

CREW: Cascadia Update

THE BIG BREAK

Subduction zones such as Cascadia produce the world's largest earthquakes: from magnitude 8.0 to 9.0+. These great quakes cause prolonged ground shaking over a large area and can trigger dangerous tsunamis and aftershocks.

The Cascadia subduction zone extends from Cape Mendocino in northern California to Brooks Peninsula in British Columbia. It produces a great earthquake on average every 500 years, but the actual time between events is irregular. Currently, the odds that the fault will break and produce a M9.0 quake within the next 50 years are about 1 in 10, so it makes sense to prepare now by assessing risks and investing in mitigation.

CREW Offers a Fresh Look at the Northwest's Next Great Cascadia Earthquake

CREW has published an updated edition of *Cascadia Subduction Zone Earthquakes: A Magnitude 9.0 Earthquake Scenario*. The scenario helps people understand and prepare for Cascadia's next great quake.

CREW first published *Cascadia* in 2005, but so much new information has emerged that a major update was needed. Among other changes, the new edition incorporates lessons from recent earthquakes and tsunamis and the results of more advanced modeling efforts.

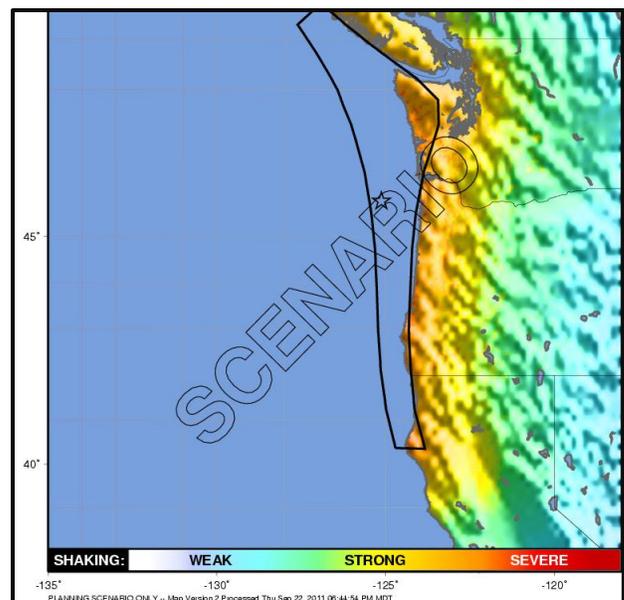
The Cascadia subduction zone last ruptured on January 26, 1700. That event—estimated at magnitude 9.0—triggered a tsunami large enough to be recorded in Japan. The 700-mile long Cascadia mega-fault has been gearing up for another great earthquake ever since.

Scientists, planners, and others have been studying Cascadia's earthquake potential since it was first recognized in the early 1980s. Their efforts continue to yield new information: They have refined modeling tools, improved our understanding of possible impacts, and gained new insights from recent subduction zone earthquakes and tsunamis elsewhere, such as those that struck Chile in 2010 and Japan in 2011.

Modeling a Great Cascadia Quake

Earthquake modeling and loss-estimation tools give us some idea of an earthquake's likely effects so that we can identify vulnerabilities, develop response and continuity plans, and prioritize seismic mitigation.

In the Cascadia scenario, the entire subduction zone ruptures. The resulting M9.0 earthquake is felt across the Northwest, but the intensity of the shaking is greatest near the coast and in areas where the local geology intensifies the seismic waves. This USGS map shows the extent and strength of the shaking.





Seattle’s historic Cadillac Hotel building after the magnitude 6.8 Nisqually earthquake in 2001.

Predicting the Effects of the Scenario Earthquake

Although earthquake simulations cannot forecast every effect in every location, they provide useful estimates and insights. Much of what we see in the Cascadia earthquake scenario resembles the magnitude 9.0 Tohoku earthquake and tsunami that struck Japan in 2011—with some important differences. For example:

- The number of injuries and deaths in Japan was much higher than is projected for Cascadia. In part this is because our coastline is less densely populated than Japan’s, and it offers more high ground for evacuation from the tsunami.
- Estimated economic losses for Cascadia are high: \$70+ billion for Washington, Oregon, and California (not counting tsunami damage). This is less than Japan’s losses, but comparable to hurricanes Sandy (\$50 billion) and Katrina (\$150+ billion).
- Japan has had strict seismic building codes in place for a long time: This effectively limited quake damage in 2011. Seismic building standards in the Northwest are far more recent, and many existing buildings, bridges, and other structures predate the standards and engineering strategies needed to address the force of an earthquake as large as magnitude 9.0.

Planning for the Tsunami

In the Cascadia scenario earthquake, large sections of the Pacific coastline are expected to drop, possibly as much as 6.6 feet (2 m). The quake will also generate a tsunami: A series of destructive waves will begin flooding the coast soon after the earthquake. In some places, the first wave will reach shore in as little as 15–20 minutes. The height of the tsunami will vary, but could reach tens of feet in certain areas.

Fortunately, steps have already been taken to prepare, including mapping the hazard zones, identifying at-risk populations, marking evacuation routes, and planning evacuation strategies. Further education of the local population and seasonal visitors remains a critical first line of defense and is an ongoing necessity.



Washington State Department of Natural Resources

Aerial view of Ocean Shores, Washington. The tsunami hazard zone is shaded in yellow.

ARE YOU PREPARED?

The Pacific Northwest is earthquake country: Preparing for the next great Cascadia quake makes us better equipped to recover from all types of earthquakes—and other disasters. Individuals, families, and businesses can improve their own resilience by taking steps now to prepare for earthquakes and other natural disasters:

- Participate in drills: Drop, cover, and hold on.
- Identify the hazards at your home and place of business.
- Develop a response plan.
- Maintain a disaster supply kit (sufficient to last 3–14 days).

LEARN MORE AT CREW.ORG

Contact: Heidi Kandathil
(206) 790-0923