

Not My Fault: Tsunami hazard still lurks

Lori Dengler/For the Times-Standard
Posted June 14, 2020

“Hey Lori, is it true you now think Humboldt doesn’t have a tsunami threat?” The question took me aback because the person who asked me was my friend Mike Furniss. Mike is a scientist and well aware of our regional earthquake hazard. If he had heard such rumors, it was clear I needed to set the record straight.

YES, WE HAVE A TSUNAMI THREAT! Everyone hear that? My guess is that Mike was at the end of a “telephone” chain. It was a game I once played at summer camp. The campers would stand in a circle and the “caller” would whisper a phrase to the kid next to them, and they would retell it to the next and so forth. By the time the story got fully round, it had always changed from how it had started.

I have no idea of the original conversation that started the chain that Mike heard. I may have been telling someone about the new North Coast tsunami maps that will be coming out in August or just explaining that not all parts of Cascadia are equal and Northern California’s tsunami threat is different than in Oregon or Washington. What is clear is that whatever I said was distorted in the retelling.

First the short version. If you feel an earthquake on or near the coast, the shaking is your warning that a tsunami may soon follow. Head inland or to higher ground as soon as you can safely move. Time is of the essence – grab your children, your grab-n-go kit and leave immediately. Use the posted tsunami zone signs as an indication of how far you need to head to be safe. Read no further - this is all you need to remember.

Now the medium answer: the North Coast may be affected by tsunamis generated by earthquakes nearby or from far away such as Alaska, Chile or Japan. For nearby earthquakes, follow the instructions above – feel the earthquake and head to high ground. You won’t feel the far away earthquakes and so the US Tsunami Warning System provides alerts. When an earthquake large enough to produce a tsunami occurs, alert bulletins are issued. If there is a need to evacuate, this information is disseminated via the Emergency Alert System on radio and television and through county emergency notification

systems. Our most credible distant sources are at least four hours away from the North Coast and public safety officials have time to coordinate evacuation. Sign up for emergency notifications and follow the instructions of officials.

For those of you still with me, here is a more detailed explanation. Our biggest tsunami threat (big in terms of water height) is the Cascadia subduction zone. The CSZ is a fault system that extends from Cape Mendocino to Vancouver Island in Canada. There are multiple lines of evidence that the most recent earthquake occurred on January 26, 1700 and ruptured the whole zone in an earthquake of about magnitude 9.

Humboldt County’s tsunami signs, maps and information materials are all based on this worst-case Cascadia earthquake. The reason is simple – with a Cascadia earthquake, you need to respond without any official notification or guidance. The earthquake will cause damage and disrupt communication networks in addition to roads and other infrastructure. Don’t count on cell phones, commercial media and the emergency alert system to work. You need to recognize that the long duration shaking is your warning and take action on your own.

Here’s where it may get confusing. Scientists approximate the CSZ rupture zone as a plane roughly 650 miles long and 40 to 70 miles wide. It breaks the seafloor near the continental slope and dips gently eastward. At Cape Mendocino, the edge is less than ten miles offshore. It’s about 40 miles offshore of Crescent City, 60 miles off of Central Oregon and nearly 80 miles west of the Washington coast. If the Cascadia rupture averages 50 miles in width, much of it is beneath land in Humboldt County. Coastal Humboldt is on top of it. Where I sit in McKinleyville, the CSZ fault plane is eight miles beneath me. In Willow Creek, the depth is closer to 15 miles.

A tsunami is caused by deformation of the sea floor. Short of asteroids, subduction zone earthquakes produce the most widespread tsunamis. Most subduction zones are offshore and the slip during a great earthquake deforms a lot of sea floor. The greater the slip and the more water atop it, the bigger the tsunami. We are unique - perhaps a quarter to a third of the Cascadia rupture zone in Humboldt County is beneath land. That means not as much water volume to be displaced as in Oregon and Washington.

This has consequences for both tsunami generation and earthquake shaking. We WILL have a tsunami. That

tsunami will consist of numerous surges lasting hours and could reach heights of twenty to thirty feet along much of the Humboldt County coast. While likely not as high as what will hit Oregon and Washington, this is still a major tsunami. Much of the Sendai coast in Japan experienced water heights in this range in 2011 and I personally saw the damage it caused.

Although our next CSZ tsunami may not be as high as along coastlines to the north, it will arrive more quickly. We are closer to the source. First surges could reach us in only ten minutes. Residents of coastal areas in Northern Oregon and Washington may have twice as much time. And, because we are atop the rupture surface, it means much stronger shaking.

We will be getting new tsunami maps in two months. The good news is that in most of Humboldt County, the hazard zone is roughly the same and in the few areas where it has been changed, the hazard zone has become smaller. If you have a family tsunami plan, bravo to you and it is still good to go.

Lori Dengler is an emeritus professor of geology at Humboldt State University, an expert in tsunami and earthquake hazards. All Not My Fault columns are archived at <https://www2.humboldt.edu/kamome/resources> and may be reused for educational purposes. Leave a message at (707) 826-6019 or email Kamome@humboldt.edu for questions/comments about this column, or to request a free copy of the North Coast preparedness magazine "Living on Shaky Ground."

<https://www.times-standard.com/2020/06/14/lori-dengler-tsunami-hazard-still-lurks/>