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Not My Fault: The 1992 earthquake makes waves in the tsunami world

Lori Dengler/For the Times-Standard
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The April 25, 1992, earthquakes produced more than $60 million in property damages. The largest losses were the destruction of the Scotia shopping center from fires triggered by the midnight aftershock and road slip outs and landslides. More than a hundred homes in the Ferndale and Rio Dell area suffered foundation damage when older structures slid off post and pier foundations or cripple walls collapsed.

All of the damage was caused by the strong shaking, the strongest ever recorded in a California earthquake. The accelerations on the instrument at Cape Mendocino exceeded twice the value of gravity, strong enough to bounce objects into the air. A Caterpillar tractor near Petrolia had been sitting idle through the winter months and was mired in mud up to the hubcaps. It was bounced into the air by acceleration, coming down to rest a foot away, without leaving a scratch in the mud.

Thirty years later, the most enduring legacy of the 92 quakes was not the accelerations or the damage. It was not the two big aftershocks or the complexity of the triple junction area the earthquake sequence revealed. It was not the bizarre green and blue lights many reported seeing in the night right after the large aftershocks. It was something that caused no damage and wasn't even noticed until days later. The main earthquake produced a modest tsunami.

Tsunamis in California weren't unheard of thirty years ago. More likely to be called tidal waves then, many of us knew something about Crescent City and the people who perished in the tsunami triggered by the 1964 Alaska earthquake. Crescent City's harbor experienced some damage in 1957 and 1960 tsunamis and a Santa Cruz resident died in 1946 from an Aleutian earthquake tsunami. We recognized that great earthquakes far away from us on the Pacific rim could send waves in our direction. We expected that tsunami warning centers would give us at least a four hour heads up that waves were on their way.

As I was counting out how long the shaking lasted that Saturday morning in 1992, tsunami never crossed my mind. I kept up with the literature on the Cascadia subduction zone and was aware of the paper published in Science in 1989 by Brian Atwater documenting tsunami sand deposits in Washington State linked to past great earthquakes but I didn't connect it with what I was experiencing and was pretty sure the shaking hadn't lasted long enough to be the kind of earthquake Brian was writing about. There were no tsunami alerts or bulletins issued after the earthquake and I was unaware there was any discussion about tsunamis until weeks later.

The first inkling that not all might have been peaceful in the ocean that day were reports over the next few days from longtime residents that the coast was permanently stuck at low tide. The word reached me about a week afterwards when the stench of dead intertidal organisms confirmed that the old-timers knew what they were talking about. It generated keen interest and Bob Rasmussen in the Humboldt Biology Department teamed up with Gary Carver in Geology to map out the uplift.

They developed a method of identifying the top of the zone of dead sea urchins and other intertidal organisms and measuring the distance to the top of the still living ones and found that the coast had uplifted as much as five feet near the mouth of the Mattole and the uplifted zone extended for over ten miles.

Coastal uplift meant the offshore area had uplifted as well and that means tsunami. Unbeknownst to me, the California State Geologist at the time, Jim Davis was a little more curious about tsunamis than I was. About two days after the earthquake, he contacted Eddie Bernard at NOAA's Pacific Marine Environmental Laboratory (PMEL) and asked if there might have been a tsunami generated. Eddie had spent time as a staff scientist at the Pacific Tsunami Warning Center and was busy building a tsunami research program at PMEL.

NOAA had operated a tide gauge in Crescent City since 1933 and the North Spit station on the Samoa Peninsula since the late 1960s. Nothing was online in 1992 so querying the tide gauges meant finding the paper records. Eddie found that not only was a tsunami recorded on the North Coast, but also on five other tide gauges from the Central California coast to Southern Oregon and in Hawaii. These gauges have recorded many tsunamis in the past but what was special in 92 was that the surges arrived only 26 minutes after the earthquake in Humboldt Bay and 47 minutes in Crescent City. This was the first near-source or

local tsunami ever recorded on the Northern California coast.

The tsunami wasn't large, about three feet from trough to peak at Crescent City. It coincided with low tide and was not generally noticed. A group on the beach at College Cove near Trinidad reported seeing an unusual surge that may have approached six feet peak to trough at about the right time the tsunami should have arrived. But height isn't the only way that tsunamis cause damage. Strong tsunami currents can damage and kill on beaches and harbor areas and, in hindsight, we all agree there should have been an official notifications.

But of course, we were all warned. Mother Nature shook the ground and most of us recognized that the shaking lasted a long time. I and most everyone else just didn't recognize that long duration shaking is the natural warning that a tsunami might be on the way.

In the weeks and months following the earthquake recognition of the near-source tsunami threat shifted. California began a study of what a larger earthquake and tsunami would do to the area. That's when I met Eddie Bernard for the first time. PMEL was responsible for the tsunami modeling, and I worked on intensities. Senators from Oregon, California, Hawaii, and Alaska urged a closer examination of national tsunami preparedness that eventually led to the National Tsunami Hazard Mitigation Program. I would get to know Eddie much better then as he ran the program, and I was one of the California representatives in the early years.

If I had been on the beach on the beautiful April Saturday back in 1992, what should I have done when I felt the earthquake? Head to higher ground. That might be back up the trail I came in on or to a nearby high dune. Then I should have stayed there until I got an official notification it was safe to return. That notification might have come quickly or in many hours. But now I know I should have thought 'tsunami' as I was counting out how long the shaking lasted.

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