

**U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY**

The Cape Mendocino Earthquakes of April 25 and 26, 1992

Open-File Report 92-575

by
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This report has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature.

Introduction

Within a 24-hour period, the Cape Mendocino region was struck by a trio of strong earthquakes on April 25 and 26, 1992. The initial earthquake was centered 6 miles north of Petrolia in the southwestern part of Humboldt County. This is a sparsely populated and undeveloped area in the coastal mountains that bounds the Northern California coastline—an area whose predominant industry is lumber. The 2nd and 3rd earthquakes were centered off shore, about 16 miles west of the 1st earthquake. Preliminary reports indicated that the initial earthquake (magnitude 7.1) was felt in southern Oregon, throughout northern California, as far south as Monterey, CA, and as far east as Carson City, NV. A composite map of the three earthquakes indicated that they were felt over an approximate contiguous land area of 86,000 km². The preliminary hypocenters computed by the U.S. Geological Survey (USGS) at Menlo Park, CA are:

April 25th
Origin time: 18 06 04.2
Latitude: 40.368N.
Longitude: 124.316W.
Depth: 15 km
Magnitude: 6.3 m_b (GS), 7.1 M_S (GS)

April 26th
Origin time: 07 41 39.7
Latitude: 40.415N.
Longitude: 124.603W.
Depth: 20 km
Magnitude: 5.9 m_b (GS), 6.6 M_S (GS)

April 26th
Origin time: 11 18 25.7
Latitude: 40.378N.
Longitude: 124.575W.
Depth: 22 km
Magnitude: 6.5 m_b (GS), 6.6 M_S (GS)

A postmaster questionnaire canvass was made to determine intensities and the extent of the felt area for the 1st and 3rd earthquakes (the 2nd earthquake was not canvassed). Tables 1 and 2 (pp. 10–26) list the preliminary intensities that were determined from these postmaster questionnaire canvasses. Also, a USGS field team was dispatched to the epicentral area to conduct a damage survey in the communities that were most affected by the earthquakes. In the course of the survey, damage information was collected through observations and by interviews with residents. The following newspaper sources were used to collate additional damage information: *The Ferndale Enterprise*, Ferndale, CA; *The Times*, San Mateo, CA; *The Press Democrat*, Santa Rosa, CA; and *Times-Standard*, Eureka, CA.

The Cape Mendocino Earthquake sequence is assigned a maximum intensity of VIII on the Modified Mercalli Intensity Scale (MMI, Wood and Neumann, 1931). MMI VIII is assigned to the small villages of Ferndale, Petrolia, Honeydew, Scotia, and Rio Dell, where serious earthquake effects were mapped (figure 1, p. 3). The lesser damage to the larger communities of Fortuna and Eureka places these towns outside of the intensity VIII zone. A Modified Mercalli Intensity Scale is found in Appendix A (pp. 28–30).

The earthquake caused 98 injuries and moderate damage in Humboldt County. Damage to homes, businesses, and the county's infrastructure is still being tallied as of April 28, 1992, but officials of the Office of Emergency Services expect the losses could top \$66 million.

Some of the more prominent geologic effects, caused by the earthquakes were:

The Cape Mendocino accelerograph station reported maximum peak horizontal accelerations of 1.3g and lasted about 7 seconds (Personal Communication, Lori Dengler, Humboldt State University).

The National Oceanic Administration reported a small tsunami at Crescent City (1.1m) and at Arena Cove (0.2m) (Alaska Tsunami Center, Palmer AK, Tom Sokolowski) within one hour after the initial earthquake. No damage was reported by either community. Fisherman at sea reported the ocean level dropped 3 feet.

Widespread areas of liquefaction were identified in the Eel and Mattole River Valleys. The sandblows were reported to be 15–20m across. Preliminary evidence suggests that the coastline near the mouth of the Mattole River was uplifted about 1m (personal communication, Lori Dengler, Humboldt State University).

Strong ground motion during the earthquake sequence triggered landslides within the MMI VIII isoseismal zone. Landslides were most numerous around the earthquake source in the steep and heavily vegetated coastal mountains. The most common landslides were rock falls and soil slides. The landslides were widespread and blocked or impeded traffic on the limited number of roads that connect the small towns located in the Coastal Mountain Range. The debris from the landslides, in some instances, flowed across the roads and down into the ravines breaking off trees, tree limbs, and bushes, and severing communication lines. Residents in Petrolia and Honeydew reported noise and dust clouds as the larger landslides descended from the steep-sided cliffs. A landslide at Scotia Bluffs (south of Scotia) temporarily interrupted rail traffic on the North Coast Railroad.

Principal preliminary effects to the infrastructure caused by the earthquakes were:

The bridges in the area were of two basic types: the concrete box girder and the older steel truss bridge. Of the 176 county-maintained bridges in the epicentral area, only two of the concrete box type bridges sustained some damage. The William Creek Bridge (in the Ferndale area) required temporary supports to strengthen the structure; the George C. Lindley (south of Petrolia) sustained damage to its supporting concrete columns. Instead of closing the Lindley Bridge, a speed limit was posted and the bridge was reduced to

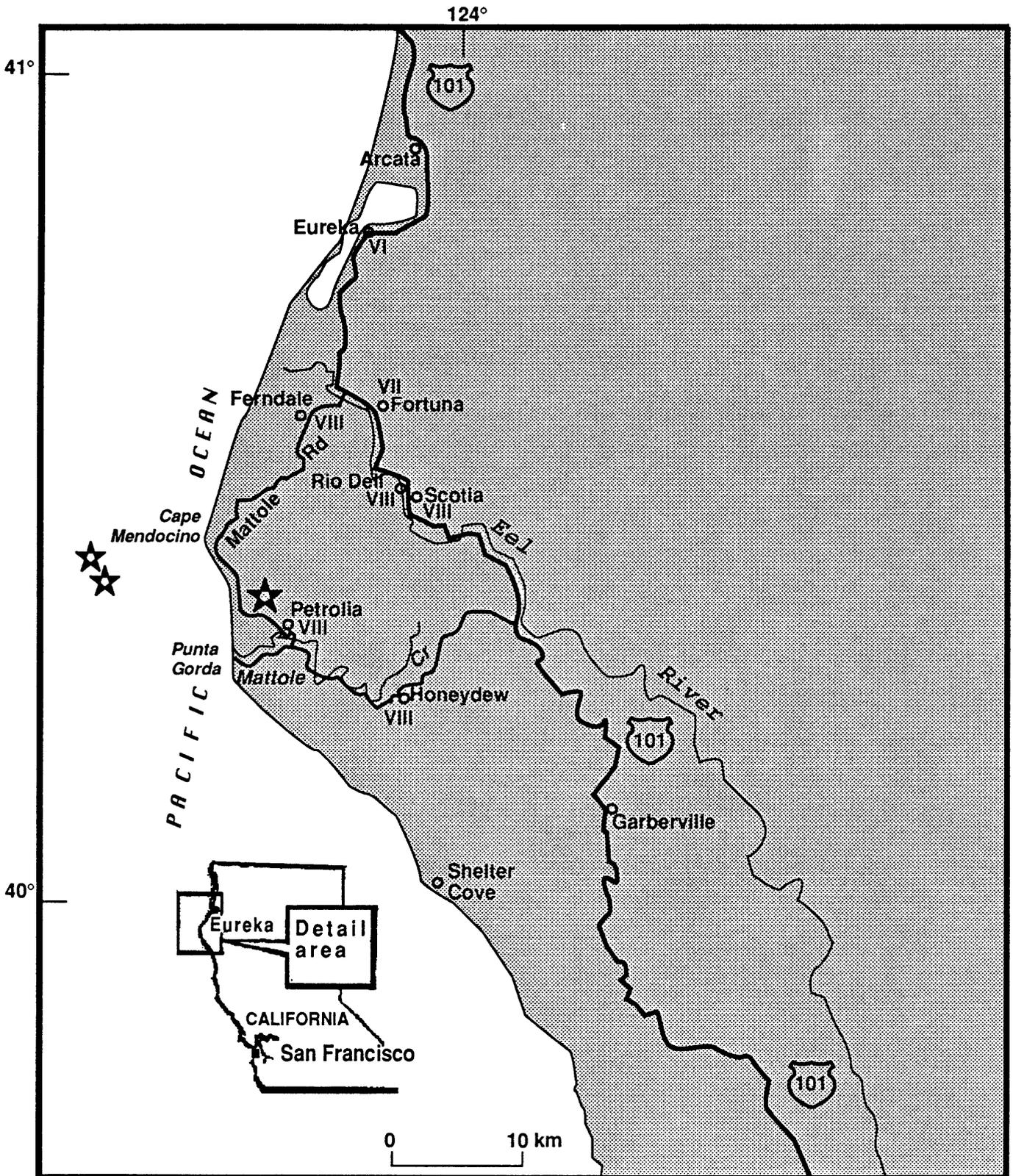


Figure 1. Epicentral area of the Cape Mendocino earthquakes. The larger star represents the 1st event. The small stars represent the 2nd and 3rd events. The preliminary Modified Mercalli intensities are based upon the damage observed during the USGS field survey. Illustration by Ralph Ricotta.

one lane traffic. Steel truss bridges, supported by concrete piers, were not damaged according to press reports in Humboldt County. The most common type of damage to the area bridges was the offset between the asphalt road and concrete bridge deck due to soil-compaction.

Local roads consist of two-lane minimum standard roads with no alternative routes available to residents. Asphalt roads were cracked to some extent within the area outlined by the MMI VIII isoseismal. The Mattole Road that connects Honeydew, Petrolia, and Ferndale was severely cracked. In some places, traffic was reduced to one way traffic. The road cracks were due to soil compaction and downhill slumping of the adjacent road shoulders. The earthquake triggered landslides that made some roads impassable for residents and hampered rescue and relief efforts.

The earthquake caused contamination of water supply systems, broke water mains and sewer pipes, and interrupted telephone, gas and electricity services in Ferndale, Rio Dell, Scotia, Petrolia, as well as other towns throughout Humboldt County.

The Trinity County Sheriff Department reported several calls were received about strange lights on the horizon at about the time of the stronger earthquakes and aftershocks. These light descriptions ranged from a green-colored flare (near Susanville), red-colored flares (near Bridgefield), and a basketball-size red flare (near Mad River) that left a white smoke trail. Whether these observations are classified as earthquake lights or they are due to other causes, such as sparks generated by contact between electrical wires that were whipped around during the quake, is not presently known.

Intensities and Damage in the Epicentral Area

The region of strong earth motion is roughly bounded by the Eel and Mattole River Valleys. The Eel River forms the east and northeast boundary and the Mattole River Valley forms the south and southwest boundary. The communities of Honeydew and Petrolia lie along the Mattole River and the communities of Rio Dell and Scotia are located along the Eel River. Ferndale is located 8 miles west of the Eel River. Each of these towns is located within a 50 mile radius of the three earthquake locations (listed on p. 1) published by the USGS *Preliminary Determination of Epicenters* program.

Building damage was random and varied with construction methods. Newer constructed buildings performed well during the earthquakes with little or no damage. Within the MMI VIII zone, damage was negligible to buildings of good design and construction; damage was slight to well-built ordinary buildings; and damage was severe to poorly built or poorly designed structures. One- and two-story, wood-frame houses and commercial buildings were the most common type of construction. There were few all-masonry buildings.

Older building foundations were mostly the post-and-pier type of construction. According to local residents, the post-and-pier foundation was used for wood-frame houses in the early 1900's because it was easier and less expensive to build. This type of foundation allowed the earthquake motion to slide the structures on their foundations because the buildings were not connected to the

foundations. The wooden-sheathing that surrounds the foundation perimeter was observed lying in disarray beside many shifted structures.

The non-structural damage within the MMI VIII isoseismal zone included: shattered, broken, or cracked display windows; emptied cupboards; jumbled shelf items and/or items thrown off shelves, and heavy furniture and appliances shifted from their original position.

The following sections summarize the earthquake damage and/or the effects in each community visited during the field survey. The intensity values assigned to the following communities reflect the cumulative damage of the three strong earthquakes and aftershocks. Whereas the first earthquake was the strongest, residents reported that the earthquake on Sunday (April 26 at 07:41 UTC) was the most damaging. The Roman numerals indicate the intensity rating for each town. As stated earlier, the damage estimates are preliminary.

Petrolia (VIII)— This community is located about 6 miles south of the initial earthquake epicenter. In this remote and rural community of approximately 100 people, five homes were destroyed; 28 sustained major damage, and 25 required minor repairs. Earthquake damage was estimated to total \$1 million.

The heart of the business district; which consisted of a United States Post Office, a 100-year-old general store, and a gas station, burned to the ground in an earthquake-related fire. The adjacent fire station was saved, but the fire station door was jammed by the first of the three strong earthquakes. It took the efforts of several firemen to raise the door to evacuate the fire equipment.

Damage to structures included: shifting on foundations and shifted off foundations (in some instances 2 to 3 feet); structures, with additions to the main house, had collapsed onto one another at the connecting wall; in some cases, wood-frame houses were racked and wood panel walls were thrown out; and brick chimneys (some reinforced with steel rods) were toppled, broken, or cracked.

Persons that were standing or walking were thrown to the ground and those persons lying in bed were thrown from the bed. Some local residents slept in tents or out on the open ground due to fear of continued earthquake activity. In a residential neighborhood a few blocks east of the burned shopping area, a large, parked front-end loader reportedly was bounced up and down. There were isolated instances where stacked firewood was shaken down and scattered on the ground.

Relief agencies setup centers to provide food, clothing, and temporary shelter for the earthquake victims. Although, the wood-frame Mattole Elementary School was reported to be slightly to moderately damaged; it served as the command center for the relief agencies and National Guard units.

Honeydew (VIII)— The village of Honeydew, fifteen miles southeast of the initial earthquake location, has a population of two persons after 5 pm with an esti-

mated 500 residents within an eight mile radius. Here, as in Petrolia, the one-and two-story structures were predominantly constructed of wood.

In an interview with the postmaster, he reported that houses had shifted on foundations and shifted off foundations, and brick chimneys fell that had not fallen in previous earthquakes. The single-story, wood-frame structure that housed the Honeydew Post Office and the general store showed no signs of movement, although the shaking was described as intense.

Adjacent to the Honeydew Post Office and general store, a one way, steel truss bridge supported by concrete piers, that spanned the Mattole River, was not damaged.

The postmaster indicated that the violent shaking was the longest (about 40 seconds) he had ever experienced and it was difficult to stand or walk during the most violent period of earthquake motion. In a another location, the postmaster reported the ground opened and closed under a man's foot.

An example of structure damage, in Honeydew, occurred to a two-story, wood-frame house with a stucco-exterior, built in 1922. The east wall of the house was severely cracked as the brick chimney separated from the exterior wall. The separation between the chimney and house was caused by the east-west sway of the structure during the earthquake sequence. The house was vacant at the time. Across the road, a single-story, wood-frame house (built in the 1950's) was not damaged; the owner reported only a tea cup was broken.

Scotia (VIII)— The town of Scotia, (approximate population 1,100), lies in the crescent-shaped bend of the the Eel River. The 123-year-old-town is largely owned by the Pacific Lumber Company. About 40 of the the 270 homes (described as clapboard houses that were owned by Pacific Lumber Company) sustained damage that displaced about 20 families. The one-story, wood-frame houses that experienced the most severe damage were located on the south bank of the Eel River. The number of structures damaged and the severity of structural damage was significantly less that the damage at Petrolia and at Ferndale. The damage was estimated to total between \$10 – \$15 million.

The primary damage in Scotia was caused by an earthquake-related fire that burned the core of Scotia's shopping district to the ground. The mall, owned by the Pacific Lumber Company, consisted of one- and two-story, wood-frame commercial buildings that housed a lumber yard, a pharmacy, a coffee shop, a grocery store, and a Ben Franklin Variety Store. The structure caught fire early Sunday (April 26). Local firemen were hampered in their efforts to save the mall due to the second quake which snapped the town's water main. In order to continue fighting the fire; firemen drew water from a nearby log pond.

Other residential damage in Scotia included chimney damage, and fallen porches—an indication that the dwellings had shifted on their foundations. The Lumber Museum

(across Main Street from the strip mall that had burned down) reported some damage. The outside portico over the museum entrance was supported by 15 – 20 foot redwood logs. Several of these logs, which acted as pillars, showed evidence of movement and subsequent displacement at the upper connection between the portico and the log pillars. One window was covered with plywood indicating damage to plate glass.

Although the Pacific Lumber Mill reported very little damage to its complex, scattered stacks of drying lumber were observed to be shaken down by the earthquake.

Rio Dell (VIII)— This community (population of ~ 2,910), formerly named Wildwood, adjoins Scotia on the north side of the Eel River Valley. Twenty residences sustained major damage and 40 homes sustained some damage. The estimate of earthquake damage for this community was placed at \$8 million.

Fifteen of the twenty businesses along Wildwood Avenue, Rio Dell's business center, were damaged. Sagging structures, boarded store fronts, shattered windows, severe cracks in store fronts, and fallen bricks were evidence of the earthquake's destructive energy. Buildings shifted as much as 2 feet from their pre-earthquake positions. A portion of a concrete parapet collapsed into the street from one business establishment.

A steel truss bridge, supported on concrete piers, links the main streets of Rio Dell and Scotia. The bridge was closed to all traffic except foot traffic because of suspected earthquake damage. Later inspections revealed no bridge damage, but spreading cracks along the river banks were reported.

Ferndale (VIII)— The town (population of ~1,450), known for its restored Victorian style of architecture, is listed in the National Registry of Historic Places. This community, of older, wood-frame, one- and two-story homes and commercial buildings, is located at the western extent of an agricultural plain which extends from the Eel River to the base of the Coastal Mountain Range. Thirty homes and 40 businesses (about 80% of the business district along Main Street) were damaged. Estimates of losses were placed at \$10.4 million.

The Valley Grocery, the only unreinforced all masonry building in town, sustained severe damage. The brick parapet (originally built in 1872 and again in 1906) spilled onto Main Street. In the 1906 earthquake, the store front collapsed onto the street and killed two cows; this time the falling bricks killed (smashed) a Chevrolet and a Volvo automobile. It was apparent that preparations were underway to rebuild the store front again in 1992.

Many of the wood-frame Victorian homes were scattered around town, but the largest concentration of these homes were located in the vicinity of Shaw Street. The single most common damage to these houses was the shifting or sliding of the structures on their foundations. The main floor of these Victorian homes were elevated on post-and-pier foundations, as much as 3 to 4 feet, above the ground. The collapse of the post-

and-pier supports left many of the structures on the ground. The wooden sheathing that covered the supporting foundations was lying in disarray near the shifted houses.

Other types of damage in Ferndale included: fallen porches, cracked or broken chimneys; curb damage; and in the local cemetery, some tombstones were rotated, fallen, and broken.

Hundreds of people, dressed in costumes, were in town for Ferndale's annual "Best of the West Festival" parade. The parade had just concluded when the initial earthquake struck. There were reports that the horses were spooked during the parade, but the riders attributed it to the wind which fluttered flags and bunting that hung from buildings along the parade route.

Loleta (VII)— This small community (approximate population of 800) is located about eight miles east of Ferndale on the Eel River. The Familiar Foods Company Creamery is a complex of multi-story brick buildings. Cracks were reported at the corners of some of the Creamery's brick buildings. Earthquake-related damage was not observed to houses or to the general store and gas station that formed the small business district.

Fortuna (VII)— This community (approximate population of 8,675) is located five miles north of Rio Dell.

Here, as in Eureka, the Veterans Memorial Building reported structural damage. The Fortuna Fire Department pulled down the few chimneys that were cracked by the earthquake. Main Street, between 9th and 12th Streets, was blocked off because of broken display windows in the older one- and two-story, wood-frame structures. There were no reports of structures shifted off foundations.

Newer shopping malls reported cosmetic types of damage, such as ceiling panels dislodged and merchandise toppled to the floor.

Eureka (VI)— This town is the largest population center (approximately 40,000) to be affected by the Cape Mendocino earthquake sequence. Eureka, located on Humboldt Bay, is 16 miles north of Fortuna. The light damage caused by the earthquake places this community outside the region of strong ground shaking. The Veterans Memorial Building was the only building in Eureka to report structural damage. This building reported previous structural damage as a result of the November 8, 1990, earthquake.

Eureka's Old Town, a restored waterfront area on Humboldt Bay where many of the one- and two-story, wood-frame buildings are historic landmarks, is a collection of art and antique shops. The earthquake damage in Old Town consisted of a few broken display windows, a few loosened bricks, and jumbled shelf items.

Although wood-frame buildings were the dominant type of construction, there were a few masonry buildings in Old Town which showed some evidence of earthquake damage. Inspections by city engineers indicated that even these buildings rode out earthquake with minimal damage.

Lazios, a seafood restaurant, is one example of non-structural damage to a two-story, unreinforced masonry building. The earthquake vibrations caused pieces of the concrete facade that covered the southwest corner of the building to fall. The owner had erected a temporary portico over the restaurant's entrance for the protection of the customers.

These masonry buildings, including Lazios Restaurant, were reported to have been retrofitted following the 1906 earthquake; however, it was acknowledged by a Eureka business owner that the retrofitting did not meet California's current earthquake building code standards.

In downtown Eureka, the principal damage to masonry buildings and to wood-frame buildings with stucco exteriors were spider-web like cracks (very fine cracks), the re-opening of older cracks at the corners of windows and doors, minor cracking due to building pounding and possible differential settlement, and numerous broken plate glass windows.

Recently constructed buildings did not sustain any structural damage. The Bayshore Mall (located southwest of downtown Eureka) built in 1990, rode out the earthquake with only superficial damage: a few fallen exterior tiles, cracked floor tiles, dislodged ceiling panels and acoustic panels, and items jumbled on shelves or thrown to the floor.

In the residential sections of Eureka, earthquake damage to homes was slight to nonexistent. There was no apparent earthquake-related damage to the restored stately Victorian mansions that were located on 2nd and 3rd Streets between J and K Streets.

Inside damage in the residential section was reported to be limited to: fallen items from shelves, sometimes breaking; swinging of hanging objects and doors; hanging pictures tilted, some fallen; and in some instances, light furniture was moved or overturned.

During the earthquake, people were concerned but did not panic. The duration of the violent shaking from the first earthquake was reported to be about 40 seconds. According to reports, buildings "rippled" or swayed as the seismic waves passed beneath them. The amount of building sway was estimated, in some cases, to be three feet from side to side. Even with slight exaggeration, it was obvious from comments that the buildings were strongly shaken.

When the first earthquake struck, people standing on the sidewalks were thrown to the ground or walked unsteadily; parked automobiles were bounced upon curbs. After the second shock, most people remained outside.

Intensities from the postmaster questionnaire canvasses

**Table 1. The Preliminary Modified Mercalli Intensities for the April 25, 1992,
18 06 04.2 UTC, Cape Mendocino Earthquake.**

Intensity	Latitude	Longitude	Town Name	State
VIII	40.576 N.	124.262 W.	Ferndale	CA
VIII	40.244 N.	124.121 W.	Honeydew	CA
VIII	40.499 N.	124.105 W.	Rio Dell	CA
VIII	40.482 N.	124.099 W.	Scotia	CA
VII	40.537 N.	124.059 W.	Carlotta	CA
VII	40.598 N.	124.156 W.	Fortuna	CA
VII	40.761 N.	123.993 W.	Kneeland	CA
VII	40.641 N.	124.224 W.	Loleta	CA
VII	40.400 N.	123.948 W.	Redcrest	CA
VII	40.120 N.	123.822 W.	Redway	CA
VII	40.023 N.	123.941 W.	Whitethorn	CA
VI	40.176 N.	123.610 W.	Alderpoint	CA
VI	40.866 N.	124.081 W.	Arcata	CA
VI	40.883 N.	123.982 W.	Blue Lake	CA
VI	40.770 N.	124.141 W.	Cutten	CA
VI	40.802 N.	124.162 W.	Eureka	CA
VI	40.724 N.	124.213 W.	Fields Landing	CA
VI	40.234 N.	123.822 W.	Miranda	CA
VI	40.266 N.	123.869 W.	Myers Flat	CA
VI	40.209 N.	123.784 W.	Phillipsville	CA
VI	40.818 N.	124.185 W.	Samoa	CA
VI	40.321 N.	123.920 W.	Weott	CA
V	40.469 N.	123.798 W.	Bridgeville	CA
V	41.756 N.	124.200 W.	Crescent City	CA
V	39.716 N.	123.352 W.	Dos Rios	CA
V	40.100 N.	123.793 W.	Garberville	CA
V	41.550 N.	122.904 W.	Greenview	CA
V	41.526 N.	124.037 W.	Klamath	CA
V	40.870 N.	123.957 W.	Korbel	CA
V	39.688 N.	123.481 W.	Laytonville	CA
V	39.307 N.	123.798 W.	Mendocino	CA
V	41.310 N.	122.309 W.	Mount Shasta	CA
V	41.286 N.	124.058 W.	Orick	CA
V	39.966 N.	123.794 W.	Piercy	CA
V	40.890 N.	123.583 W.	Salyer	CA
V	41.059 N.	124.141 W.	Trinidad	CA
V	41.036 N.	124.110 W.	Westhaven	CA
V	39.635 N.	123.781 W.	Westport	CA

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Intensity	Latitude	Longitude	Town Name	State
V	39.409 N.	123.354 W.	Willits	CA
V	40.939 N.	123.630 W.	Willow Creek	CA
IV	38.721 N.	123.368 W.	Annapolis	CA
IV	39.412 N.	121.711 W.	Biggs	CA
IV	41.138 N.	122.316 W.	Castella	CA
IV	39.927 N.	122.178 W.	Coming	CA
IV	40.385 N.	122.279 W.	Cottonwood	CA
IV	41.967 N.	121.916 W.	Dorris	CA
IV	41.219 N.	122.273 W.	Dunsmuir	CA
IV	39.646 N.	121.798 W.	Durham	CA
IV	41.458 N.	122.430 W.	Edgewood	CA
IV	39.130 N.	123.716 W.	Elk	CA
IV	39.920 N.	122.435 W.	Flournoy	CA
IV	39.445 N.	123.804 W.	Fort Bragg	CA
IV	41.845 N.	123.968 W.	Gasquet	CA
IV	40.554 N.	123.181 W.	Hayfork	CA
IV	40.021 N.	122.099 W.	Los Molinos	CA
IV	38.970 N.	123.686 W.	Manchester	CA
IV	39.322 N.	123.111 W.	Potter Valley	CA
IV	40.680 N.	122.350 W.	Project City	CA
IV	40.178 N.	122.234 W.	Red Bluff	CA
IV	40.586 N.	122.390 W.	Redding	CA
IV	38.581 N.	121.493 W.	Sacramento	CA
IV	41.840 N.	123.191 W.	Seiad Valley	CA
IV	41.928 N.	124.145 W.	Smith River	CA
IV	38.703 N.	123.425 W.	The Sea Ranch	CA
IV	41.956 N.	121.476 W.	Tulelake	CA
IV	39.164 N.	122.909 W.	Upper Lake	CA
IV	39.933 N.	122.052 W.	Vina	CA
IV	40.731 N.	122.940 W.	Weaverville	CA
IV	40.400 N.	123.053 W.	Wildwood	CA
IV	39.524 N.	122.192 W.	Willows	CA
IV	42.053 N.	124.266 W.	Harbor	OR
III	40.448 N.	122.296 W.	Anderson	CA
III	40.640 N.	122.231 W.	Bella Vista	CA
III	40.741 N.	123.254 W.	Big Bar	CA
III	39.009 N.	123.365 W.	Boonville	CA
III	40.882 N.	121.659 W.	Burney	CA
III	41.309 N.	122.800 W.	Callahan	CA
III	39.233 N.	123.202 W.	Calpella	CA
III	38.617 N.	121.327 W.	Carmichael	CA
III	40.680 N.	122.370 W.	Central Valley	CA

**Table 1. The Preliminary Modified Mercalli Intensities for the April 25, 1992,
18 06 04.2 UTC, Cape Mendocino Earthquake.**

Intensity	Latitude	Longitude	Town Name	State
III	38.805 N.	123.016 W.	Cloverdale	CA
III	41.004 N.	121.437 W.	Fall River Mills	CA
III	39.004 N.	122.874 W.	Finley	CA
III	41.251 N.	123.325 W.	Forks of Salmon	CA
III	41.520 N.	122.519 W.	Gazelle	CA
III	39.219 N.	121.060 W.	Grass Valley	CA
III	40.617 N.	123.451 W.	Hyampom	CA
III	40.733 N.	123.052 W.	Junction City	CA
III	38.978 N.	122.838 W.	Kelseyville	CA
III	41.861 N.	122.821 W.	Klamath River	CA
III	39.275 N.	121.658 W.	Live Oak	CA
III	39.812 N.	121.577 W.	Magalia	CA
III	41.255 N.	122.138 W.	McCloud	CA
III	41.728 N.	122.526 W.	Montague	CA
III	39.261 N.	121.015 W.	Nevada City	CA
III	39.435 N.	121.536 W.	Palermo	CA
III	40.563 N.	122.237 W.	Palo Cedro	CA
III	39.884 N.	122.544 W.	Paskenta	CA
III	39.065 N.	123.443 W.	Philo	CA
III	40.360 N.	122.890 W.	Platina	CA
III	38.155 N.	121.690 W.	Rio Vista	CA
III	40.599 N.	122.490 W.	Shasta	CA
III	38.651 N.	123.398 W.	Stewarts Point	CA
III	40.686 N.	122.400 W.	Summit City	CA
III	40.027 N.	122.122 W.	Tehama	CA
III	41.066 N.	122.691 W.	Trinity Center	CA
III	40.638 N.	122.558 W.	Whiskeytown	CA
III	39.154 N.	122.148 W.	Williams	CA
III	38.898 N.	123.213 W.	Yorkville	CA
III	39.163 N.	119.766 W.	Carson City	NV
III	42.052 N.	124.282 W.	Brookings	OR
III	42.163 N.	123.646 W.	Cave Junction	OR
III	42.736 N.	123.422 W.	Glendale	OR
III	37.463 N.	122.427 W.	Half Moon Bay	OR
III	42.067 N.	123.701 W.	O'Brien	OR
III	42.275 N.	122.816 W.	Phoenix	OR
II	38.255 N.	120.350 W.	Arnold	CA
II	38.323 N.	121.821 W.	Dixon	CA
II	37.548 N.	121.987 W.	Fremont	CA
II	38.501 N.	122.995 W.	Guerneville	CA
II	40.685 N.	122.023 W.	Oak Run	CA
II	41.301 N.	123.540 W.	Orleans	CA

**Table 1. The Preliminary Modified Mercalli Intensities for the April 25, 1992,
18 06 04.2 UTC, Cape Mendocino Earthquake.**

Intensity	Latitude	Longitude	Town Name	State
Felt	37.909 N.	122.685 W.	Bolinas	CA
Felt	39.728 N.	121.836 W.	Chico	CA
Felt	40.056 N.	122.149 W.	Gerber	CA
Felt	39.375 N.	122.543 W.	Stonyford	CA
Felt	42.439 N.	123.327 W.	Grants Pass	OR
No Felt	41.487 N.	120.541 W.	Alturas	CA
No Felt	37.426 N.	121.974 W.	Alviso	CA
No Felt	38.076 N.	120.552 W.	Angels Camp	CA
No Felt	38.005 N.	121.804 W.	Antioch	CA
No Felt	36.977 N.	121.898 W.	Aptos	CA
No Felt	39.017 N.	122.056 W.	Arbuckle	CA
No Felt	36.315 N.	119.707 W.	Armona	CA
No Felt	36.888 N.	121.641 W.	Aromas	CA
No Felt	37.346 N.	120.611 W.	Atwater	CA
No Felt	37.080 N.	119.484 W.	Auberry	CA
No Felt	38.896 N.	121.075 W.	Auburn	CA
No Felt	38.566 N.	120.263 W.	Bear River Lake	CA
No Felt	37.520 N.	122.274 W.	Belmont	CA
No Felt	37.089 N.	122.085 W.	Ben Lomond	CA
No Felt	37.871 N.	122.271 W.	Berkeley	CA
No Felt	38.015 N.	121.639 W.	Bethel Island	CA
No Felt	36.270 N.	121.806 W.	Big Sur	CA
No Felt	36.802 N.	120.015 W.	Biola	CA
No Felt	38.313 N.	122.480 W.	Boyes Hot Springs	CA
No Felt	38.255 N.	119.230 W.	Bridgeport	CA
No Felt	37.680 N.	122.398 W.	Brisbane	CA
No Felt	37.584 N.	122.365 W.	Burlingame	CA
No Felt	38.183 N.	120.889 W.	Burson	CA
No Felt	38.578 N.	122.578 W.	Calistoga	CA
No Felt	35.564 N.	121.079 W.	Cambria	CA
No Felt	38.680 N.	121.015 W.	Cameron Park	CA
No Felt	38.738 N.	120.673 W.	Camino	CA
No Felt	37.287 N.	121.948 W.	Campbell	CA
No Felt	37.833 N.	122.164 W.	Canyon	CA
No Felt	36.542 N.	119.832 W.	Caruthers	CA
No Felt	39.363 N.	123.814 W.	Caspar	CA
No Felt	41.529 N.	120.172 W.	Cedarville	CA
No Felt	37.595 N.	120.956 W.	Ceres	CA
No Felt	40.306 N.	121.230 W.	Chester	CA
No Felt	37.123 N.	120.259 W.	Chowchilla	CA
No Felt	36.570 N.	121.517 W.	Chualar	CA
No Felt	38.707 N.	121.280 W.	Citrus Heights	CA
No Felt	38.420 N.	121.526 W.	Clarksburg	CA

**Table 1. The Preliminary Modified Mercalli Intensities for the April 25, 1992,
18 06 04.2 UTC, Cape Mendocino Earthquake.**

Intensity	Latitude	Longitude	Town Name	State
No Felt	38.956 N.	122.646 W.	Clearlake Highlands	CA
No Felt	39.024 N.	122.673 W.	Clearlake Oaks	CA
No Felt	38.967 N.	122.653 W.	Clearlake Park	CA
No Felt	36.825 N.	119.701 W.	Clovis	CA
No Felt	36.139 N.	120.359 W.	Coalinga	CA
No Felt	38.036 N.	120.400 W.	Columbia	CA
No Felt	39.214 N.	122.008 W.	Colusa	CA
No Felt	38.884 N.	121.016 W.	Cool	CA
No Felt	38.331 N.	121.567 W.	Courtland	CA
No Felt	38.052 N.	122.211 W.	Crockett	CA
No Felt	37.393 N.	121.070 W.	Crows Landing	CA
No Felt	36.523 N.	119.285 W.	Cutler	CA
No Felt	37.720 N.	122.463 W.	Daly City	CA
No Felt	37.825 N.	121.879 W.	Danville	CA
No Felt	38.544 N.	121.739 W.	Davis	CA
No Felt	36.659 N.	119.592 W.	Del Rey	CA
No Felt	37.432 N.	120.777 W.	Delhi	CA
No Felt	37.526 N.	120.795 W.	Denair	CA
No Felt	38.694 N.	120.813 W.	Diamond Springs	CA
No Felt	36.543 N.	119.386 W.	Dinuba	CA
No Felt	38.114 N.	120.453 W.	Douglas Flat	CA
No Felt	38.833 N.	120.045 W.	Echo Lake	CA
No Felt	37.915 N.	122.310 W.	El Cerrito	CA
No Felt	38.297 N.	122.490 W.	El Verano	CA
No Felt	39.605 N.	122.538 W.	Elk Creek	CA
No Felt	37.638 N.	120.901 W.	Empire	CA
No Felt	40.563 N.	122.341 W.	Enterprise	CA
No Felt	41.456 N.	122.893 W.	Etna	CA
No Felt	38.644 N.	121.271 W.	Fair Oaks	CA
No Felt	37.987 N.	122.587 W.	Fairfax	CA
No Felt	38.249 N.	122.038 W.	Fairfield	CA
No Felt	36.858 N.	120.455 W.	Firebaugh	CA
No Felt	36.429 N.	120.101 W.	Five Points	CA
No Felt	36.630 N.	119.677 W.	Fowler	CA
No Felt	37.884 N.	121.270 W.	French Camp	CA
No Felt	40.700 N.	122.637 W.	French Gulch	CA
No Felt	36.747 N.	119.771 W.	Fresno	CA
No Felt	38.496 N.	122.768 W.	Fulton	CA
No Felt	38.906 N.	120.837 W.	Georgetown	CA
No Felt	38.707 N.	122.901 W.	Geyserville	CA
No Felt	37.005 N.	121.567 W.	Gilroy	CA
No Felt	38.364 N.	122.523 W.	Glen Ellen	CA
No Felt	39.026 N.	122.731 W.	Glenhaven	CA

**Table 1. The Preliminary Modified Mercalli Intensities for the April 25, 1992,
18 06 04.2 UTC, Cape Mendocino Earthquake.**

Intensity	Latitude	Longitude	Town Name	State
No Felt	39.521 N.	122.012 W.	Glenn	CA
No Felt	36.351 N.	119.419 W.	Goshen	CA
No Felt	38.436 N.	122.868 W.	Graton	CA
No Felt	36.320 N.	121.242 W.	Greenfield	CA
No Felt	40.139 N.	120.950 W.	Greenville	CA
No Felt	39.363 N.	121.692 W.	Gridley	CA
No Felt	37.838 N.	120.231 W.	Groveland	CA
No Felt	38.765 N.	123.526 W.	Gualala	CA
No Felt	37.257 N.	120.997 W.	Gustine	CA
No Felt	38.064 N.	122.505 W.	Hamilton Air Force Base	CA
No Felt	39.742 N.	122.012 W.	Hamilton City	CA
No Felt	36.327 N.	119.644 W.	Hanford	CA
No Felt	37.631 N.	122.089 W.	Hayward	CA
No Felt	38.610 N.	122.868 W.	Healdsburg	CA
No Felt	37.408 N.	120.849 W.	Hilmar	CA
No Felt	38.973 N.	123.115 W.	Hopland	CA
No Felt	37.596 N.	120.865 W.	Hughson	CA
No Felt	38.101 N.	122.855 W.	Inverness	CA
No Felt	38.352 N.	120.931 W.	Ione	CA
No Felt	38.348 N.	120.773 W.	Jackson	CA
No Felt	37.953 N.	120.421 W.	Jamestown	CA
No Felt	37.779 N.	119.074 W.	June Lake	CA
No Felt	38.413 N.	122.545 W.	Kenwood	CA
No Felt	36.723 N.	120.058 W.	Kerman	CA
No Felt	36.008 N.	119.960 W.	Kettleman City	CA
No Felt	37.556 N.	120.914 W.	Keyes	CA
No Felt	36.212 N.	121.125 W.	King City	CA
No Felt	38.702 N.	120.071 W.	Kirkwood	CA
No Felt	37.663 N.	120.462 W.	LaGrange	CA
No Felt	40.905 N.	122.378 W.	Lakehead	CA
No Felt	37.822 N.	121.275 W.	Lathrop	CA
No Felt	36.433 N.	119.685 W.	Laton	CA
No Felt	36.300 N.	119.781 W.	Lemoore	CA
No Felt	38.891 N.	121.291 W.	Lincoln	CA
No Felt	38.021 N.	121.082 W.	Linden	CA
No Felt	37.681 N.	121.766 W.	Livermore	CA
No Felt	37.386 N.	120.722 W.	Livingston	CA
No Felt	38.163 N.	121.148 W.	Lockeford	CA
No Felt	38.821 N.	121.191 W.	Loomis	CA
No Felt	37.226 N.	121.973 W.	Los Gatos	CA
No Felt	38.910 N.	122.609 W.	Lower Lake	CA
No Felt	39.676 N.	120.240 W.	Loyalton	CA
No Felt	39.090 N.	122.795 W.	Lucerne	CA
No Felt	36.961 N.	120.059 W.	Madera	CA

**Table 1. The Preliminary Modified Mercalli Intensities for the April 25, 1992,
18 06 04.2 UTC, Cape Mendocino Earthquake.**

Intensity	Latitude	Longitude	Town Name	State
No Felt	37.648 N.	118.971 W.	Mammoth Lakes	CA
No Felt	37.797 N.	121.215 W.	Manteca	CA
No Felt	40.435 N.	121.868 W.	Manton	CA
No Felt	37.485 N.	119.965 W.	Mariposa	CA
No Felt	38.019 N.	122.133 W.	Martinez	CA
No Felt	39.276 N.	122.190 W.	Maxwell	CA
No Felt	39.001 N.	121.020 W.	Meadow Vista	CA
No Felt	36.753 N.	120.380 W.	Mendota	CA
No Felt	37.453 N.	122.183 W.	Menlo Park	CA
No Felt	37.302 N.	120.481 W.	Merced	CA
No Felt	38.752 N.	122.613 W.	Middletown	CA
No Felt	37.906 N.	122.543 W.	Mill Valley	CA
No Felt	37.598 N.	122.386 W.	Millbrae	CA
No Felt	40.549 N.	122.174 W.	Millville	CA
No Felt	36.692 N.	119.051 W.	Miramonte	CA
No Felt	37.639 N.	120.995 W.	Modesto	CA
No Felt	38.300 N.	120.705 W.	Mokelumne Hill	CA
No Felt	37.542 N.	122.515 W.	Montara	CA
No Felt	37.236 N.	121.991 W.	Monte Serano	CA
No Felt	37.130 N.	121.653 W.	Morgan Hill	CA
No Felt	37.527 N.	122.512 W.	Moss Beach	CA
No Felt	38.556 N.	120.725 W.	Mount Aukum	CA
No Felt	37.051 N.	122.057 W.	Mount Hermon	CA
No Felt	38.137 N.	120.458 W.	Murphys	CA
No Felt	38.297 N.	122.284 W.	Napa	CA
No Felt	37.176 N.	121.819 W.	New Almaden	CA
No Felt	38.874 N.	121.132 W.	Newcastle	CA
No Felt	37.229 N.	119.508 W.	North Fork	CA
No Felt	38.107 N.	122.568 W.	Novato	CA
No Felt	37.328 N.	119.648 W.	Oakhurst	CA
No Felt	37.804 N.	122.269 W.	Oakland	CA
No Felt	38.407 N.	122.947 W.	Occidental	CA
No Felt	39.095 N.	121.551 W.	Olivehurst	CA
No Felt	36.624 N.	119.312 W.	Orange Cove	CA
No Felt	38.678 N.	121.224 W.	Orangevale	CA
No Felt	37.877 N.	122.178 W.	Orinda	CA
No Felt	39.747 N.	122.195 W.	Orland	CA
No Felt	36.544 N.	119.286 W.	Orosi	CA
No Felt	39.513 N.	121.555 W.	Oroville	CA
No Felt	36.620 N.	121.230 W.	Pacific Grove	CA
No Felt	37.593 N.	122.503 W.	Pacifica (San Pedro Valley)	CA
No Felt	36.611 N.	119.526 W.	Parlier	CA
No Felt	35.626 N.	120.690 W.	Paso Robles	CA
No Felt	38.299 N.	122.665 W.	Penngrove	CA

**Table 1. The Preliminary Modified Mercalli Intensities for the April 25, 1992,
18 06 04.2 UTC, Cape Mendocino Earthquake.**

Intensity	Latitude	Longitude	Town Name	State
No Felt	38.232 N.	122.635 W.	Petaluma	CA
No Felt	38.828 N.	122.730 W.	Pine Grove	CA
No Felt	38.004 N.	122.297 W.	Pinole	CA
No Felt	38.028 N.	121.883 W.	Pittsburg	CA
No Felt	37.290 N.	120.317 W.	Planada	CA
No Felt	37.662 N.	121.873 W.	Pleasanton	CA
No Felt	39.810 N.	120.468 W.	Portola	CA
No Felt	38.339 N.	120.516 W.	Rail Road Flat	CA
No Felt	36.602 N.	119.903 W.	Raisin	CA
No Felt	38.589 N.	121.301 W.	Rancho Cordova	CA
No Felt	36.596 N.	119.449 W.	Reedley	CA
No Felt	38.691 N.	121.447 W.	Rio Linda	CA
No Felt	37.741 N.	121.123 W.	Ripon	CA
No Felt	37.736 N.	120.934 W.	Riverbank	CA
No Felt	36.431 N.	119.858 W.	Riverdale	CA
No Felt	38.033 N.	122.265 W.	Rodeo	CA
No Felt	38.752 N.	121.286 W.	Roseville	CA
No Felt	40.794 N.	121.940 W.	Round Mountain	CA
No Felt	38.458 N.	122.421 W.	Rutherford	CA
No Felt	38.505 N.	122.469 W.	Saint Helena	CA
No Felt	37.705 N.	121.083 W.	Salida	CA
No Felt	38.196 N.	120.679 W.	San Andreas	CA
No Felt	37.974 N.	122.560 W.	San Anselmo	CA
No Felt	37.507 N.	122.266 W.	San Carlos	CA
No Felt	36.606 N.	120.188 W.	San Joaquin	CA
No Felt	37.338 N.	121.891 W.	San Jose	CA
No Felt	36.845 N.	121.536 W.	San Juan Bautista	CA
No Felt	37.681 N.	122.123 W.	San Lorenzo	CA
No Felt	37.555 N.	122.308 W.	San Mateo	CA
No Felt	37.973 N.	122.530 W.	San Rafael	CA
No Felt	37.780 N.	121.976 W.	San Ramon	CA
No Felt	35.643 N.	121.189 W.	San Simeon	CA
No Felt	38.440 N.	122.713 W.	Santa Rosa	CA
No Felt	38.402 N.	122.822 W.	Sebastopol	CA
No Felt	36.570 N.	119.611 W.	Selma	CA
No Felt	37.107 N.	119.318 W.	Shaver Lake Heights	CA
No Felt	38.665 N.	120.925 W.	Shingle Springs	CA
No Felt	40.492 N.	121.888 W.	Shingletown	CA
No Felt	38.496 N.	121.190 W.	Sloughhouse	CA
No Felt	36.424 N.	121.325 W.	Soledad	CA
No Felt	38.291 N.	122.456 W.	Sonoma	CA
No Felt	37.984 N.	120.381 W.	Sonora	CA
No Felt	36.988 N.	121.955 W.	Soquel	CA
No Felt	37.654 N.	122.408 W.	South San Francisco	CA

**Table 1. The Preliminary Modified Mercalli Intensities for the April 25, 1992,
18 06 04.2 UTC, Cape Mendocino Earthquake.**

Intensity	Latitude	Longitude	Town Name	State
No Felt	37.900 N.	122.643 W.	Stinson Beach	CA
No Felt	37.957 N.	121.289 W.	Stockton	CA
No Felt	38.238 N.	122.039 W.	Suisun City	CA
No Felt	37.595 N.	121.637 W.	Sunol	CA
No Felt	40.416 N.	120.651 W.	Susanville	CA
No Felt	39.159 N.	121.747 W.	Sutter	CA
No Felt	39.172 N.	120.137 W.	Tahoe City	CA
No Felt	39.130 N.	123.165 W.	Talmage	CA
No Felt	37.739 N.	121.424 W.	Tracy	CA
No Felt	36.648 N.	120.251 W.	Tranquillity	CA
No Felt	39.328 N.	120.182 W.	Truckee	CA
No Felt	37.960 N.	120.236 W.	Tuolumne	CA
No Felt	37.494 N.	120.845 W.	Turlock	CA
No Felt	38.356 N.	121.986 W.	Vacaville	CA
No Felt	38.104 N.	122.255 W.	Vallejo	CA
No Felt	38.138 N.	121.205 W.	Victor	CA
No Felt	38.242 N.	121.510 W.	Walnut Grove	CA
No Felt	37.641 N.	120.759 W.	Waterford	CA
No Felt	36.910 N.	121.755 W.	Watsonville	CA
No Felt	40.306 N.	121.004 W.	Westwood	CA
No Felt	39.009 N.	121.421 W.	Wheatland	CA
No Felt	38.547 N.	122.815 W.	Windsor	CA
No Felt	37.389 N.	120.612 W.	Winton	CA
No Felt	38.154 N.	121.300 W.	Woodbridge	CA
No Felt	38.152 N.	121.242 W.	Woodlake	CA
No Felt	38.678 N.	121.772 W.	Woodland	CA
No Felt	38.401 N.	122.359 W.	Yountville	CA
No Felt	40.205 N.	123.490 W.	Zenia	CA
No Felt	39.473 N.	118.776 W.	Fallon	NV
No Felt	39.608 N.	119.250 W.	Fernley	NV
No Felt	38.941 N.	119.748 W.	Gardnerville	NV
No Felt	38.524 N.	118.623 W.	Hawthorne	NV
No Felt	40.179 N.	118.472 W.	Lovelock	NV
No Felt	39.529 N.	119.812 W.	Reno	NV
No Felt	39.535 N.	119.751 W.	Sparks	NV
No Felt	39.480 N.	119.745 W.	Steamboat	NV
No Felt	39.518 N.	119.987 W.	Verdi	NV
No Felt	39.309 N.	119.648 W.	Virginia City	NV
No Felt	40.973 N.	117.734 W.	Winnemucca	NV
No Felt	38.985 N.	119.161 W.	Yerington	NV
No Felt	45.115 N.	123.206 W.	Amity	OR
No Felt	42.194 N.	122.708 W.	Ashland	OR
No Felt	44.841 N.	122.869 W.	Aumsville	OR
No Felt	45.231 N.	122.754 W.	Aurora	OR

**Table 1. The Preliminary Modified Mercalli Intensities for the April 25, 1992,
18 06 04.2 UTC, Cape Mendocino Earthquake.**

Intensity	Latitude	Longitude	Town Name	State
No Felt	43.119 N.	124.407 W.	Bandon	OR
No Felt	45.288 N.	122.534 W.	Beaver Creek	OR
No Felt	45.487 N.	122.802 W.	Beaverton	OR
No Felt	44.058 N.	121.314 W.	Bend	OR
No Felt	45.430 N.	122.373 W.	Boring	OR
No Felt	44.393 N.	122.983 W.	Brownsville	OR
No Felt	45.263 N.	122.691 W.	Canby	OR
No Felt	42.927 N.	123.280 W.	Canyonville	OR
No Felt	45.294 N.	123.175 W.	Carlton	OR
No Felt	45.407 N.	122.569 W.	Clackamas	OR
No Felt	45.172 N.	122.436 W.	Colton	OR
No Felt	43.368 N.	124.215 W.	Coos Bay	OR
No Felt	43.177 N.	124.186 W.	Coquille	OR
No Felt	45.520 N.	123.058 W.	Cornelius	OR
No Felt	44.564 N.	123.260 W.	Corvallis	OR
No Felt	43.797 N.	123.058 W.	Cottage Grove	OR
No Felt	43.918 N.	123.023 W.	Creswell	OR
No Felt	44.919 N.	123.315 W.	Dallas	OR
No Felt	45.220 N.	123.075 W.	Dayton	OR
No Felt	43.103 N.	123.426 W.	Dillard	OR
No Felt	43.658 N.	123.317 W.	Drain	OR
No Felt	45.278 N.	123.009 W.	Dundee	OR
No Felt	45.289 N.	122.332 W.	Estacada	OR
No Felt	44.052 N.	123.085 W.	Eugene	OR
No Felt	45.538 N.	122.432 W.	Fairview	OR
No Felt	45.520 N.	123.109 W.	Forest Grove	OR
No Felt	43.730 N.	124.109 W.	Gardiner	OR
No Felt	45.436 N.	123.138 W.	Gaston	OR
No Felt	42.407 N.	124.420 W.	Gold Beach	OR
No Felt	45.498 N.	122.430 W.	Gresham	OR
No Felt	44.384 N.	123.108 W.	Halsey	OR
No Felt	44.274 N.	123.169 W.	Harrisburg	OR
No Felt	45.523 N.	122.988 W.	Hillsboro	OR
No Felt	43.564 N.	119.080 W.	Hines	OR
No Felt	44.851 N.	123.185 W.	Independence	OR
No Felt	42.313 N.	122.965 W.	Jacksonville	OR
No Felt	44.719 N.	123.009 W.	Jefferson	OR
No Felt	43.670 N.	121.502 W.	La Pine	OR
No Felt	45.420 N.	122.669 W.	Lake Oswego	OR
No Felt	42.188 N.	120.344 W.	Lakeview	OR
No Felt	44.958 N.	124.016 W.	Lincoln City	OR
No Felt	44.774 N.	122.613 W.	Lyons	OR
No Felt	44.633 N.	121.128 W.	Madras	OR
No Felt	44.031 N.	123.856 W.	Mapleton	OR

**Table 1. The Preliminary Modified Mercalli Intensities for the April 25, 1992,
18 06 04.2 UTC, Cape Mendocino Earthquake.**

Intensity	Latitude	Longitude	Town Name	State
No Felt	45.410 N.	122.700 W.	Marylhurst	OR
No Felt	45.210 N.	123.197 W.	McMinnville	OR
No Felt	42.517 N.	123.418 W.	Merlin	OR
No Felt	42.025 N.	121.599 W.	Merrill	OR
No Felt	44.754 N.	122.476 W.	Mill City	OR
No Felt	44.848 N.	123.232 W.	Monmouth	OR
No Felt	44.314 N.	123.295 W.	Monroe	OR
No Felt	45.068 N.	122.798 W.	Mount Angel	OR
No Felt	45.221 N.	122.580 W.	Mulino	OR
No Felt	43.020 N.	123.291 W.	Myrtle Creek	OR
No Felt	43.065 N.	124.137 W.	Myrtle Point	OR
No Felt	45.300 N.	122.971 W.	Newberg	OR
No Felt	43.406 N.	124.223 W.	North Bend	OR
No Felt	43.746 N.	122.460 W.	Oakridge	OR
No Felt	45.357 N.	122.605 W.	Oregon City	OR
No Felt	44.540 N.	123.366 W.	Philomath	OR
No Felt	42.745 N.	124.496 W.	Port Orford	OR
No Felt	45.523 N.	122.675 W.	Portland	OR
No Felt	44.272 N.	121.172 W.	Redmond	OR
No Felt	42.951 N.	123.363 W.	Riddle	OR
No Felt	42.436 N.	123.170 W.	Rogue River	OR
No Felt	44.943 N.	123.033 W.	Salem	OR
No Felt	45.397 N.	122.260 W.	Sandy	OR
No Felt	44.705 N.	122.848 W.	Scio	OR
No Felt	42.615 N.	122.808 W.	Shady Cove	OR
No Felt	45.099 N.	123.393 W.	Sheridan	OR
No Felt	45.356 N.	122.838 W.	Sherwood	OR
No Felt	45.005 N.	122.781 W.	Silverton	OR
No Felt	44.046 N.	123.020 W.	Springfield	OR
No Felt	44.829 N.	122.793 W.	Sublimity	OR
No Felt	44.397 N.	122.735 W.	Sweet Home	OR
No Felt	44.621 N.	123.937 W.	Toledo	OR
No Felt	45.539 N.	122.386 W.	Troutdale	OR
No Felt	45.384 N.	122.762 W.	Tualatin	OR
No Felt	44.843 N.	122.951 W.	Turner	OR
No Felt	44.048 N.	123.349 W.	Veneta	OR
No Felt	44.426 N.	124.067 W.	Waldport	OR
No Felt	44.763 N.	121.265 W.	Warm Springs	OR
No Felt	45.341 N.	123.186 W.	Yamhill	OR

**Table 2. The Preliminary Modified Mercalli Intensities for the April 26, 1992,
11 18 25.7 UTC, Cape Mendocino Earthquake**

Intensity	Latitude	Longitude	Town Name	State
VIII	40.576 N.	124.262 W.	Ferndale	CA
VII	40.537 N.	124.059 W.	Carlotta	CA
VII	40.598 N.	124.156 W.	Fortuna	CA
VII	40.209 N.	123.784 W.	Phillipsville	CA
VII	40.400 N.	123.948 W.	Redcrest	CA
VI	40.802 N.	124.162 W.	Eureka	CA
VI	40.724 N.	124.213 W.	Fields Landing	CA
VI	40.100 N.	123.793 W.	Garberville	CA
VI	40.641 N.	124.224 W.	Loleta	CA
VI	40.234 N.	123.822 W.	Miranda	CA
VI	40.266 N.	123.869 W.	Myers Flat	CA
VI	40.499 N.	124.105 W.	Rio Dell	CA
V	40.866 N.	124.081 W.	Arcata	CA
V	40.883 N.	123.982 W.	Blue Lake	CA
V	40.469 N.	123.798 W.	Bridgeville	CA
V	39.793 N.	123.246 W.	Covelo	CA
V	41.756 N.	124.200 W.	Crescent City	CA
V	39.445 N.	123.804 W.	Fort Bragg	CA
V	38.501 N.	122.995 W.	Guerneville	CA
V	41.526 N.	124.037 W.	Klamath	CA
V	40.761 N.	123.993 W.	Kneeland	CA
V	39.812 N.	121.577 W.	Magalia	CA
V	39.307 N.	123.798 W.	Mendocino	CA
V	41.286 N.	124.058 W.	Orick	CA
V	40.178 N.	122.234 W.	Red Bluff	CA
V	40.818 N.	124.185 W.	Samoa	CA
V	37.681 N.	122.123 W.	San Lorenzo	CA
V	40.321 N.	123.920 W.	Weott	CA
IV	40.448 N.	122.296 W.	Anderson	CA
IV	36.977 N.	121.898 W.	Aptos	CA
IV	37.584 N.	122.365 W.	Burlingame	CA
IV	39.728 N.	121.836 W.	Chico	CA
IV	40.385 N.	122.279 W.	Cottonwood	CA
IV	40.770 N.	124.141 W.	Cutten	CA
IV	39.716 N.	123.352 W.	Dos Rios	CA
IV	40.650 N.	122.950 W.	Douglas City	CA

**Table 2. The Preliminary Modified Mercalli Intensities for the April 26, 1992,
11 18 25.7 UTC, Cape Mendocino Earthquake**

Intensity	Latitude	Longitude	Town Name	State
IV	37.500 N.	122.470 W.	El Granada	CA
IV	41.456 N.	122.893 W.	Etna	CA
IV	41.251 N.	123.325 W.	Forks of Salmon	CA
IV	38.436 N.	122.868 W.	Graton	CA
IV	38.765 N.	123.526 W.	Gualala	CA
IV	39.742 N.	122.012 W.	Hamilton City	CA
IV	40.547 N.	124.096 W.	Hydesville	CA
IV	41.020 N.	124.100 W.	Little River	CA
IV	40.950 N.	124.100 W.	McKinleyville	CA
IV	40.563 N.	122.237 W.	Palo Cedro	CA
IV	38.232 N.	122.635 W.	Petaluma	CA
IV	40.586 N.	122.390 W.	Redding	CA
IV	39.265 N.	123.203 W.	Redwood Valley	CA
IV	37.775 N.	122.418 W.	San Francisco	CA
IV	41.066 N.	122.691 W.	Trinity Center	CA
IV	39.164 N.	122.909 W.	Upper Lake	CA
IV	41.422 N.	122.385 W.	Weed	CA
IV	39.409 N.	123.354 W.	Willits	CA
IV	43.368 N.	124.215 W.	Coos Bay	OR
III	37.764 N.	122.240 W.	Alameda	CA
III	40.680 N.	122.370 W.	Central Valley	CA
III	38.805 N.	123.016 W.	Cloverdale	CA
III	39.927 N.	122.178 W.	Coming	CA
III	39.646 N.	121.798 W.	Durham	CA
III	37.987 N.	122.587 W.	Fairfax	CA
III	39.004 N.	122.874 W.	Finley	CA
III	41.607 N.	122.839 W.	Fort Jones	CA
III	39.363 N.	121.692 W.	Gridley	CA
III	38.978 N.	122.838 W.	Kelseyville	CA
III	40.549 N.	122.174 W.	Millville	CA
III	41.728 N.	122.526 W.	Montague	CA
III	36.600 N.	121.893 W.	Monterey	CA
III	41.310 N.	122.309 W.	Mount Shasta	CA
III	39.513 N.	121.555 W.	Oroville	CA
III	40.360 N.	122.890 W.	Platina	CA
III	38.505 N.	122.469 W.	Saint Helena	CA
III	37.974 N.	122.560 W.	San Anselmo	CA
III	37.507 N.	122.266 W.	San Carlos	CA
III	41.300 N.	123.133 W.	Sawyers Bar	CA
III	36.988 N.	121.955 W.	Soquel	CA

**Table 2. The Preliminary Modified Mercalli Intensities for the April 26, 1992,
11 18 25.7 UTC, Cape Mendocino Earthquake**

Intensity	Latitude	Longitude	Town Name	State
III	39.163 N.	119.766 W.	Carson City	NV
III	42.052 N.	124.282 W.	Brookings	OR
II	40.680 N.	122.350 W.	Project City	CA
II	42.439 N.	123.327 W.	Grants Pass	OR
No Felt	41.487 N.	120.541 W.	Alturas	CA
No Felt	38.575 N.	122.448 W.	Angwin	CA
No Felt	38.005 N.	121.804 W.	Antioch	CA
No Felt	39.017 N.	122.056 W.	Arbuckle	CA
No Felt	37.346 N.	120.611 W.	Atwater	CA
No Felt	38.896 N.	121.075 W.	Auburn	CA
No Felt	37.520 N.	122.274 W.	Belmont	CA
No Felt	38.049 N.	122.157 W.	Benicia	CA
No Felt	37.871 N.	122.271 W.	Berkeley	CA
No Felt	37.680 N.	122.398 W.	Brisbane	CA
No Felt	40.882 N.	121.659 W.	Burney	CA
No Felt	37.287 N.	121.948 W.	Campbell	CA
No Felt	38.617 N.	121.327 W.	Carmichael	CA
No Felt	37.595 N.	120.956 W.	Ceres	CA
No Felt	38.707 N.	121.280 W.	Citrus Heights	CA
No Felt	38.956 N.	122.646 W.	Clearlake Highlands	CA
No Felt	39.024 N.	122.673 W.	Clearlake Oaks	CA
No Felt	36.825 N.	119.701 W.	Clovis	CA
No Felt	36.139 N.	120.359 W.	Coalinga	CA
No Felt	39.214 N.	122.008 W.	Colusa	CA
No Felt	37.978 N.	122.030 W.	Concord	CA
No Felt	37.720 N.	122.463 W.	Daly City	CA
No Felt	38.544 N.	121.739 W.	Davis	CA
No Felt	38.323 N.	121.821 W.	Dixon	CA
No Felt	37.915 N.	122.310 W.	El Cerrito	CA
No Felt	38.408 N.	121.370 W.	Elk Grove	CA
No Felt	38.644 N.	121.271 W.	Fair Oaks	CA
No Felt	38.249 N.	122.038 W.	Fairfield	CA
No Felt	38.678 N.	121.175 W.	Folsom	CA
No Felt	37.548 N.	121.987 W.	Fremont	CA
No Felt	36.747 N.	119.771 W.	Fresno	CA
No Felt	38.496 N.	122.768 W.	Fulton	CA
No Felt	38.254 N.	121.298 W.	Galt	CA
No Felt	38.707 N.	122.901 W.	Geyserville	CA
No Felt	39.219 N.	121.060 W.	Grass Valley	CA
No Felt	41.793 N.	123.378 W.	Happy Camp	CA
No Felt	37.631 N.	122.089 W.	Hayward	CA
No Felt	38.610 N.	122.868 W.	Healdsburg	CA
No Felt	38.348 N.	120.773 W.	Jackson	CA

**Table 2. The Preliminary Modified Mercalli Intensities for the April 26, 1992,
11 18 25.7 UTC, Cape Mendocino Earthquake**

Intensity	Latitude	Longitude	Town Name	State
No Felt	36.723 N.	120.058 W.	Kerman	CA
No Felt	36.212 N.	121.125 W.	King City	CA
No Felt	38.702 N.	120.071 W.	Kirkwood	CA
No Felt	37.822 N.	121.275 W.	Lathrop	CA
No Felt	37.681 N.	121.766 W.	Livermore	CA
No Felt	37.386 N.	120.722 W.	Livingston	CA
No Felt	37.058 N.	120.848 W.	Los Banos	CA
No Felt	37.226 N.	121.973 W.	Los Gatos	CA
No Felt	39.090 N.	122.795 W.	Lucerne	CA
No Felt	36.961 N.	120.059 W.	Madera	CA
No Felt	37.648 N.	118.971 W.	Mammoth Lakes	CA
No Felt	37.797 N.	121.215 W.	Manteca	CA
No Felt	38.019 N.	122.133 W.	Martinez	CA
No Felt	39.145 N.	121.590 W.	Marysville	CA
No Felt	39.276 N.	122.190 W.	Maxwell	CA
No Felt	37.453 N.	122.183 W.	Menlo Park	CA
No Felt	37.302 N.	120.481 W.	Merced	CA
No Felt	38.752 N.	122.613 W.	Middletown	CA
No Felt	37.639 N.	120.995 W.	Modesto	CA
No Felt	37.130 N.	121.653 W.	Morgan Hill	CA
No Felt	38.297 N.	122.284 W.	Napa	CA
No Felt	39.123 N.	122.847 W.	Nice	CA
No Felt	38.107 N.	122.568 W.	Novato	CA
No Felt	37.804 N.	122.269 W.	Oakland	CA
No Felt	38.407 N.	122.947 W.	Occidental	CA
No Felt	38.678 N.	121.224 W.	Orangevale	CA
No Felt	37.877 N.	122.178 W.	Orinda	CA
No Felt	37.593 N.	122.503 W.	Pacifica (San Pedro Valley)	CA
No Felt	37.471 N.	121.128 W.	Patterson	CA
No Felt	38.828 N.	122.730 W.	Pine Grove	CA
No Felt	38.004 N.	122.297 W.	Pinole	CA
No Felt	38.028 N.	121.883 W.	Pittsburg	CA
No Felt	37.662 N.	121.873 W.	Pleasanton	CA
No Felt	38.589 N.	121.301 W.	Rancho Cordova	CA
No Felt	36.596 N.	119.449 W.	Reedley	CA
No Felt	38.691 N.	121.447 W.	Rio Linda	CA
No Felt	38.155 N.	121.690 W.	Rio Vista	CA
No Felt	37.741 N.	121.123 W.	Ripon	CA
No Felt	38.790 N.	121.234 W.	Rocklin	CA
No Felt	38.752 N.	121.286 W.	Roseville	CA
No Felt	38.581 N.	121.493 W.	Sacramento	CA
No Felt	37.338 N.	121.891 W.	San Jose	CA
No Felt	37.555 N.	122.308 W.	San Mateo	CA

**Table 2. The Preliminary Modified Mercalli Intensities for the April 26, 1992,
11 18 25.7 UTC, Cape Mendocino Earthquake**

Intensity	Latitude	Longitude	Town Name	State
No Felt	37.780 N.	121.976 W.	San Ramon	CA
No Felt	38.440 N.	122.713 W.	Santa Rosa	CA
No Felt	37.259 N.	122.033 W.	Saratoga	CA
No Felt	40.482 N.	124.099 W.	Scotia	CA
No Felt	38.402 N.	122.822 W.	Sebastopol	CA
No Felt	36.570 N.	119.611 W.	Selma	CA
No Felt	36.424 N.	121.325 W.	Soledad	CA
No Felt	37.984 N.	120.381 W.	Sonora	CA
No Felt	37.957 N.	121.289 W.	Stockton	CA
No Felt	38.238 N.	122.039 W.	Suisun City	CA
No Felt	40.416 N.	120.651 W.	Susanville	CA
No Felt	39.172 N.	120.137 W.	Tahoe City	CA
No Felt	39.130 N.	123.165 W.	Talmage	CA
No Felt	38.703 N.	123.425 W.	The Sea Ranch	CA
No Felt	37.739 N.	121.424 W.	Tracy	CA
No Felt	39.328 N.	120.182 W.	Truckee	CA
No Felt	37.494 N.	120.845 W.	Turlock	CA
No Felt	38.356 N.	121.986 W.	Vacaville	CA
No Felt	38.104 N.	122.255 W.	Vallejo	CA
No Felt	36.910 N.	121.755 W.	Watsonville	CA
No Felt	40.731 N.	122.940 W.	Weaverville	CA
No Felt	38.580 N.	121.529 W.	West Sacramento	CA
No Felt	39.524 N.	122.192 W.	Willows	CA
No Felt	38.547 N.	122.815 W.	Windsor	CA
No Felt	38.678 N.	121.772 W.	Woodland	CA
No Felt	39.473 N.	118.776 W.	Fallon	NV
No Felt	38.524 N.	118.623 W.	Hawthorne	NV
No Felt	39.529 N.	119.812 W.	Reno	NV
No Felt	39.535 N.	119.751 W.	Sparks	NV
No Felt	40.973 N.	117.734 W.	Winnemucca	NV
No Felt	38.985 N.	119.161 W.	Yerington	NV
No Felt	42.194 N.	122.708 W.	Ashland	OR
No Felt	43.119 N.	124.407 W.	Bandon	OR
No Felt	45.487 N.	122.802 W.	Beaverton	OR
No Felt	44.058 N.	121.314 W.	Bend	OR
No Felt	45.263 N.	122.691 W.	Canby	OR
No Felt	45.407 N.	122.569 W.	Clackamas	OR
No Felt	43.177 N.	124.186 W.	Coquille	OR
No Felt	44.564 N.	123.260 W.	Corvallis	OR
No Felt	43.797 N.	123.058 W.	Cottage Grove	OR
No Felt	44.919 N.	123.315 W.	Dallas	OR
No Felt	44.052 N.	123.085 W.	Eugene	OR
No Felt	43.982 N.	124.098 W.	Florence	OR
No Felt	45.520 N.	123.109 W.	Forest Grove	OR

**Table 2. The Preliminary Modified Mercalli Intensities for the April 26, 1992,
11 18 25.7 UTC, Cape Mendocino Earthquake**

Intensity	Latitude	Longitude	Town Name	State
No Felt	42.407 N.	124.420 W.	Gold Beach	OR
No Felt	45.498 N.	122.430 W.	Gresham	OR
No Felt	45.523 N.	122.988 W.	Hillsboro	OR
No Felt	42.313 N.	122.965 W.	Jacksonville	OR
No Felt	45.420 N.	122.669 W.	Lake Oswego	OR
No Felt	42.188 N.	120.344 W.	Lakeview	OR
No Felt	44.958 N.	124.016 W.	Lincoln City	OR
No Felt	44.633 N.	121.128 W.	Madras	OR
No Felt	42.517 N.	123.418 W.	Merlin	OR
No Felt	44.848 N.	123.232 W.	Monmouth	OR
No Felt	43.020 N.	123.291 W.	Myrtle Creek	OR
No Felt	45.300 N.	122.971 W.	Newberg	OR
No Felt	45.357 N.	122.605 W.	Oregon City	OR
No Felt	42.275 N.	122.816 W.	Phoenix	OR
No Felt	45.523 N.	122.675 W.	Portland	OR
No Felt	44.272 N.	121.172 W.	Redmond	OR
No Felt	42.436 N.	123.170 W.	Rogue River	OR
No Felt	45.397 N.	122.260 W.	Sandy	OR
No Felt	45.005 N.	122.781 W.	Silverton	OR
No Felt	44.046 N.	123.020 W.	Springfield	OR
No Felt	44.397 N.	122.735 W.	Sweet Home	OR
No Felt	45.365 N.	122.611 W.	West Linn	OR
No Felt	45.587 N.	122.398 W.	Camas	WA
No Felt	45.638 N.	122.660 W.	Vancouver	WA

Cited References

Wood, Harry O., and Neumann, Frank, 1931, Modified Mercalli intensity scale of 1931, Bulletin of the Seismological Society of America, v. 21, no. 4, p. 277–283.

Appendix A

Modified Mercalli Intensity Scale of 1931

Adapted from Sieberg's Mercalli-Cancani scale, modified and condensed.

I— Not felt—or, except rarely under especially favorable circumstances. Under certain conditions, at and outside the boundary of the area in which a great shock is felt: sometimes birds, animals, reported uneasy or disturbed; sometimes dizziness or nausea experienced; sometimes trees, structures, liquids, bodies of water, may sway—doors may swing, very, slowly.

II— Felt indoors by few, especially on upper floors, or by sensitive, or nervous persons. Also, as in grade I, but often more noticeably: sometimes hanging objects may swing, especially when delicately suspended; sometimes trees, structures, liquids, bodies of water, may sway, doors may swing, very slowly; sometimes birds, animals, reported uneasy or disturbed; sometimes dizziness or nausea experienced.

III— Felt indoors by several, motion usually rapid vibration. Sometimes not recognized to be an earthquake at first. Duration estimated in some cases. Vibration like that due to passing of light, or lightly loaded trucks, or heavy trucks some distance away. Hanging objects may swing slightly. Movements may be appreciable on upper levels of tall structures. Rocked standing motor cars slightly.

IV— Felt indoors by many, outdoors by few. Awakened few, especially light sleepers. Frightened no one, unless apprehensive from previous experience. Vibration like that due to passing of heavy or heavily loaded trucks. Sensation like heavy body striking building or falling of heavy objects inside. Rattling of dishes, windows, doors; glassware and crockery clink and clash. Creaking of walls, frame, especially in the upper range of this grade. Hanging objects swung in numerous instances. Disturbed liquids in open vessels slightly. Rocked standing motor cars noticeably.

V— Felt indoors by practically all, outdoors by many or most: outdoors direction estimated. Awakened many, or most. Frightened few—slight excitement, a few ran outdoors. Buildings trembled throughout. Broke dishes, glassware, to some extent. Cracked windows—in some cases, but not generally. Overturned vases, small or unstable objects, in many instances, with occasional fall. Hanging objects, doors, swing generally or considerably. Knocked pictures against walls, or swung them out of place. Opened, or closed, doors, shutters, abruptly. Pendulum clocks stopped, started or ran fast, or slow. Moved small objects, furnishings, the latter to slight extent. Spilled liquids in small amounts from well-filled open containers. Trees, bushes, shaken slightly.

VI— Felt by all, indoors and outdoors. Frightened many, excitement general, some alarm, many ran outdoors. Awakened all. Persons made to move unsteadily. Trees, bushes, shaken slightly to moderately. Liquid set in strong motion. Small bells rang—church, chapel, school, etc. Damage slight in poorly built buildings. Fall of plaster in small amount. Cracked plaster somewhat, especial-

ly fine cracks in chimneys in some instances. Broke dishes, glassware, in considerable quantity, also some windows. Fall of knickknacks, books, pictures. Overtured furniture in many instances. Moved furnishings of moderately heavy kind.

VII— Frightened all—general alarm, all ran outdoors. Some, or many, found it difficult to stand. Noticed by persons driving motor cars. Trees and bushes shaken moderately to strongly. Waves on ponds, lakes, and running water. Water turbid from mud stirred up. Incaving to some extent of sand or gravel stream banks. Rang large church bells, etc. Suspended objects made to quiver. Damage negligible in buildings of good design and construction, slight to moderate in well-built ordinary buildings, considerable in poorly built or badly designed buildings, adobe houses, old walls (especially where laid up without mortar), spires, etc. Cracked chimneys to considerable extent, walls to some extent. Fall of plaster in considerable to large amount, also some stucco. Broke numerous windows, furniture to some extent. Shook down loosened brickwork and tiles. Broke weak chimneys at the roofline (sometimes damaging roofs). Fall of cornices from towers and high buildings. Dislodged bricks and stones. Overtured heavy furniture, with damage from breaking. Damage considerable to concrete irrigation ditches.

VIII— Fright general—alarm approaches panic. Disturbed persons driving motor cars. Trees shaken strongly—branches, trunks, broken off, especially palm trees. Ejected sand and mud in small amounts. Changes: temporary, permanent; in flow of springs and wells; dry wells renewed flow; in temperature of spring and well waters. Damage slight in structures (brick) built especially to withstand earthquakes. Considerable in ordinary substantial buildings, partial collapse: racked, tumbled down, wooden houses in some cases; threw out panel walls in frame structures, broke off decayed piling. Fall of walls. Cracked, broke, solid stone walls seriously. Wet ground to some extent, also ground on steep slopes. Twisting, fall, of chimneys, columns, monuments, also factory stacks, towers. Moved conspicuously, overtured, very heavy furniture.

IX— Panic general. Cracked ground conspicuously. Damage considerable in (masonry) structures built especially to withstand earthquakes: Threw out of plumb some wood-frame houses built especially to withstand earthquakes; great in substantial (masonry) buildings, some collapse in large part; or wholly shifted frame buildings off foundations, racked frames; serious to reservoirs; underground pipes sometimes broken.

X— Cracked ground, especially when loose and wet, up to widths of several inches; fissures up to a yard in width ran parallel to canal and stream banks. Landslides considerable from river banks and steep coasts. Shifted sand and mud horizontally on beaches and flat land. Changed level of water in wells. Threw water on banks of canals, lakes, rivers, etc. Damage serious to dams, dikes, embankments. Severe to well-built wooden structures and bridges, some destroyed. Developed dangerous cracks in excellent brick walls. Destroyed most masonry and frame structures, also their foundations. Bent railroad rails slightly. Tore apart, or crushed endwise, pipe lines buried in earth. Open cracks and broad wavy folds in cement pavements and asphalt road surfaces.

XI— Disturbances in ground many and widespread varying with ground material. Broad fissures, earth slumps, and land slips in soft, wet ground. Ejected water in large amounts charged with

sand and mud. Caused sea-waves ("tidal" waves) of significant magnitude. Damage severe to wood frame structures, especially near shock centers. Great to dams, dikes, embankments often for long distances. Few, if any (masonry) structures remained standing. Destroyed large well-built bridges by the wrecking of supporting piers, or pillars. Affected yielding wooden bridges less. Bent railroad rails greatly, and thrust them endwise. Put pipe lines buried in earth completely out of service.

XII— Damage total—practically all works of construction damaged greatly or destroyed. Disturbances in ground great and varied, numerous shearing cracks. Landslides, falls of rock of significant character, slumping of river banks, etc., numerous and extensive. Wrenched loose, tore off, large rock masses. Fault slips in firm rock, with notable horizontal and vertical offset displacements. Water channels, surface and underground, disturbed and modified greatly. Dammed lakes, produced waterfalls, deflected rivers, etc. Waves seen on ground surfaces (actually seen, probably, in some cases). Distorted lines of sight.