

Puget Sound quake likely in Seattle Fault zone, geologists say

September 23 2014, by Sandi Doughton, The Seattle Times

The magnitude-4.0 earthquake that rattled people awake across the Puget Sound region last Wednesday probably struck on the western edge of the Seattle Fault, according to geologists.

Initially, scientists said it didn't appear the quake was associated with any of the region's major faults. But U.S. Geological Survey (USGS) researcher Craig Weaver took a closer look at the location and the way the rocks 10 miles underground appear to have ruptured, and concluded that the quake occurred where geologists suspect the Seattle Fault connects with another fault on the Olympic Peninsula.

"It's certainly an interesting earthquake, in that it gives us a hint there is more to the Seattle Fault," Weaver said.

The occurrence of a quake on the Seattle Fault zone slightly boosts the possibility that a more powerful quake will follow - but the odds remain very low and the added danger diminishes quickly with time, said John Vidale, director of the Pacific Northwest Seismic Network at the University of Washington.

A series of small quakes under Elliott Bay in the 1970s didn't trigger a bigger quake. Nor did a magnitude-5 quake in 1995 near Vashon Island, which scientists also believe occurred on a portion of the Seattle Fault.

The last time the fault ruptured in a big way was about 1,100 years ago. The resulting quake measured at least magnitude-7 and thrust up

shorelines in West Seattle and Bainbridge Island by 20 feet or more. It also triggered a tsunami that swept through Puget Sound.

Pinpointing the exact location of the fault has been difficult, though, because it only breaks the surface in a few places on Bainbridge Island and near Lake Sammamish.

Based on surveys that measure the magnetic properties of rocks, scientists have assembled a fuzzy picture of a wide swath of fractures that extends from Bremerton, passes south of downtown Seattle and continues into the Puget Sound foothills. "There's a lot of complexity to the Seattle Fault," Weaver said. "It doesn't line up in a nice, simple fault zone, like in California."

Recent, ship-based surveys found signs that the fault continues westward under Hood Canal. "We've realized over the course of quite a few years that the Seattle Fault can't just be this little stub between Bainbridge Island and Bellevue," Weaver said.

Last week's quake adds to that evidence and also suggests the Seattle Fault may connect with the Saddle Mountain Fault, which roughly parallels the eastern shore of the Olympic Peninsula.

"We're really starting to figure out how this system works and how it's connected," Weaver said. "This earthquake may help us unravel some of the details."

A better understanding of the network of faults that crisscrosses the Puget Sound lowlands also will help the region know what to expect from future quakes, Weaver said.

A scenario published in 2008 estimated that a major quake on the Seattle Fault could kill as many as 1,600 people and seriously damage more than

200,000 homes and other buildings.

By digging trenches on exposed sections of the fault, geologists have uncovered evidence of three or four major quakes on the Seattle Fault in the past 2,500 years.

Though small, the recent [quake](#) shows that the fault is still being squeezed by tectonic forces and will snap again someday, said USGS geologist Brian Sherrod.

"It just reinforces the idea that this is an active [fault](#) that is going to produce earthquakes of various magnitude from here on out," he said. "And it can produce very large earthquakes."

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