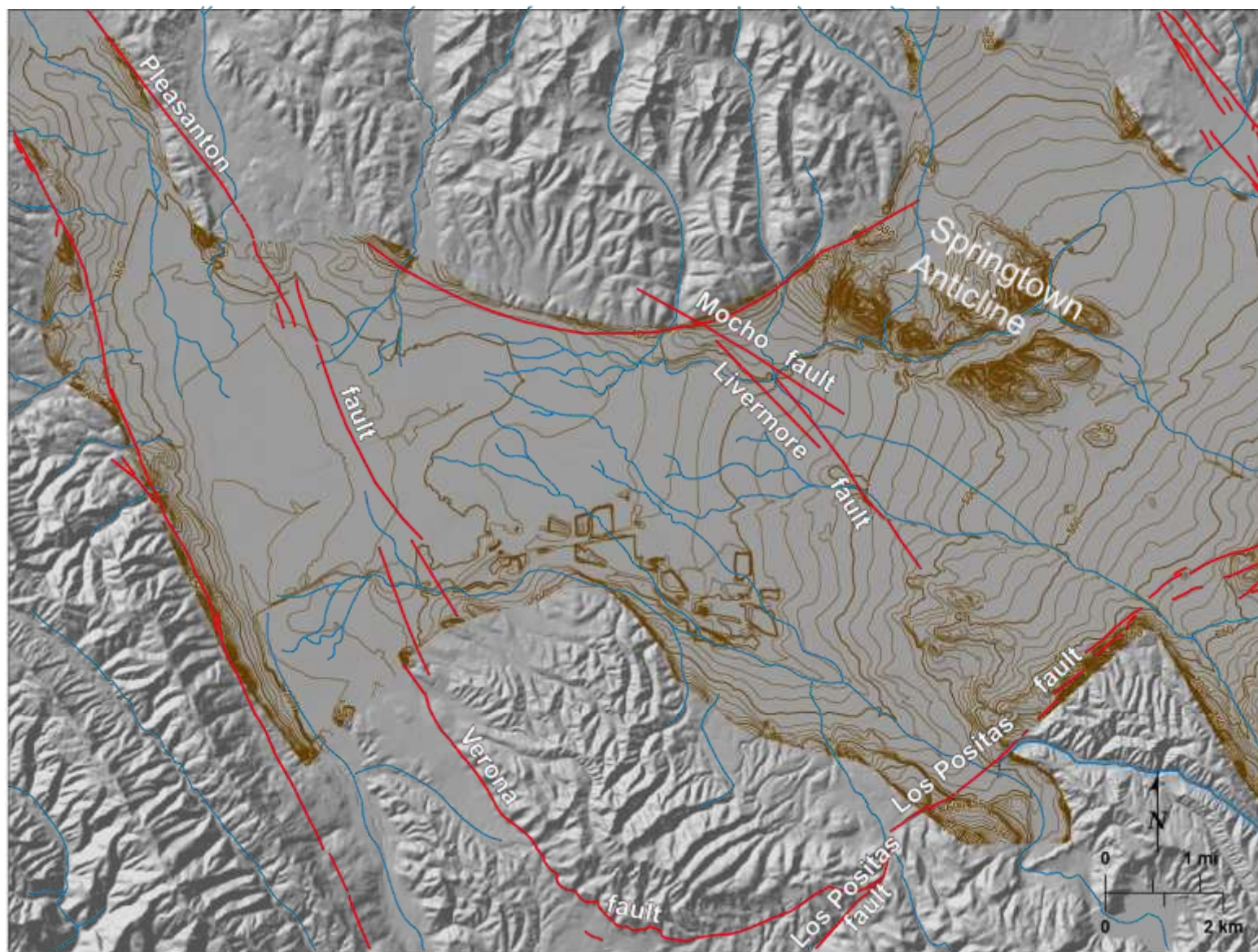
Active Deformation in Livermore-Amador Valley



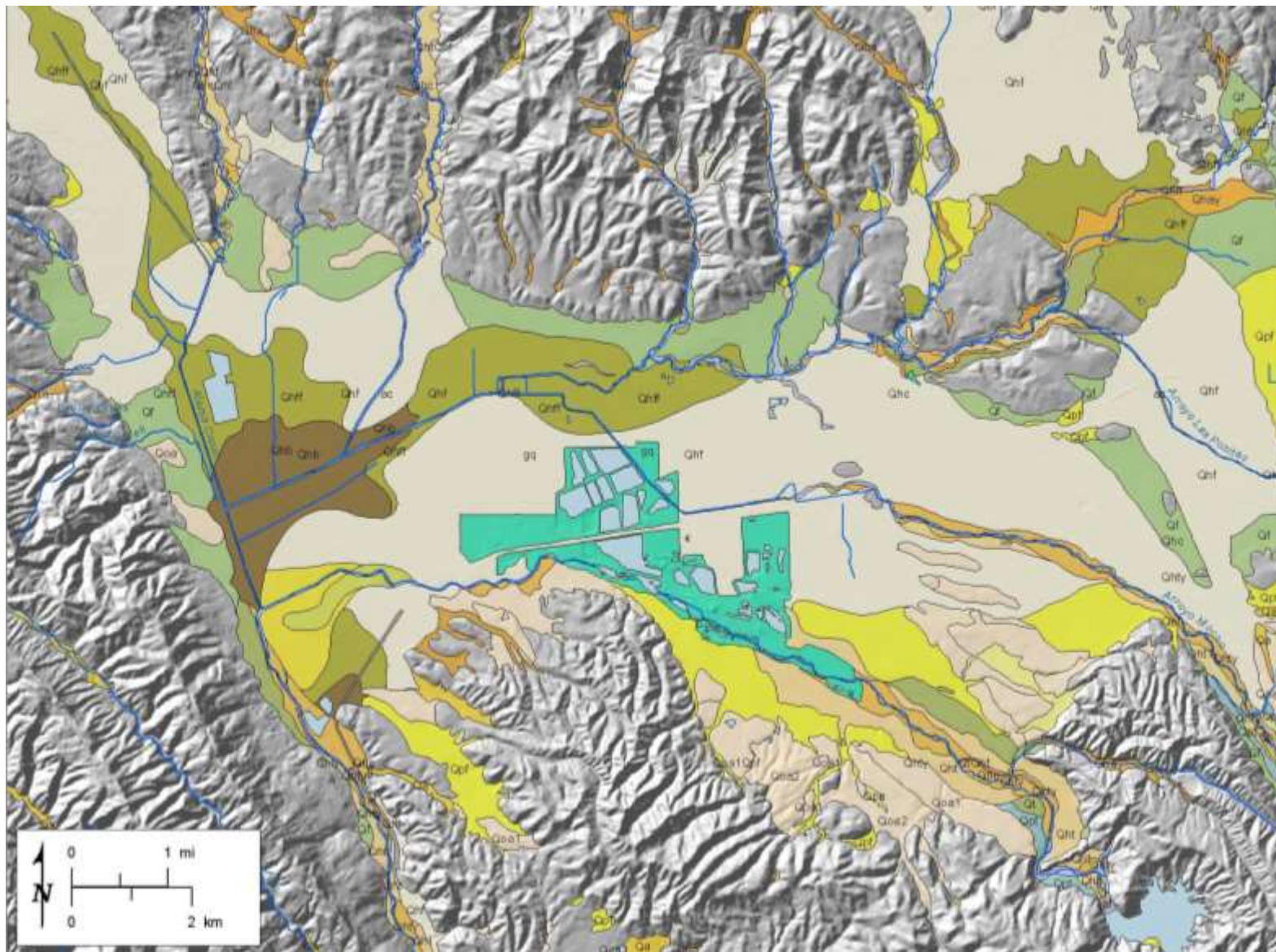
Structures in the Livermore-Amador Valley

(T.Sawyer)

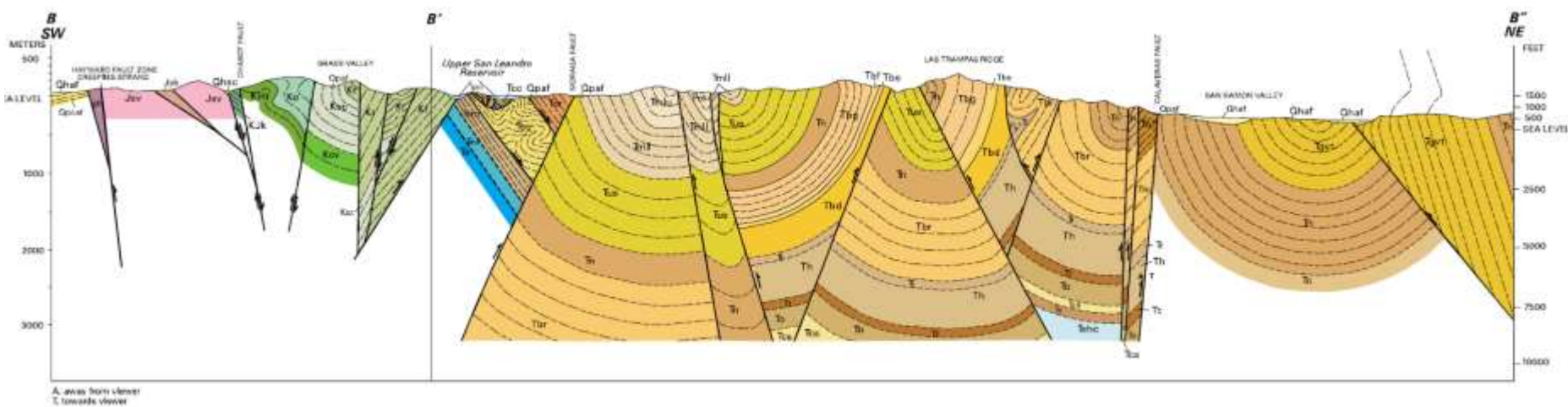
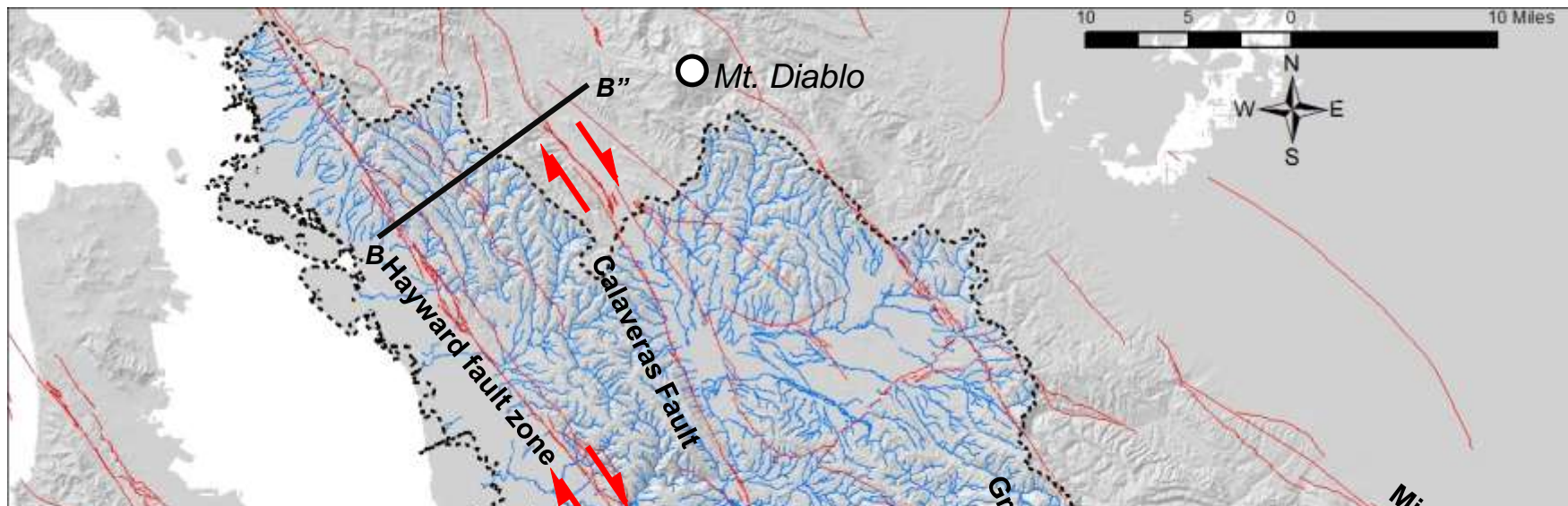
Active Deformation in Livermore-Amador Valley



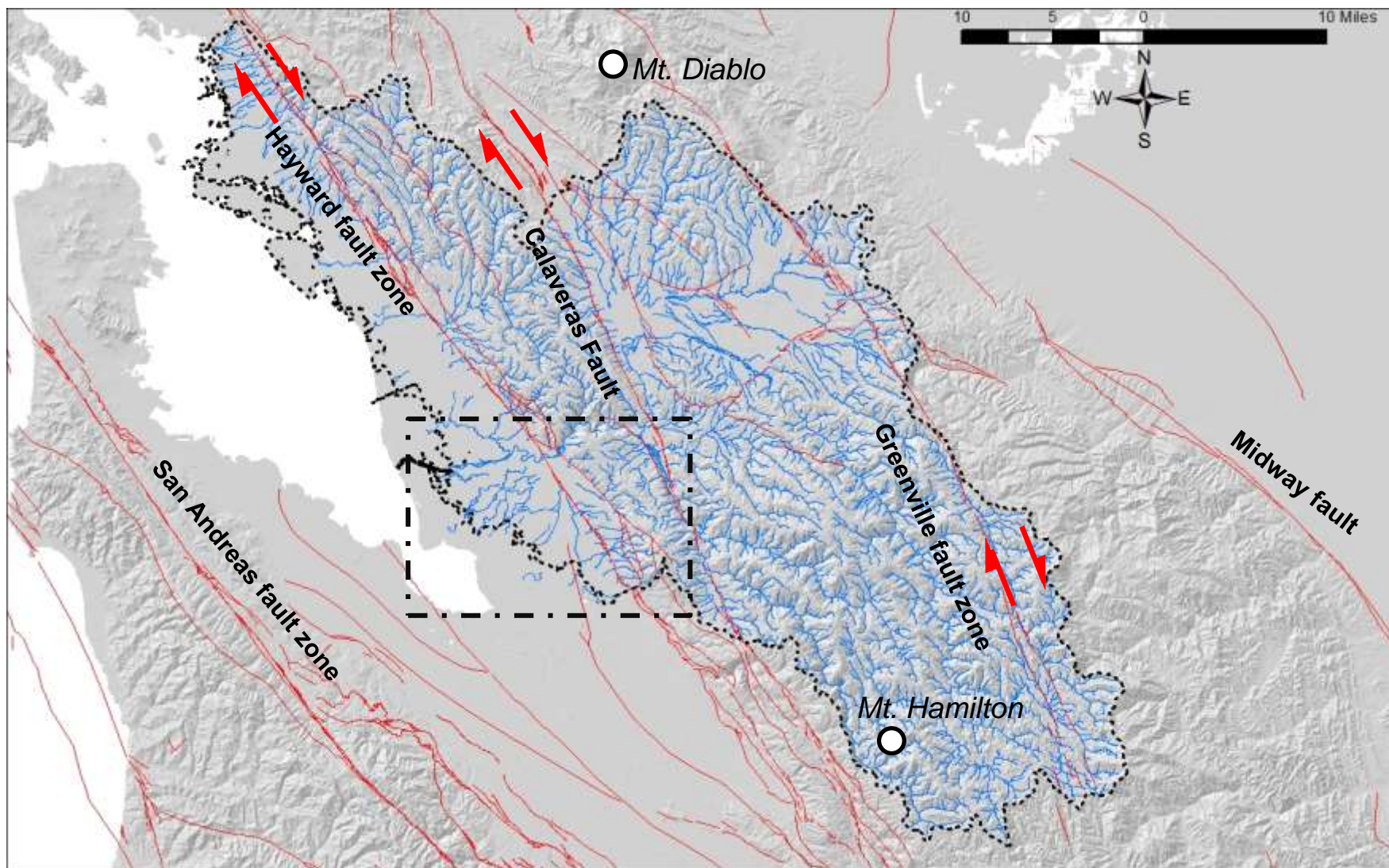
Active Deformation in Livermore-Amador Valley



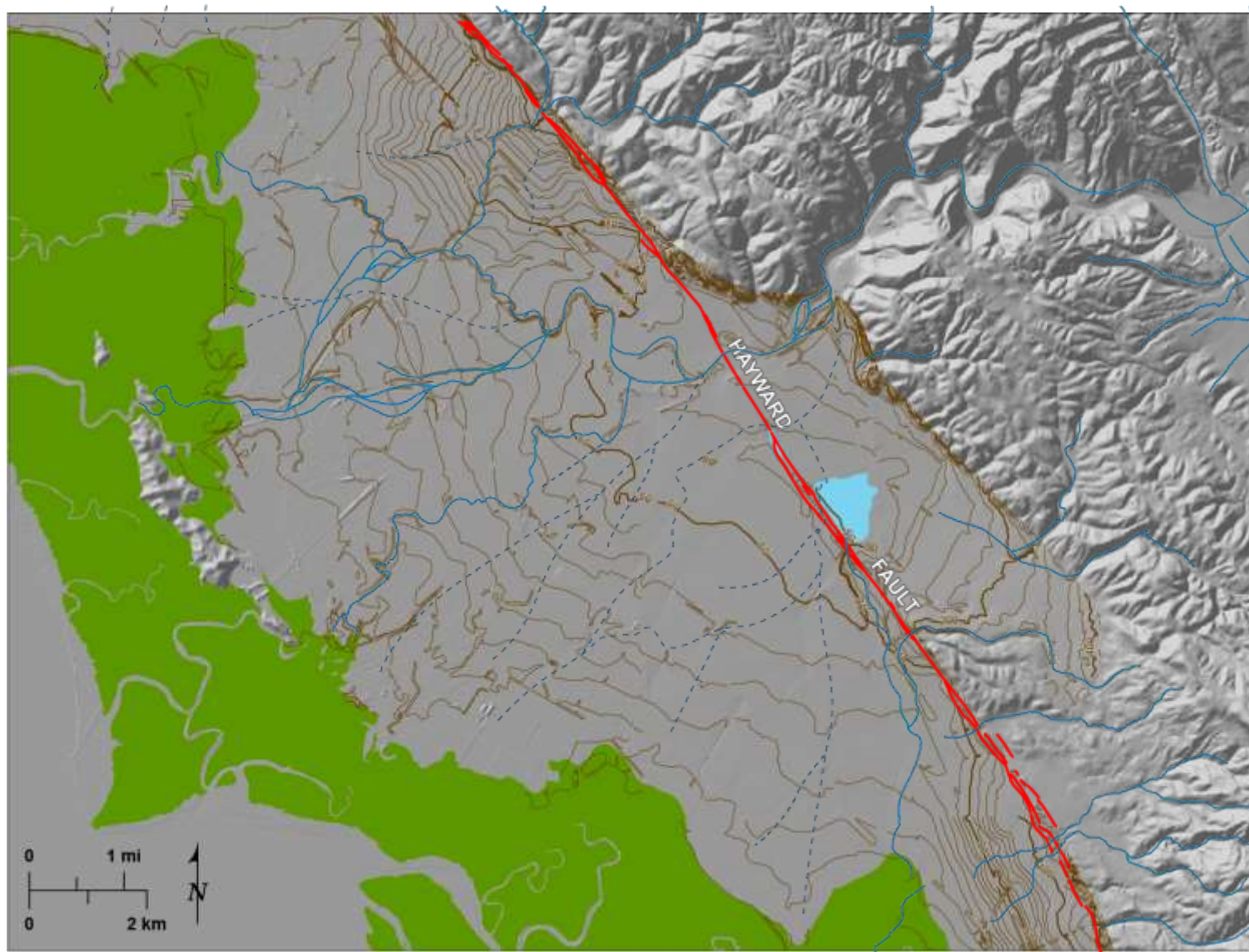
Geologic Cross Section Oakland Hills



Geologic Cross Section Oakland Hills

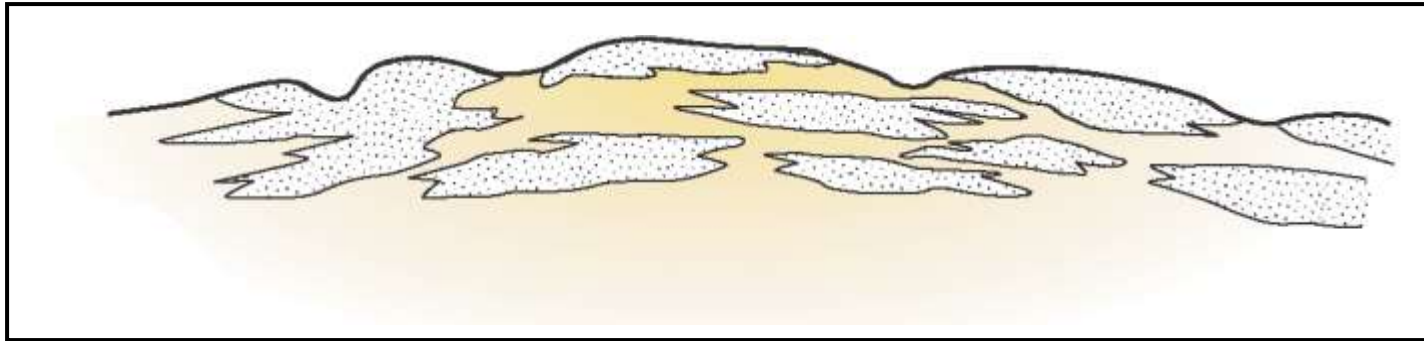


~9,000 year old shutter ridge on Alameda Creek Fan

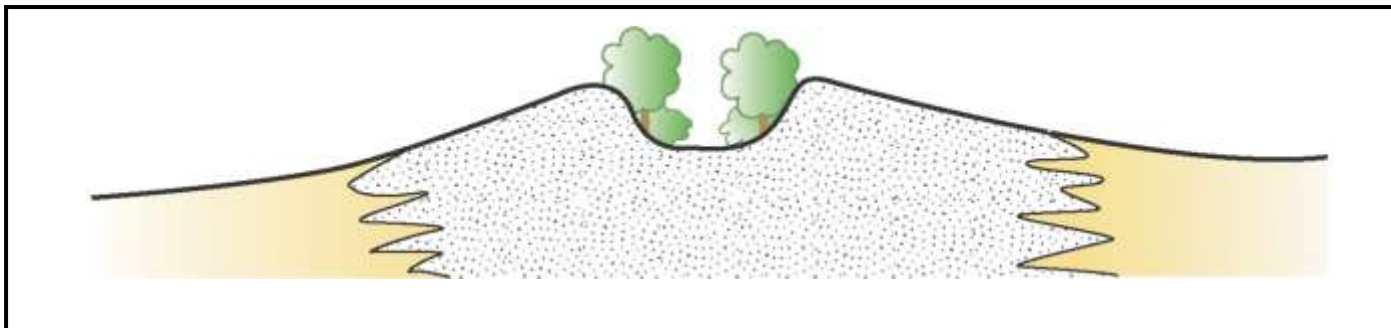


Alluvial Fan Sedimentology and morphology

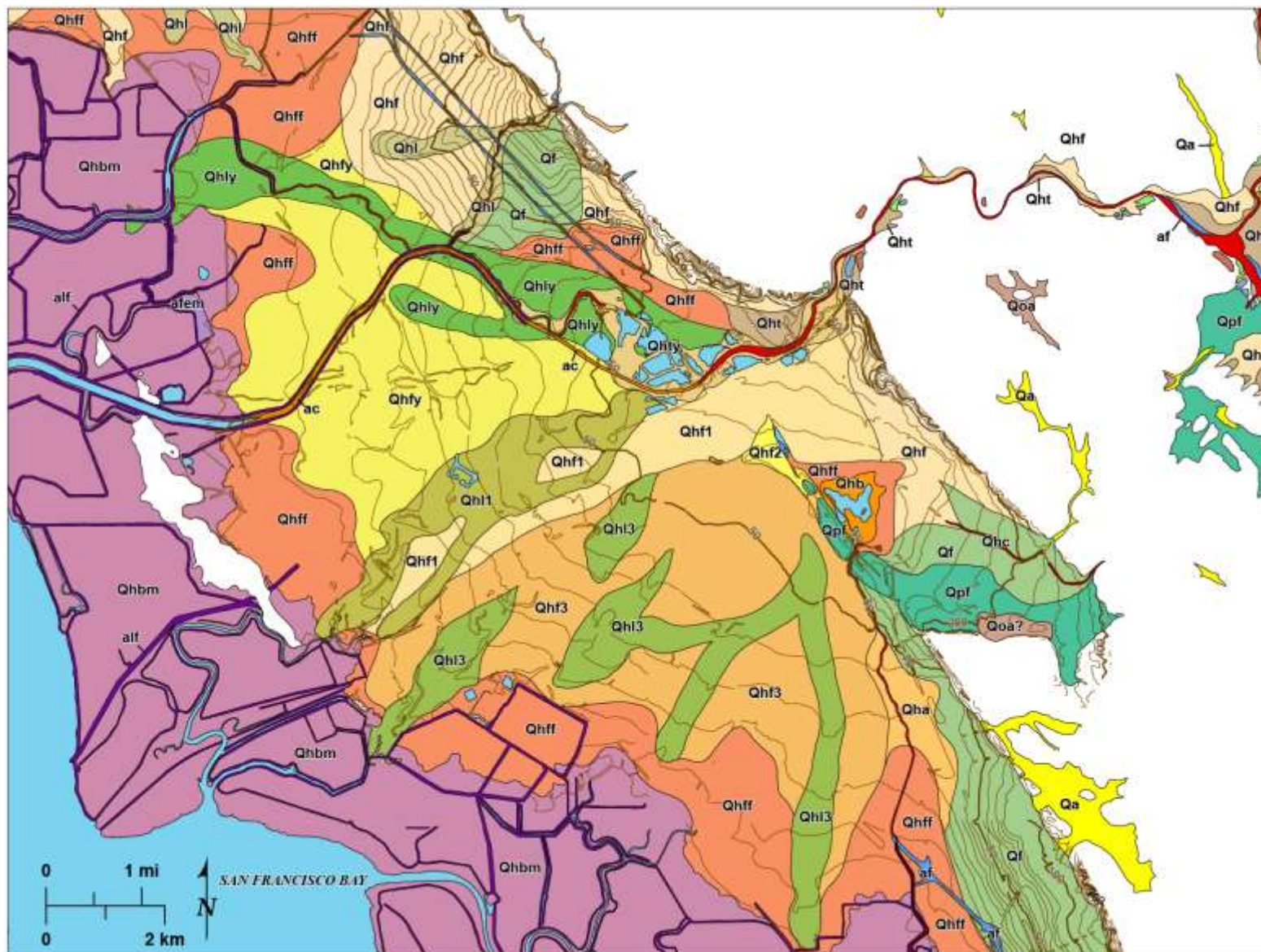
Distributary system: Multiple unstable channels; sediment deposited as lobes.



Levee system: Single stable channel; sediment deposited as levees.



Surficial Geologic Map of the Alameda Creek Fan



Diablo Range:

1. Dominantly Mesozoic Franciscan complex and Great Valley Sequence related to subduction of the Farallon Plate

Oakland Hills:

1. Transpressional deformation creating linear drainage patterns

Livermore Valley:

1. Active faulting and folding creating basin geometry.
2. Alluvial fan processes control features such as the valley floor topography, and distribution of soils and groundwater.

Alameda Creek alluvial fan:

1. This massive fan is a thick complex of deposits of different ages and facies.
2. The rise of a Hayward fault shutter-ridge blocked alluviation on the southern part of the alluvial fan about 9,000 years ago.
3. The fan geomorphology includes prominent natural levees or “channel ridges.”
4. The youngest deposits lie on the northwest flank of the fan.



Thank You!