

MARCH/APRIL 1992



CALIFORNIA GEOLOGY

\$1.25

CAPE MENDOCINO



California's Geology
Our Resources - Our Hazards

CALIFORNIA
DEPARTMENT
OF CONSERVATION

Division of
Mines and Geology

PETE WILSON, Governor
STATE OF CALIFORNIA
DOUGLAS P. WHEELER, Secretary
THE RESOURCES AGENCY
EDWARD G. HEIDIG, Director
DEPARTMENT OF CONSERVATION

The Cape Mendocino Earthquakes

April 25-26, 1992

During the preparation of this issue of CALIFORNIA GEOLOGY three large earthquakes rocked the Cape Mendocino area, Humboldt County, California. They were felt throughout much of northern California and in southern Oregon. Peak intensities were at least VIII (Lori Dengler, Humboldt State University, written communication).

There were at least 144 aftershocks of magnitude 3 or greater within a month of the magnitude 7 event (Rick McKenzie, University of California, Berkeley, oral communication).

The earthquakes triggered numerous landslides, damaged roads and bridges, and caused widespread liquefaction in the Eel River Valley. Structural damage was concentrated in Ferndale, Fortuna, Petrolia, Rio Del, and Scotia. President Bush declared Humboldt County a major disaster area.

The National Oceanic and Atmospheric Administration (NOAA) reported a 3-foot- (1-m-) high tsunami, an earthquake-generated sea wave, at Crescent City. The tsunami measured about 0.6 feet (18 cm) at Point Arena, California and about 0.3 feet (9 cm) in Hawaii.

The April 25 event occurred along a northeast-dipping reverse fault very close to the postulated location of the Cascadia subduction zone. Thus, this may be the first historic earthquake along the Cascadia subduction zone. However, the area is geologically complex so the rupture could have occurred along any one of the other thrust faults in the area. The April 26 earthquakes struck along a northwest-striking right-lateral strike-slip fault in the Gorda plate (Lori Dengler, Humboldt State University, written communication). No surface rupture has been discovered.

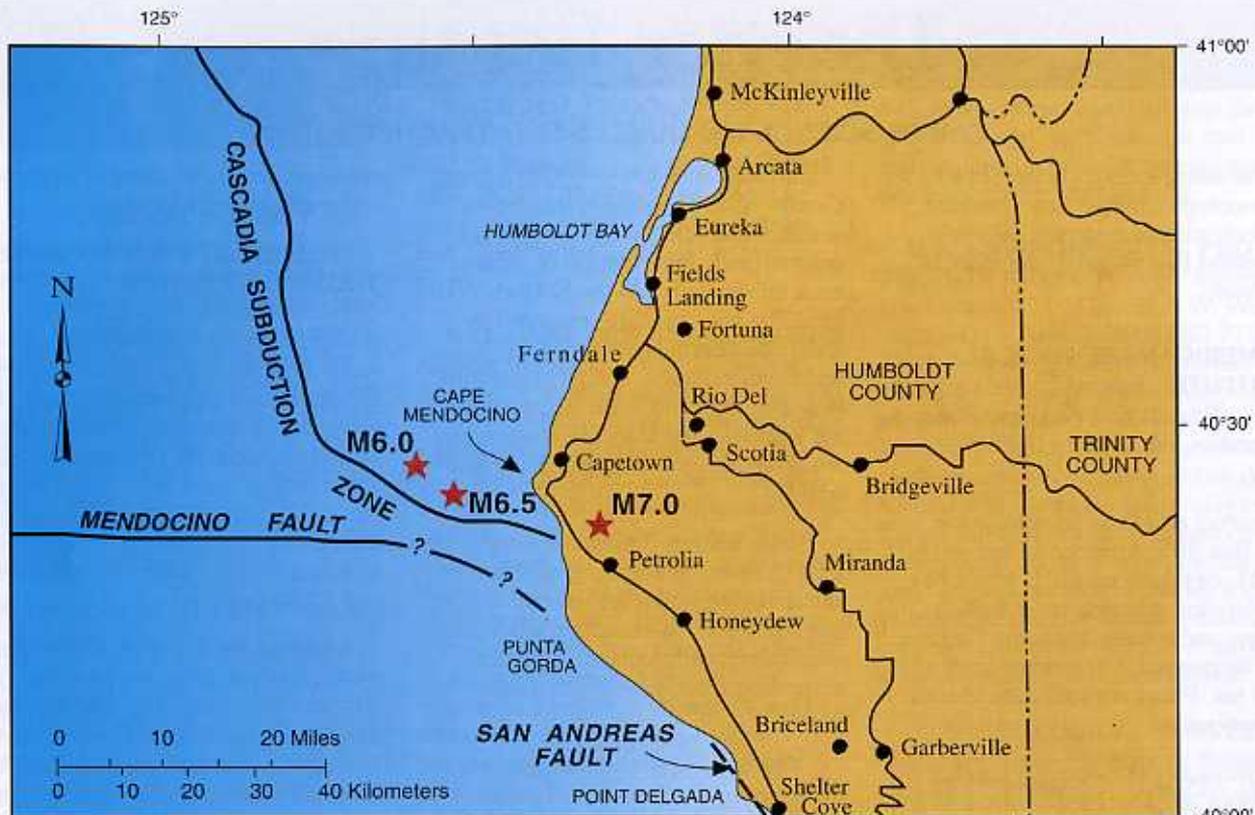
This sequence of earthquakes occurred in one of California's most geologically complex and seismically active areas (see *Sources of North Coast Seismicity*, this issue, for a description of the tectonics and an overview of the seismic history). The region's largest historic earthquake (magnitude 7.2) occurred in 1923. More recently, a magnitude 6.0 event struck about 13 miles (21 km) southeast of Cape Mendocino (see *The Honeydew Earthquake: August 17, 1991*, this issue).



The front door was at the top of the stairs before this Ferndale house was shaken off its foundation. Photo by Kevin Bayliss.

Preliminary locations and magnitudes determined by the U.S. Geological Society and the University of California at Berkeley.

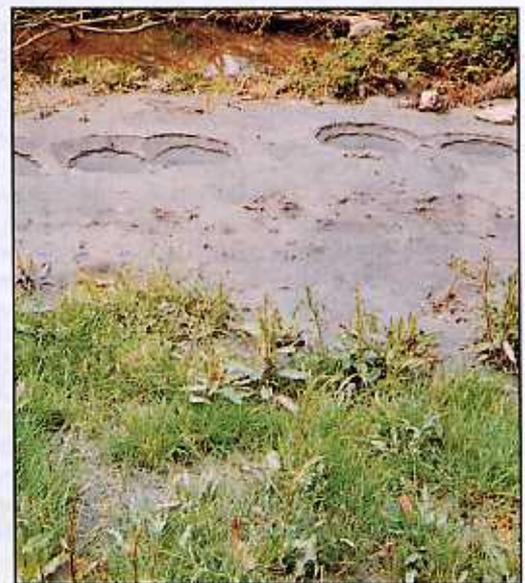
Date	Time	°N. Lat.	°W. Long.	Depth	M _s	M _L
4/25/92	11:06:04 PDT	40.37	124.31	15 km	7.0	6.4
4/26/92	00:41:40 PDT	40.44	124.58	18 km	6.0	6.2
4/26/92	04:18:26 PDT	40.40	124.56	21 km	6.5	6.4



Location map of the April 1992 Mendocino area earthquakes.



Humboldt County roads, which serve rural communities near the epicenters, were damaged and blocked at numerous locations by debris slides. However, maintenance crews were able to clear one lane on most of these roads within 2 or 3 hours of the earthquake. These roads cracked due to settlement of roadway embankments, but none of the cracks were large enough to block traffic. *Photo by Oscar Huber.*



Sandblows adjacent to the Salt River near Port Kenyon provide evidence of liquefaction of saturated sand layers beneath younger deposits of silt and clay, during the April 25-26, 1992 earthquake sequence. Water and sand squirted to the surface through fissures in the silt/clay layer, and left small craters of fine gray cohesionless sand on the surface. The craters in this photo are about 12 inches (30 cm) in diameter. Port Kenyon is about 1.5 miles (2.4 km) northwest of Ferndale, and the Salt River is a tributary to the Eel River. Similar sandblows were observed near the lower reaches of the Eel and Mattole rivers. *Photo by Oscar Huber.*