

EXPLANATION

● Location of damaging landslide. The number identifies the landslide in the database. Data on file with authors, USGS, Menlo Park, California and Golden, Colorado.

SUMMARY

Except for the reactivation of a few older, recurring slope failures, landslide activity in Santa Clara County from the 1997-98 El Niño event was limited mainly to small debris flows along roadcuts or narrow canyon walls, slumping of road fills, and flood-related washouts. Although generally small (less than 500 m³ volume), these features were widespread throughout the county. Cost for repair and cleanup of these minor failures on county roads is estimated at about \$1.3 million by the Santa Clara County Roads and Airports Department. Of this \$1.3 million, \$500,000 was for repairs on Montebello Road in the Santa Cruz Mountains just west of the City of San Jose, and \$290,000 for repairs to Gilroy Hot Springs Road in the southeastern part of the county.

The most costly slope failure resulting from the 1997-98 El Niño storms in Santa Clara County occurred in the community of Alum Rock, where reactivation of the Penitencia Creek landslide caused extensive damage, including destruction of water and sewer lines, and closure of Crothers Road and a part of Highland Drive. The slide also poses a threat to several private residences near the head of the slide along Highland Drive. The slide forced closure of Alum Rock Park due to the loss of potable water to park facilities and damage to the access road. Estimates from the county Roads and Airports Department for repairs resulting from the 1998 reactivation of this landslide total \$4.1 million.

The 1997-98 El Niño rains also reactivated an existing landslide that closed Clayton Road in the hills just east of the community of Alum Rock. A part of Clayton Road had been restricted to one lane by a previous landslide in 1983, but reactivation of the slide resulted in total loss of the roadway for about 50 m. Clayton Road is a loop drive providing access to the semi-rural residential area in the hills. Closure to through traffic around the loop is inconvenient, but is not a critical problem because access can be gained through either end of the loop. Estimates for repair of Clayton Road have been placed at \$2.0 million by the county.

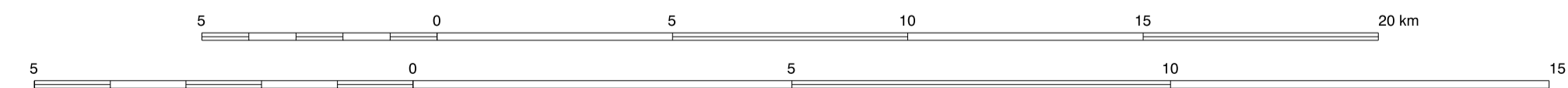
A relatively large landslide, approximately 500 m wide by 500 m in length, was also reactivated near Old Piedmont Road on the east side of the city of Milpitas. This slide apparently was initiated following the 1982-83 winter storms, resulting in vertical and horizontal offset of the roadway as well as minor damage to sidewalks and possibly foundations in residences near the toe of the slide. The slide began moving noticeably in February 1998 and was continuing to move in early April, with a total displacement near the toe at that time of about 20 cm (J. Baker, Santa Clara County Geologist, oral and written commun., 1998). Because this renewed movement had not resulted in any significant new damage to facilities or structures, the slide did not contribute to the 1997-98 damage cost estimates for Santa Clara County.

Damage to private property in the county appeared to be sparse. The most costly incidence observed was to a private access roadway that crosses a rotational slump activated by the 1997-98 storms. Estimated costs obtained by the property owner for repair and remediation

of this slide were as much as \$300,000. Another private residence on Higuera Drive was threatened by renewed movement on an old slide that has caused some damage to a large barn. A second residence near this slide sustained considerable damage to a driveway security gate. In Los Gatos, significant damage was sustained by at least one residence when the attached garage was destroyed by a small debris flow. A home immediately above this flow was yellow-tagged, but remediation of the hillslope appeared feasible and that home is unlikely to be lost. "Tagged" structures are those that have been either condemned (red) or in need of significant repair (yellow). Municipal and county building inspection departments are commonly responsible for such determinations.

In summary, most of the observed damage in Santa Clara County occurred from reactivation of existing landslides, most of which apparently originated as a result of the 1982-83 storms. Most of these features are in the northern part of the county, along the range front on the east side of the Santa Clara Valley. The total damage estimate for the county is \$7.6 million, although minor damage to private property that may have been missed by this reconnaissance survey could result in a larger figure. It appears that 1997-98 rainfall intensities were not sufficient to cause widespread damage in the county. Numerous incipient failures in soils, and other minor slope failures along roadways and in steep terrain, however, suggest that rainfall amounts may have approached the threshold that could have produced many more debris flows and major slope failures.

Scale 1:125,000



Universal Transverse Mercator Projection
Zone 10



Digital data prepared using ARC/INFO 7.1.2 running under Solaris 2.6 on a UNIX workstation. Map formatted using Adobe Illustrator 8.0 running under Mac OS 8.6.

Shaded relief base derived from Graham, S.E., and Pike, R.J., 1997, Shaded Relief Map of the San Francisco Bay Region, California, U.S. Geological Survey Open-File Report 97-745-B.

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This map was produced on request, directly from digital files, on an electronic plotter. It is also available as a PDF file at <http://greenwood.cr.usgs.gov>

For sale by U.S. Geological Survey Information Services Box 25286, Federal center, Denver, CO 80225.

MAP SHOWING LOCATIONS OF DAMAGING LANDSLIDES IN SANTA CLARA COUNTY, CALIFORNIA, RESULTING FROM 1997-98 EL NIÑO RAINSTORMS

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