

tsunami (soo-NAH-mee)

The word “tsunami” is a Japanese word meaning “harbor wave”. Tsunamis (often erroneously called tidal waves) are an infrequent yet serious hazard in the Pacific. A tsunami is a series of traveling ocean waves of great length and long period, generated by disturbances associated with earthquakes in oceanic and coastal regions. As the tsunami crosses the deep ocean, its length from crest to crest may be a hundred miles or more. Its height from trough to crest may only be only a few feet. It cannot be felt aboard ships in deep water, and cannot be seen from the air. In deep water, tsunami waves may reach speeds exceeding 600 miles per hour.

As the tsunami enters the shoaling water of coastlines in its path, velocity diminishes and wave height increases. It is in these shallow waters that tsunamis become a threat to life and property, for they can reach heights of more than 100 feet, and strike with devastating force.

Warning System

The tsunami warning system in the United States is a function of the National Ocean and Atmospheric Administration’s National Weather Service. Development of the tsunami warning system was impelled by the disastrous waves generated in Alaska in April 1946, which surprised Hawaii and the West Coast and took a heavy toll in life and property. The Pacific Tsunami Warning Center was established at Ewa Beach, Hawaii in August 1948. The disastrous 1964 tsunami resulted in the development of another warning center in Alaska. The West Coast & Alaska

Tsunami Warning Center (WC/ATWC) in Palmer was dedicated in September of 1967.

The WC/ATWC is the nerve center for an elaborate telemetry network of remote seismic stations in Alaska, British Columbia, Washington, Oregon, California, and other worldwide locations. Real time tide data are transmitted directly to the WC/ATWC from Alaska stations and in near-real time from stations in Washington, Oregon, and California..

The Area of Responsibility for the WC/ATWC extends to the coastal areas from western most Aleutian Islands to the California-Mexico border.

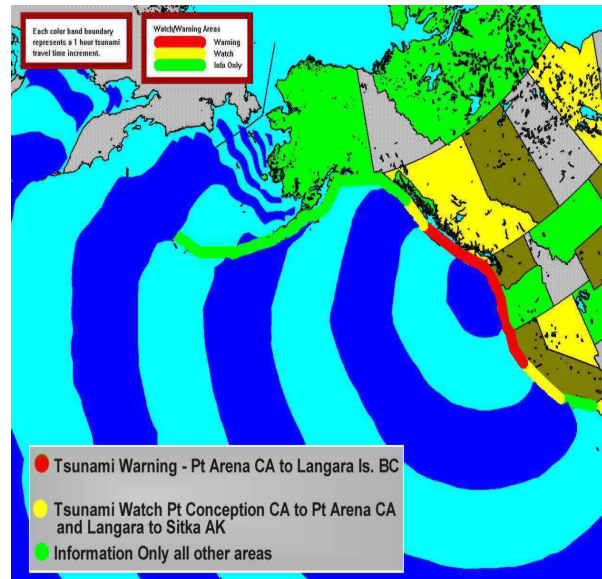


The Area of Responsibility for the PTWC extends to the remainder of the Pacific – including U.S. interests and 25 member states of the Intergovernmental Oceanographic Commission International Coordination Group for the Tsunami Warning System.

Warnings & Watches

When a large earthquake occurs near the coast of Alaska or the West Coast, an automated system and geophysicists at the WC/ATWC rapidly determine its location (epicenter) and magnitude. If the earthquake is considered great enough to generate a tsunami, the WC/ATWC will issue an immediate **TSU-**

NAMI WARNING for a limited area near the epicenter. This warning is issued through the National Weather Service, state emergency service offices, U.S. Coast Guard, military, and other agencies. A **TSUNAMI WATCH** is issued to adjacent areas of Alaska, Canada and the other West Coast states, as appropriate, alerting them to a possible tsunami threat.



If a significant tsunami is detected by tide stations near the epicenter, the **WARNING** is expanded to the entire coastline. If no wave was generated, the warning will be cancelled. Although this will occasionally cause a warning to be issued when no wave was generated, the alternative is unthinkable – to wait until the wave strikes a community to issue a warning.

Local Tsunamis

Tsunamis can be categorized as local and Pacific-wide. Typically a Pacific-wide tsunami is generated

by major, vertical, ocean bottom movement in deep offshore trenches. A local tsunami can be a component of the Pacific wide tsunami in the area of the earthquake or a wave that is confined to the area of generation within a bay or harbor and caused by movement of the bay itself or landslide. The local tsunami may be the most serious threat – as it strikes suddenly, sometimes before the earthquake shaking stops. Alaska has had 6 serious local tsunamis in the last 90 years. Although serious local tsunamis are less frequent on the West Coast, they still pose a significant local hazard.

Therefore, it is imperative that people near shore who feel a strong earthquake should move to higher ground immediately. A strong quake is one that lasts 30 seconds or longer and causes difficulty in standing. The West Coast & Alaska Tsunami Warning Center will begin issuing its **WARNING** in approximately 10 to 12 minutes, but that may be not quick enough for a local tsunami. So when in doubt, evacuate. Local authorities will tell you when the danger of tsunami has passed.

Pacific-wide Tsunamis

Tsunamis generated in other areas of the Pacific can also threaten the West Coast. The West Coast & Alaska Tsunami Warning Center works closely with the Pacific Tsunami Warning Center. The Pacific Tsunami Warning Center issues a **WARNING** for the immediate area and a **WATCH** for adjacent areas. If the earthquake is located in South America, for example, PTWC will issue a warning for that area, whereas WC/ATWC will issue a **TSUNAMI ADVISORY** for Alaska and the West Coast. If a Pacific-wide tsu-

nami is evaluated as having the potential to be dangerous to Alaska and the West Coast, the **ADVISORY** will ultimately be upgraded to a **WATCH** or **WARNING** as the wave approaches the U.S. coastal areas.



The West Coast & Alaska Tsunami Warning Center

Palmer, Alaska

Web Reference Sites:

NWS TsunamiReady: <http://wcatwc.gov/tsunamiready/tready.htm>

NWS StormReady: <http://www.stormready.noaa.gov>

Alaska DES: <http://www.ak-prepared.com/>

British Columbia EM: <http://www.pep.bc.ca/iepc/BCEID/BCEID.html>

Washington EMD: <http://www.wa.gov/wsem>

Oregon OES: <http://www.osp.state.or.us/oem/>

California OES: <http://www.oes.ca.gov/>

National Weather Service: <http://www.nws.noaa.gov>

PMEL: <http://tsunami.pmel.noaa.gov>

FEMA: <http://www.fema.gov>

Tsunami Safety Rules

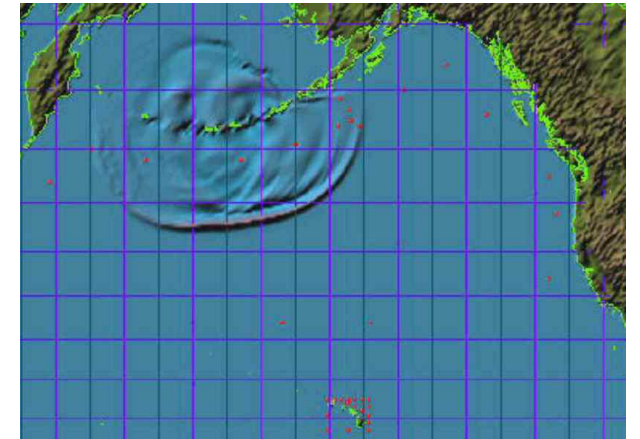
- ◆ A strong earthquake felt in a low-lying coastal area is a natural warning of possible, immediate danger. Keep calm and quickly move to higher ground.
- ◆ All large earthquakes do not cause tsunamis, but many do. If the quake is located near or directly under the ocean, the probability of a tsunami increases. When you hear that an earthquake has occurred in the ocean or coastline regions, prepare for a tsunami emergency.
- ◆ A tsunami is not a single wave, but a series of waves. Stay out of danger until an “all clear” is issued by competent authority.
- ◆ Approaching tsunamis are sometimes heralded by noticeable rise or fall of coastal water. This is nature’s tsunami warning and should be heeded.
- ◆ A small tsunami at one beach can be a giant a few miles away. Don’t let the modest size of one make you lose respect for all.
- ◆ Sooner or later, tsunamis visit every coastline in the Pacific. All tsunamis – like hurricanes – are potentially dangerous even though they may not damage every coastline they strike.
- ◆ **Never go down to the beach to watch for a tsunami. When you can see the wave, you are too close to escape.**
- ◆ During a tsunami emergency, your local emergency management office, police, and other emergency organizations will try to save your life. Give them your fullest cooperation.
- ◆ Stay tuned to your radio, marine radio, NOAA Weather Radio, or television stations during a tsunami emergency – bulletins issued through your local emergency management office and National Weather Service offices can save your life.



Kodiak, Alaska
1964

Tsunami

the great waves
on the West Coast & Alaska



West Coast & Alaska
Tsunami Warning Center



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Administration
National Weather Service
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