

USGS Real-Time Earthquake Information Products: PAGER

Napa, California: 1 killed; Loss ≥ \$500M

USGS Earthquake Shaking **Orange Alert**

M 6.0, 6.7 km (4.2 mi) NW of American Canyon, CA
Origin Time: Sun 2014-08-24 10:20:44 UTC (03:20:44 local)
Location: 38.21°N 122.32°W Depth: 10 km

USAID FROM THE AMERICAN PEOPLE
PAGER Version 4
Created: 33 minutes, 25 seconds after earthquake

Estimated Fatalities
Orange alert level for economic losses. Significant damage is likely and the disaster is potentially widespread. Estimated economic losses are less than 1% of GDP of the United States. Past events with this alert level have required a regional or national level response.
Green alert level for shaking-related fatalities. There is a low likelihood of casualties.

Estimated Economic Losses

Estimated Population Exposed to Earthquake Shaking

ESTIMATED POPULATION EXPOSURE (k = x1000)	ESTIMATED MODIFIED MERCALLI INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+
1,521k*	6,255k*	736k	180k	106k	15k	0	0			
PERCEIVED SHAKING		Not felt	Weak	Light	Moderate	Strong	Very Strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	Resistant Structures	none	none	none	V. Light	Light	Moderate	Moderate/Heavy	Heavy	V. Heavy
	Vulnerable Structures	none	none	none	Light	Moderate	Moderate/Heavy	Heavy	V. Heavy	V. Heavy

Population Exposure
Estimated exposure only includes population within the map area.

Structures:
Overall, the population in this region resides in structures that are highly resistant to earthquake shaking, though some vulnerable structures exist.

Historical Earthquakes (with MMI levels):

Date (UTC)	Dist. (km)	Mag.	Max Shaking (MMI#)	Deaths
1983-05-02	284	5.7	VIII(1k)	0
1980-01-24	76	5.8	VIII(31k)	1
1989-10-18	132	6.9	IX(3k)	62

Recent earthquakes in this area have caused secondary hazards such as landslides and liquefaction that might have contributed to losses.

Selected City Exposure
from GeoNames.org

MMI City	Population
VII Napa	77k
VII American Canyon	19k
VI Sonoma	11k
VI Vallejo	116k
VI Yountville	3k
VI El Verano	4k
IV Sacramento	466k
IV Stockton	292k
IV San Francisco	805k
IV Oakland	391k
III Fremont	214k

bold cities appear on map (k = x1000)
Event ID: nc72282711

PAGER content is automatically generated, and only considers losses due to structural damage. Limitations of input data, shaking estimates, and loss models may add uncertainty. <http://earthquake.usgs.gov/pager>

"OnePAGER" Content for News Reporting

Prompt Assessment of Global Earthquakes for Response

Background

PAGER provides shaking and loss estimates following significant earthquakes anywhere in the world. These estimates are generally available within 30 minutes and are updated as more information becomes available. Rapid estimates include the number of people and names of cities exposed to each shaking intensity level as well as the likely ranges of fatalities and economic losses. PAGER does not consider secondary effects such as landslides, liquefaction, and tsunami in loss estimates at this time. For tsunami warnings see <http://tsunami.gov/>.

Information on the extent of shaking will be uncertain in the minutes and hours following an earthquake and typically improves as additional sensor data and reported intensities are acquired and incorporated into models of the earthquake's source. Users of PAGER need to account for uncertainty and always seek the most current PAGER release for any earthquake.

PAGER alerts are available in a one-page summary and Web pages with extended content at <http://earthquake.usgs.gov/pager/>.

- A** Summary of the basic earthquake parameters, including origin time, local time, magnitude, hypocenter, and the name of the region where the earthquake took place. For events with high likelihood of a tsunami, a link to the NOAA tsunami Web page is provided (bold red text).
- B** Earthquake Impact Scale summary alert level. The higher of the two alert levels (D) is shown as the summary alert at the top-center of the page.
- C** The version of the PAGER alert and the time the alert was created. New versions of the alert are generated when the earthquake information is improved as supplemental ground-shaking constraints become available.
- D** Earthquake Impact Scale alert levels for fatalities (left) and economic losses (right). The alert levels are based on the range of most likely losses due to earthquake shaking; the uncertainty in the alert level can be gauged by the histogram, depicting the percent likelihood that adjacent alert levels (or fatality/loss ranges) occur. Accompanying text clarifies the nature of the alert based on experience from past earthquakes. If the economic alert is yellow or greater, the text will also give a range of economic losses in terms of the country's Gross Domestic Product. The higher level of the two alerts is shown as the summary alert at the top-center of the page (B).
- E** Table showing population exposed to different estimated Modified Mercalli Intensity (MMI) levels and the possible damage at different intensity levels for resistant and vulnerable structures. MMI describes the severity of an earthquake in terms of its effect on humans and structures and is a rough measure of the amount of shaking at a given location. Unlike earthquake magnitude, intensity varies with distance from the fault. Population outside the map bounds are not included in the totals.
- F** Map of MMI contours plotted over the Landscan (Oak Ridge National Laboratory) population base map. The regions labeled with Roman numeral MMI values are separated by half intensity unit contour lines, e.g., 5.5, 6.5, 7.5. The total population exposure to a given MMI value is obtained by summing the population between the contour lines. This total is shown in the population exposure table (E).
- G** Region-specific structure and earthquake commentary. The Structures comment may contain the most vulnerable building type(s) in the region or a general description of the vulnerability of the buildings in the region. The Historical Earthquakes section includes a table of population exposure and fatalities for three previous nearby earthquakes, and, in some cases, the potential for fires, landslides, liquefaction, or other hazards, based on past earthquakes in the region, will be noted.
- H** Table of MMI estimates for selected settlements. A maximum of 11 settlements that fall within the map boundary are included in the table. The table contains country capitals and the six settlements with the highest estimated intensity. The remaining settlements listed are selected by population. Settlement name, location, and population are obtained from the freely-available GeoNames geographical database (GeoNames.org).
- I** Footer, including a link to the PAGER Web page, the event-identification number, and a disclaimer noting that the content was automatically generated and has additional sources of uncertainty. All possible uncertainties are not considered in the determination of estimated earthquake fatalities and economic losses; the actual impact of the earthquake may differ from PAGER's automatically generated estimate.

L'Aquila, Italy: 308 killed; Loss ≥ \$16B

USGS Earthquake Shaking **Red Alert**

M 6.3, L'Aquila, Italy
Origin Time: Mon 2009-04-06 01:32:39 UTC (02:25:58 local)
Location: 42.33°N 13.33°E Depth: 8 km

USAID FROM THE AMERICAN PEOPLE
PAGER Version 1
Created: 20 minutes, 0 seconds after earthquake

Estimated Fatalities
Red alert level for economic losses. Extensive damage is probable and the disaster is likely widespread. Estimated economic losses are less than 1% of GDP of Italy. Past events with this alert level have required a national or international level response.
Orange alert level for shaking-related fatalities. Significant casualties are likely.

Estimated Economic Losses

Estimated Population Exposed to Earthquake Shaking

ESTIMATED POPULATION EXPOSURE (k = x1000)	ESTIMATED MODIFIED MERCALLI INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+
670k*	8,801k*	3,659k	129k	26k	45k	0	0			
PERCEIVED SHAKING		Not felt	Weak	Light	Moderate	Strong	Very Strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	Resistant Structures	none	none	none	V. Light	Light	Moderate	Moderate/Heavy	Heavy	V. Heavy
	Vulnerable Structures	none	none	none	Light	Moderate	Moderate/Heavy	Heavy	V. Heavy	V. Heavy

Population Exposure
Estimated exposure only includes population within the map area.

Structures:
Overall, the population in this region resides in structures that are a mix of vulnerable and earthquake resistant construction. The predominant vulnerable building types are unreinforced brick masonry with mud and mid-rise concrete frame with masonry infill construction.

Historical Earthquakes (with MMI levels):

Date (UTC)	Dist. (km)	Mag.	Max Shaking (MMI#)	Deaths
1990-05-05	279	5.8	VIII(11k)	2
1997-09-26	89	5.7	VIII(2k)	14
1980-11-23	237	6.9	IX(37k)	2483

Recent earthquakes in this area have caused secondary hazards such as landslides that might have contributed to losses.

Selected City Exposure
from GeoNames.org

MMI City	Population
VIII L'Aquila	69k
VII San Panfilo d'Ocre	<1k
VII Ocre	<1k
VII Fossa	<1k
VII Sant'Eusanio F.	<1k
VII Villagrande	3k
V Roma	2,563k
V Campobasso	51k
IV Vatican City	<1k
IV Ancona	101k
IV Perugia	149k

bold cities appear on map (k = x1000)
Event ID: us20090406013239

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