

Prepare...



Because
You Care

Washington Earthquakes

Although the earth feels solid as we walk along the surface, it is only partly so. The earth's crust is broken into massive irregular pieces called "plates" which have been moving very slowly over the earth's surface for billions of years, driven by energy deep within the earth. This movement has shaped the physical features of the earth and is responsible for the three types of earthquakes we are likely to experience in Washington State.

Subduction zone earthquakes

Washington, sitting on top of the North American Plate, is located near the boundary of the North American and Juan de Fuca Plates. This fault boundary is commonly referred to as the Cascadia Subduction Zone. The Juan de Fuca Plate is moving northeast and pushing past and then deep under the North American Plate. Normally, the colliding edges of these plates are locked, one against the other. As the relative motion of one plate continues to push against the other, huge stresses build up until the lock is broken and the plates move suddenly giving rise to a subduction zone earthquake.

Although there has not been a large historic subduction earthquake in the Pacific Northwest since European settlement began in the early 1800s, it is believed that the Cascadia Subduction Zone may be storing energy to be released rapidly in future catastrophic earthquakes similar to the Alaska earthquake of 1964. Researchers say the stresses they observe off the coast of Washington could generate an earthquake measuring 9+ on the Richter scale causing coastal areas to drop up to six feet in minutes and that would produce a tsunami (series of giant sea waves) all along the fault line from British Columbia to Mendocino, California. Such an earthquake would last several minutes and produce catastrophic damage.

Deep earthquakes

Deep earthquakes occur within the Juan de Fuca Plate as a result of the stress that builds up as it pushes under and downward past the North American Plate. The 1949 Olympia and the 1965 Seattle-Tacoma earthquakes both occurred due to this sinking plate. It is commonly believed that deep Puget Sound earthquakes occur every 25-30 years, generally last 20-30 seconds and have the potential of reaching 7.5 on the Richter scale.

Shallow crustal earthquakes

Shallow crustal earthquakes occur in the crust at the top of the North American Plate as a result of accumulated pressure. This type of earthquake can occur almost anywhere in the state. Many of the nearly 1000 events that occur in the state each year are shallow earthquakes. While magnitudes from shallow earthquakes are generally expected in the 5.7 to 6.3 Richter scale range, there is a potential in some areas for these shallow events to reach magnitude 7.5. Evidence supports that earthquakes of this intensity have occurred in the North Cascades in the late 1800s and along the recently defined Seattle fault nearly

More information on other side -

*For more information, contact your
local emergency management office
list at right, or call the state's
Emergency Management office
(800) 562-6108*

Washington State Military Department, Emergency Management Division

Washington Earthquakes

Continued -

1000 years ago. The St. Helens Seismic Zone in the southern Washington Cascades is thought to be capable of producing a magnitude 7.0 earthquake. Eastern Washington, however, has not had an earthquake exceeding 5.8 in the last 150 years.

Washington earthquake risk

The risk of earthquakes prevails throughout the state. Some areas are at higher risk than earthquake risk others. Site conditions and the types of soil or rock affect the amount of shaking and the potential for damage. Solid rock or bedrock does not increase the shaking. However, soft materials such as mud, artificial fill and layers of sand and clay will make the consequences of ground shaking much worse. This, because they increase or amplify the effects of an earthquake. Steep slopes may experience landslides. Floodplains and areas of artificial fill will be prone to liquefaction. This may result in local areas experiencing severe damage, especially where the ground fails under buildings, pipelines or bridges.

It has been awhile since we have experienced a significant earthquake in the state. However, as the geological clock moves into the future, our opportunity to experience what has happened before draws ever closer. Major earthquakes with magnitudes between 6 and 7.5 can be expected every 30 to 50 years. If you spend just half your lifetime in the state, you should expect to live through a major earthquake.