

## **Not My Fault: Lessening the pain of disasters through mitigation**

Lori Dengler/For the Times-Standard  
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Mitigate means to lessen the pain. You have heard it a lot recently. We've been asked to lessen the pain of the Coronavirus through mitigation – washing hands, distancing and isolating ourselves at home.

Mitigation is not new and is an institutionalized part of many disciplines. Development projects that affect the environment are required to include mitigation to equalize impacts. Mitigation is part of law, commerce, medicine and politics. In its broadest sense, any discipline where adverse effects may occur has incorporated mitigation efforts into its practice.

My introduction to mitigation was many decades ago at my first meeting of the Seismological Society of America. The SSA was born in response to the 1906 earthquake and from its earliest years has always emphasized that earthquake scientists have a responsibility to apply their work to reducing losses in future earthquakes. Most granting agencies now require that all proposals include a section on how a proposed project will reduce risk.

I became much more familiar with mitigation in 1995 when I was part of the small group that developed the US National Tsunami Hazard Mitigation Program (NTHMP). There was Mitigation in capital letters right in the title. The NTHMP was the brainchild of Dr. Eddie Bernard who headed NOAA's Pacific Marine Environmental Laboratory at the time and its fledgling tsunami research program. Eddie pulled together a small group of emergency managers and scientists from the five Pacific states to develop a modest seed proposal to reduce US tsunami hazards.

Like many mitigation programs, the NTHMP came into existence in response to an event, the 1992 Cape Mendocino earthquake that occurred 28 years ago yesterday. What did 1992 have to do with tsunamis? If you were here in 1992, your memory was of ground shaking. I was at home at the time, getting ready for a family picnic. The shaking is etched in my memory, not so much for how strong it was (I was 40 miles from the epicenter), but for how long it lasted. I counted the

shaking. By the time I hit 45, I knew our picnic was not going to happen. I ended up at 72.

The length of shaking should have been an immediate red flag that a tsunami was possible, but I had no such thoughts back in 1992. I knew what a tsunami was and taught about them in classes. I had colleagues working on tsunami deposits in the region and we were all beginning to be aware of the potential for great subduction zone earthquakes here. But when the ground shook a little past 11 am on that Saturday morning, I never made the connection.

The Cape Mendocino earthquake did produce a tsunami. There were anecdotal reports from people on the beach that were confirmed by NOAA's tide gauge in Crescent City. Fortunately, the tsunami was modest – about a foot and a half at the Crescent City gauge and nearly three feet from eyewitnesses at College Cove. It was also recorded as far away as Hawaii and the Central California coast. It coincided with low tide and no damage was observed.

The Cape Mendocino earthquake had a magnitude of 7.2. It ruptured a 15-mile long fault and caused more than \$60 million in shaking-related losses. It was nothing to sniff at. But even in 1992, evidence had emerged that an earthquake as large as 9 was lurking in our future. The small tsunami produced by our 7.2 made the potential for a greater tsunami much more real.

Dr. Bernard along with others in the emergency response and earthquake hazards fields recognized that we were woefully unprepared for that much larger earthquake and its inevitable tsunami. The NTHMP was built on a three-sided triangle – Hazard Assessment, Warning Guidance and Mitigation. When the program was funded as an earmark to the Senate Appropriations Bill in 1996, I was handed the job of developing a strategic plan for the mitigation leg of the triangle.

It was a fast education on the ins and outs of mitigation – of “hard” mitigation (projects that involve infrastructure such as sea walls and warning systems) and “soft” mitigation (behavioral solutions). Both are equally important and both have costs.

Costs are the crux. Both Warning Guidance and Mitigation required solid science. We needed to understand the tsunami hazards of US coastal communities. At the time, only Hawaii and a few locations in Alaska had tsunami maps and they were out of date. Hazard mapping requires validated models and good data. The most important data – high quality sea

floor topography – did not exist in many areas. And we had to understand what the most effective ways of motivating people to evacuate were by studying what had happened in past tsunamis.

The first eight years of the NTHMP was taking small bites with limited funding, mapping the most vulnerable areas and developing an education program. All that changed in 2004 after the Indian Ocean tsunami. Enhanced funding allowed the completion of hazard mapping, installation of deep ocean sensors, and outreach programs not just in the original five Pacific states, but expanded to all coastal regions of the country.

Any mitigation program needs care and sustained funding. Rare events like tsunamis are problematic because interest flags as time passes. Governments are always looking for places to cut budgets and the more remote an event, the more tempting it is to slash. Most everyone has heard that the current administration cut the pandemic planning arm of the CDC two years ago. But what you haven't heard is that nearly every president of the past several decades has been tempted to do the same thing

(<https://www.politico.com/news/magazine/2020/04/11/america-two-decade-failure-prepare-coronavirus-179574>). After all, 1918 was a very long time ago and more recent pandemics didn't turn out to be very large.

The most important lesson from tsunamis, pandemics and other disasters, is that mitigation is not a switch you can quickly turn off and on. If we truly hope to lessen the pain, we must be in it for the long haul.

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