

TSUNAMI HAZARDS IN WASHINGTON STATE

All marine shorelines in Washington State are vulnerable to tsunamis. The Pacific Coast, the Strait of Juan de Fuca, and Puget Sound all have geologic evidence for past tsunamis, and future tsunamis are inevitable. This fact sheet contains information for Washington State residents and visitors, including how tsunamis form, the different sources of tsunamis that affect Washington coastlines and what you should do in the event of a tsunami.

What is a tsunami?

- ◆ A tsunami is a surge of water that typically forms when an earthquake causes sudden movement on the seafloor and displaces a mass of overlying water.
- ◆ Tsunamis can also be caused by landslides into or under water.
- ◆ Tsunamis are typically not like breaking beach waves, but behave more like a surge of fast-rising water, and move much farther inland than high tides or storm waves.

Tsunamis sources and hazards in Washington State

- ◆ Washington is vulnerable to tsunamis from both local and remote sources.
- ◆ Tsunamis generated offshore on the Cascadia subduction zone are the largest and most dangerous, and will arrive along Washington's Pacific coastline in as little as 20 minutes after a major earthquake.
- ◆ Washington is also vulnerable to tsunamis that have traveled across the Pacific Ocean. In particular, tsunamis from Alaska are in a direct path across the Pacific to Washington. Trans-Pacific tsunamis from distant earthquakes take longer to arrive and are generally not as dangerous because they are not as large, and there is more warning time to evacuate. In 1964, a tsunami triggered by a magnitude 9.2 earthquake in Alaska reached northwest Washington within 3.5 hours, and caused flooding and damage in some locations.
- ◆ Faults that cross Puget Sound can also generate tsunamis farther inland, as happened when an earthquake on the Seattle fault generated a tsunami about 1,100 years ago.
- ◆ Tsunamis generated by local faults or landslides may affect only limited areas, but can be devastating at those locations.

Be aware and prepare

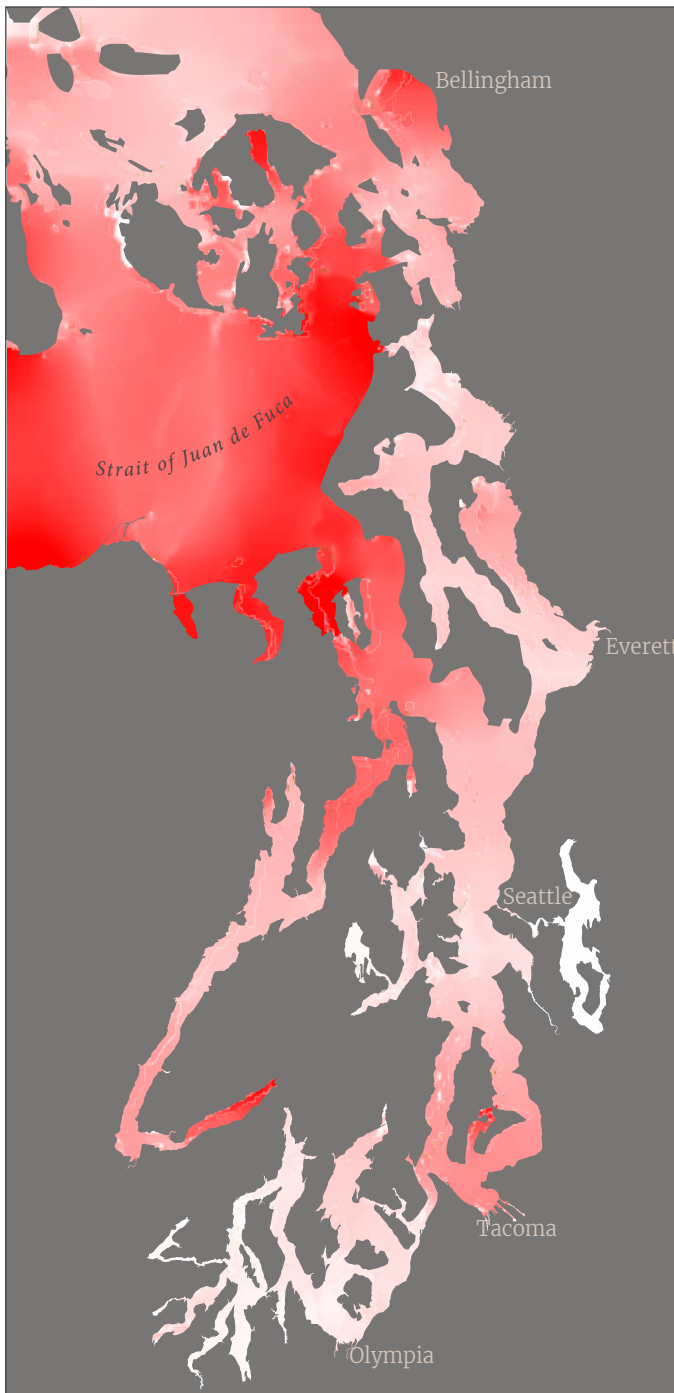
- ◆ When you are near the coast, plan where you will go in the event of a tsunami.
- ◆ Determine how you will evacuate on foot, since you may not have time to drive due to traffic congestion and earthquake-damaged roads and bridges.
- ◆ The Washington State Geological Survey has published inundation and evacuation maps for most of the Pacific coastline; and additional coastal area maps are currently being developed.



Light colored sand layers from four tsunamis in the last 1,000 years at Discovery Bay, Washington.

What should you do in the event of a tsunami?

- ◆ The first warning of a large local tsunami will be the earthquake. Don't wait for an official tsunami warning if you feel an earthquake. If you feel shaking, head to high ground immediately, and stay away from low-lying coastal areas for at least 12 hours.
- ◆ Incoming tsunamis often cause water along the coast to recede before the wave arrives. If you see receding water, even if you did not feel an earthquake, head to high ground immediately.



Modeled areas of higher (red) and lower (white) tsunami flood depths from a Cascadia tsunami in Puget Sound.

- ◆ If you cannot get to high ground, move to the top of the most substantial structure you can find, preferably one with a strong concrete foundation. Some communities have, or will soon have, tsunami evacuation structures or assembly areas.
- ◆ If there is no high ground or structure nearby, climb a large tree. After the Tohoku tsunami in 2011, many trees were left standing in areas where buildings had been washed away.

Did you know?

- ◆ There may be several tsunami waves. The first is often, but not always, the largest.
- ◆ Tsunami waves can continue for up to 12 hours.
- ◆ You cannot outrun a tsunami. Tsunamis travel 20-30 miles per hour (9-13 meters per second) when they inundate the coast. Most adults run at speeds between 10-15 miles per hour.
- ◆ New research indicates that Cascadia tsunamis may also be dangerous in parts of Puget Sound (see left).

For more information

- ◆ Washington Department of Natural Resources tsunami evacuation information: <https://www.dnr.wa.gov/programs-and-services/geology/geologic-hazards/tsunamis/evacuation>
- ◆ <https://www.mil.wa.gov/tsunami>
- ◆ <https://nctr.pmel.noaa.gov>
- ◆ Seattle Times article about the Ocosta School tsunami evacuation structure: <https://www.seattletimes.com/seattle-news/it-will-happen-here-westport-school-builds-nations-first-tsunami-refuge>
- ◆ Washington Department of Natural Resources tsunami information: <https://www.dnr.wa.gov/programs-and-services/geology/geologic-hazards/tsunamis>

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