

Landslide Hazards along the Interstate 80 Corridor Associated with the Early Oligocene Sedimentary and Volcanic Deposits in the Sierra Nevada

Abstract of the Abstract

Prehistoric to active slope failure near Alta, California threatens important trans-Sierran transportation infrastructure. Oligocene sedimentary and volcanic deposits contain abundant smectite clay and cause widespread slope failure and foundation settling/heaving in the section and have occurred through a wide area of the Sierran foothills and adjacent lowlands in the Sacramento Valley. The California Geological Survey issued a Geologic Hazard Notice in 2009 warning of geohazards associated with the smectitic unit.

Preliminary landslide reconnaissance mapping shows that the I-80 roadway, UP railway, and a petroleum pipeline all traverse extensive areas of prehistoric landslide terrain. All transportation lines have suffered repeated historic failures. Better mapping and analysis of hazardous slope failure zones will help in preventative efforts along transportation routes to minimize future economic loss.

Historic Landslides

UTCH FLAT ENQUIRER, Saturday Morning, April 21, 1866: LAND SLIDE.—A huge land slide occurred a few days since near Buckley's ranch, just above this place, on the line of the C. P. Railroad, damaging the ditches of the Dutch Flat Water Company to the amount of several thousand dollars, and rendering a change of the railroad bed necessary, which will also cost an immense sum. Nearly a quarter section, extending along a heavy fill of the railroad several hundred yards, suddenly gave way and moved off in a solid body, taking with it ditches, flumes and everything else that obstructed its course, and making a change from the original survey of the railroad at that point imperative. The material that gave way, it seems, was of a soapy or pipe clay formation, and the pressure from the railroad fill is assigned as the cause.

Sacramento Daily Union. Volume 86. Number 127. 17 January 1894. Landslide on the Central Pacific Near Alta: The first landslide that has taken place on the Sacramento division of the Central Pacific Company for many years occurred between Alta and Towle's Station about noon today. About one-half of an acre on the mountain side slid upon the railroad track between the two stations. The slide leveled everything in its path, telegraph poles, large trees and survey monuments being entirely swept out of existence. A large force of men was at one ordered to the scene, and efforts are being made to clear the track as speedily as possible. The slide delayed the East-bound trains that left this city last night, and the trains due here this morning will also be delayed.

1911 - Placer Herald, Feb. 4. 1911. "Landslide at Alta": a landslide several hundred feet wide covered both sets of tracks of Southern Pacific 10 ft deep in the cut 1/8 mile east of Alta on Wednesday (2/1). Same place where a slide 100 ft wide occurred 2 weeks ago. A steam shovel and crews came from Sparks. Several acres of hillside are reported moving. County road is gone, 2 cottages and the workshed of the White Crusaders are in danger of sliding down.

1914 - Placer County Republican, Jan 15, 1914: Landslides threatened several small cottages on the Alta Sanitarium Property. Dr. W.J. Broome and wife had to abandon their cottage and it is not believed to be threatened. Bank was sloughing away adjacent to it.

1914 - Placer County Republican, March 5, 1914: SP moves cottage of resident physician at Alta Sanitarium in Alta, due to threat of landslide. It now appears landslide has stabilized.

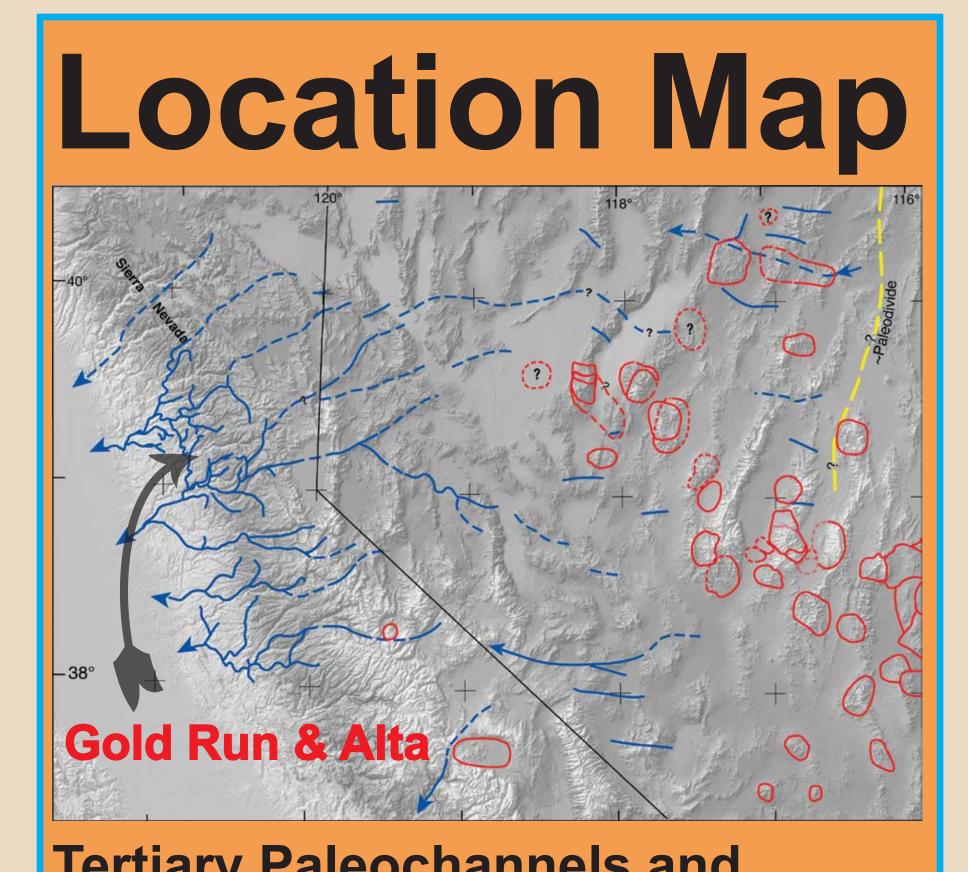
1955 - Colfax Record, Dec 30, 1955: A large section of highway 40 has slid out near the home of Highway Patrolman Earl Crane. Traffic now being routed from Monte Vista thru Alta and back to highway at Baxter.

1960 - A landslide occurred during the grading of the new Interstate 80 freeway near Alta below the railroad tracks. The slide has a circuate headscarp and must have been deep seated as it took out a large stratigraphic section of clay and tuff bedding. The slide took out the county road (Towle Rd) above the railroad tracks; the railroad tracks; the railroad tracks; the railroad tracks themselves and dumped the landslide debris onto the grade of the new highway. Cost, \$16.8 million (2000 dollars). Ref: Doug Ferrier; Taylor and Brabb, 1986.

1990 - A landslide near Baxter blocked westbound I-80 Feb. 18, 1990 during a winter storm. The flume above the slide was damaged and may have been a contributing factor. Ref: Dick Hilton

mid-1990s - Landslide in green smectite and interbedded tuffs totals house on Moody Ridge. Ref: Jim Wood

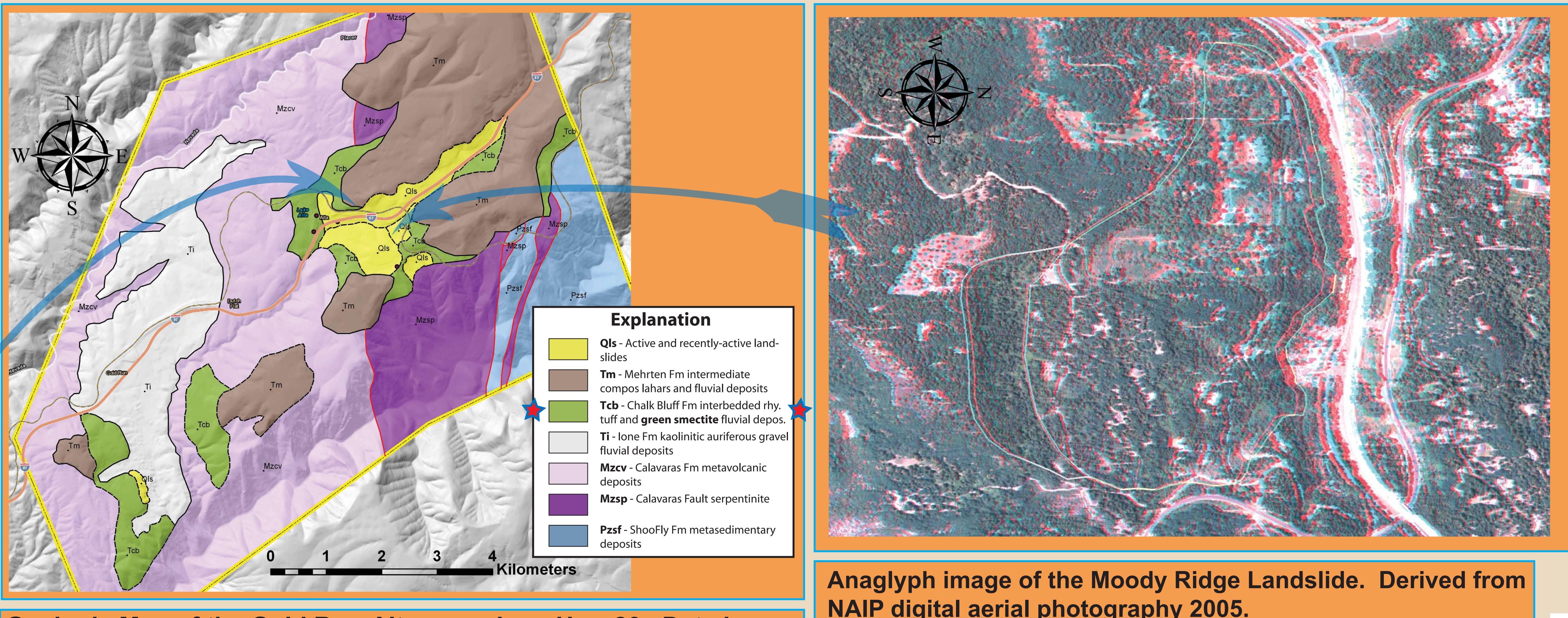
Brian Hausback, Jim Wood, Chris Henry, Tim McCrink



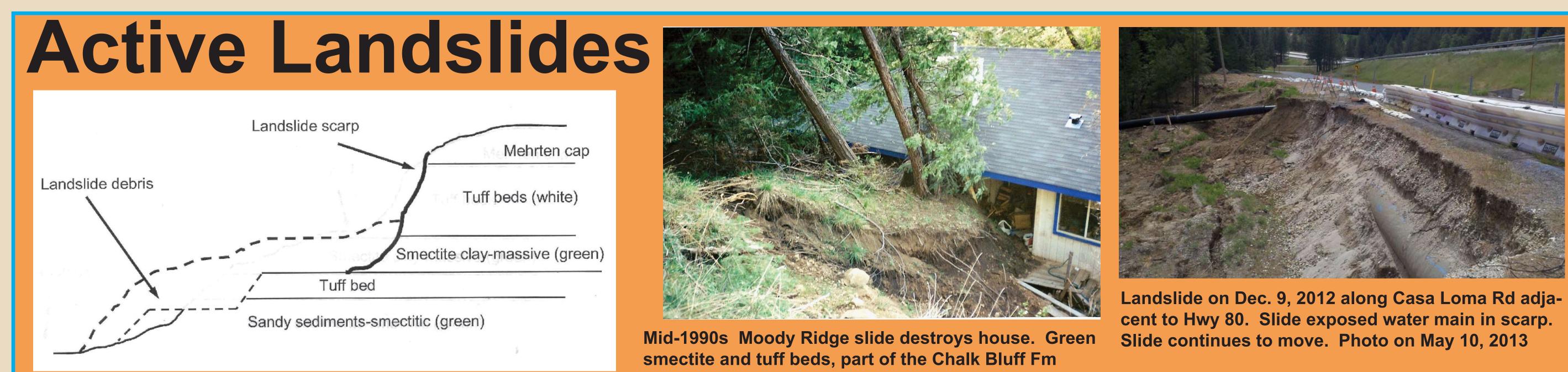
Tertiary Paleochannels and Source Calderas for ash-flow tuffs From Chris Henry





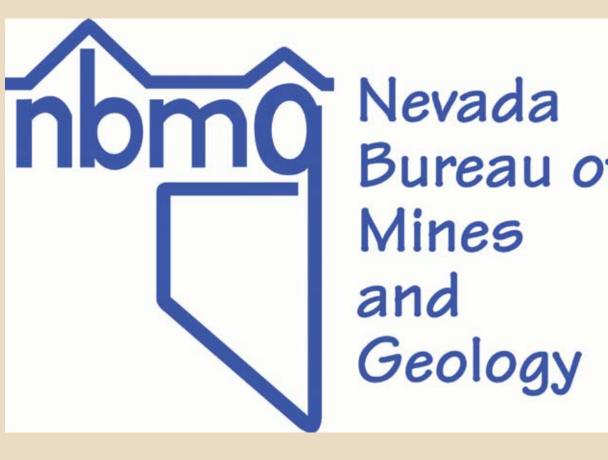


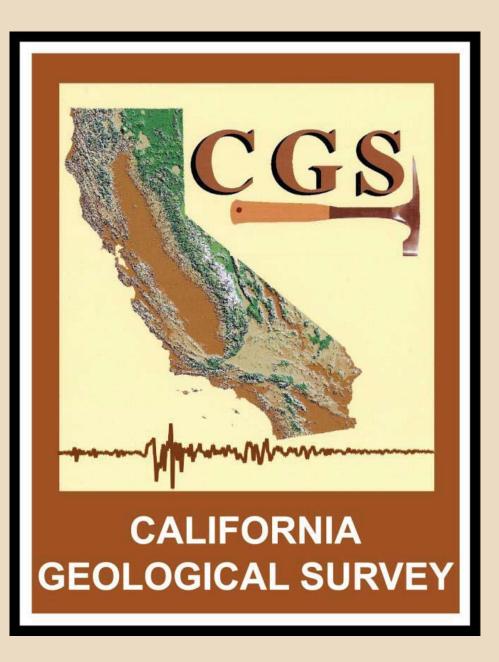
Geologic Map of the Gold Run-Alta area along Hwy 80. Data is both photo-interpreted and derived from published maps from various sources: Harwood, Livingston, and Loyd.

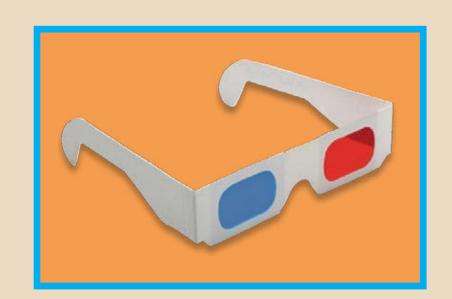


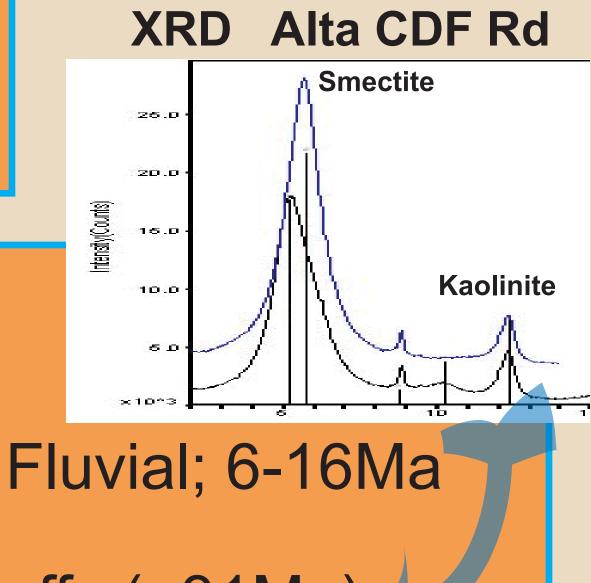
NAIP digital aerial photography 2005. **Rendering by Tim McCrink**











2 4 8 8 10 12

Kaolinite

Mehrten Fm - Intermediate composition Lahars and Fluvial; 6-16Ma

Chalk Bluff Fm - Smectitic Fluvial and interbedded tuffs (~31Ma) NASTY Green Swelling Clays!!!!! XRD Gold Rui

lone Fm - Kaolinitic Fluvial auriferous gravels (~50 Ma)

Bedrock - Mesozoic and Paleozoic