

TSUNAMI

HOW TO SURVIVE THE HAZARDS ON CALIFORNIA'S COAST

WHAT IS A TSUNAMI?

A tsunami is a series of sea waves generated by an undersea disturbance such as an earthquake or an underwater landslide. From the area of disturbance, the waves will travel outward in all directions, much like ripples caused by throwing a rock into a pond. The time between wave crests may be from five to 90 minutes, and the wave speed in the open ocean will average 450 miles per hour. Tsunamis reaching heights of more than 100 feet have been recorded. As the waves approach the shallow coastal waters, they appear normal and the speed decreases. Then, as the tsunami nears the coastline, it may grow to great height and smash into the shore causing extensive destruction.



Two kinds of tsunamis could affect the coastal area of California:

- **Locally generated tsunami:** If a large earthquake displaces the sea floor near our coast, the first waves may reach the coast within minutes after the ground stops shaking. There is no time for authorities to issue a warning. People on the beach or in low coastal areas need to be prepared to move to higher ground as soon as they are able, and stay there until they are told by an official source that the danger has passed.
- **Distant-source tsunami:** Tsunami waves may also be generated by large earthquakes in other areas of the Pacific Ocean reaching our coastline many hours after the earthquake occurred. Tsunami warning centers are responsible for alerting local officials, who may order evacuation. If you are in an isolated area, you may not hear official evacuation announcements. You notice a sudden drop or rise in sea level, nature may be warning you of impending danger. Move inland or to higher ground immediately.
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Hueneme Beach coastline and Hueneme Pier

CALIFORNIA'S TSUNAMI RISK

Since 1812, California has experienced 14 tsunamis with wave heights greater than three feet. Six of these were destructive. The worst resulted from the 1964 Alaskan earthquake and caused 12 deaths and at least \$17 million in damages in California.

The 1992 Cape Mendocino earthquake produced a tsunami that reached tide gauges at Humboldt Bay about 20 minutes after the shaking with wave heights of about one foot. Although not damaging, this tsunami demonstrated that locally generated tsunamis are possible in California and can reach the coastline very quickly.

Recent studies have tsunamis deposits at coastal sites along the Pacific dating from about 300 years ago. Evidence suggests that very large earthquakes capable of producing local tsunamis recur every two to three hundred years.

REMEMBER:

- **Never go to the coast to watch for a tsunami** if you hear that a warning has been issued. Tsunamis move faster than a person can run. Any incoming traffic in the coastal area hampers safe and timely evacuation.
- **Tsunamis are not surfable.** They are not V-shaped or curling waves. Large tsunamis most frequently come onshore as a rapidly rising turbulent surge of water choked with debris.
- **All tsunamis are potentially dangerous,** though they may not damage every coastline they strike.
- **Our coastlines are vulnerable.** Understand the hazard and learn how to protect yourself.

WHAT CAN I DO TO PROTECT MY FAMILY AND MYSELF?

- **Find out if your home is in a danger area.** Know the height of your street above sea level and the distance of your street from the coast. Evacuation orders may be based on these numbers.
- **Make a disaster plan beforehand.** Know where to go to survive a tsunami. Pick an inland location that is elevated. After an earthquake or other natural disaster, roads in and out of the vicinity may be blocked, so pick more than one evacuation route and be prepared to walk.
- **Assemble a portable disaster supply kit.** Have a kit available at home, in your car, and at work. Put your kit in a backpack and leave it in an easy to reach location.
- **Teach family members** how and when to turn off gas, electricity, and water. Know which radio stations to listen to for official information. Hold earthquake/tsunami drills at home and at work.
- **Ask an out-of-state relative or friend to serve as the family “contact.”** After a disaster, it's often easier to call long distance. Make sure everyone knows the name, address, and phone number of the contact person.
- **Take a first aid class.** Learn survival skills, talk with your family, friends, and neighbors. Knowledge is your greatest defense against any potential disaster.
- **Be familiar with the tsunami warning signs.** People living along the coast should consider a coastal earthquake (5.0 or greater) or a sizable rumbling as a warning signal. A noticeable or rapid rise or fall in coastal waters is also a sign that a tsunami is approaching.
- **Count the seconds of shaking during an earthquake.** Twenty to 30 seconds of severe shaking is a warning sign that a tsunami may follow. Don't wait for officials to issue a warning. Evacuate immediately to higher ground.
- **Listen to your local EAS station** for information on location of epicenter, magnitude of WHEN

WHEN AND WHERE DO TSUNAMIS OCCUR?

Tsunamis can occur at any time of day or night, under any and all weather conditions and throughout the year. Beaches open to the ocean, bay mouths of tidal flats, and the shores of large coastal rivers are in the greatest danger of tsunamis.

WHAT IS A LOW-LYING AREA AND HOW HIGH IS HIGH GROUND?

Typical peak wave heights from large tsunamis in the Pacific Ocean over the last eighty years have been between 21 and 45 feet at the shoreline. A few waves, however, have been locally higher—as much as 100 feet in a few isolated locations. The best general advice is:

- Go to an area 100 feet above sea level, if possible or go up to two miles inland, away from the coastline. If you cannot get this high or far, as high as you can. Every foot inland, or upwards may make a difference.
- Go on foot if at all possible because of traffic, damage to roads, downed power lines and other earthquake debris.

- If evacuation is impossible, the third floor or higher of a reinforced concrete building may offer protection, but such a building should only be used as a last resort.



WHO GIVES TSUNAMI WARNINGS?

The Alaska Tsunami Warning Center is responsible for issuing warnings about potential tsunamis along the West Coast of the United States. Bulletins are typically issued within 10-15 minutes of a large undersea earthquake in the Pacific Basin. The information is transmitted to state and local emergency managers; they decide whether or not to order an evacuation.

YOUR EMERGENCY ALERT SYSTEM (EAS) STATIONS ARE:

**KVEN 1450 AM
KHAY 100.7 FM**

STANDARD TSUNAMI SIGNAGE



FOR FURTHER INFORMATION

Contact:
The Port Hueneme Police Department
Commander Jerry Beck
805-986-6534



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