

Level Up Audio Project, Season 2

Episode 3: Increasing Tsunami Resilience in Hawaii

- Voice Over: Welcome to Level Up, a FEMA audio project for practitioners where communities share their stories and expertise about building resilience and reducing risk from a disaster.
- Jackie Kahula: When we got to town, everybody was running down to the Hana Bay. Then a wave starts coming, it's not a wave, it's more like just a wall of water that comes in. There was nine that was lost from the village, from that tsunami anyway.
- Bunji Fujimoto: You can imagine timber that builds up a grandstand, it can hold probably a hundred people or so. It just collapse like a house of matchsticks. I can hear the cracking in my ear still today, the cracking of the timber.
- Michael Sterns: And how I stayed afloat, semi-unconscious, I don't know. I remember tossing with the wave. All I'm saying to myself is, "I want to die fast. I want to die fast."
- Voice Over: These are the voices of Jackie Kahula, Bunji Fujimoto and Michael Sterns, real people who survived devastating tsunamis in Hawaii in 1946 and 1975. Over 450 stories like these have been collected by the Pacific Tsunami Museum in Hilo, Hawaii. Storytelling is one of the oldest methods of passing knowledge from one generation to the next. By featuring these stories, the museum educates the public about tsunamis and preserves the social and cultural history of Hawaii. First, our interviewer, Emily Breen, a community planner for FEMA Region 9, will talk with Jeanne Johnston, the co-founder of the Pacific Tsunami Museum, a FEMA grant specialist, and a survivor of the 1946 tsunami in Hilo. Later, we'll hear from Crystal van Beelen, a disaster preparedness officer for the city and county of Honolulu, whose tsunami evacuation mapping project used local historical knowledge to validate the maps and shared information with the community. In this episode, we ask, "Can listening to stories from our past help us create a more resilient future?" From both of our guests, the answer is a resounding yes.
- Jeanne Johnston: We were looking out the kitchen window and the water, at that time, was up to the top of the clothesline. So it was probably five feet high in the backyard. My grandmother started to scream and ran and got my grandfather and woke up my uncle. He was the only one that seemed to know what was going on there and he said, "we have to get out of the house." And my grandfather, who's an old Scottish seaman said, "I'm not leaving my house." And my grandma said, "I'm not leaving him." And so, my uncle took my brother and I out in between the next waves and handed us over to the next door neighbor, uncle Eddie van Giesen. We went down two houses and then we were able to get through

somebody's yard and back into the jungle. We were trying to get to the airport, but it's very dense back there and there's a lot of lava rock. And I remember the standing there and the lava was porous and the water was coming up through the lava instead of coming at us as it was when we left the house, it was coming up through the ground. And for many, many years after that, I dreamt about the lava and the water coming up and swimming through the lauhala leaves. And about two o'clock in the afternoon, they decided that it was safe enough for us to go back and we got back to the road and all I could see was mass destruction. There was a house right in the middle of the street, and it looked like somebody had lifted it up and poured the furniture out and then put the house back on top of it. It was all lopsided and there was all kinds of debris, trees, lauhala trees, coconut trees.

Voice Over: Fortunately, Jeanne and her family survived the 1946 tsunami, even those that stayed behind. Years later, after teaming up with co-founder Dr. Walter Dudley, a tsunami expert from the University of Hawaii and other interested people in the community, Jeanne started the Pacific Tsunami Museum. Since 1994, Jeanne and her team have captured audio and video recordings of tsunami survivors from Hawaii and around the world.

Jeanne Johnston: The funding came from several places. By that time, other people have gotten interested. NOAA, they funded a lot of the interviews. FEMA funded some exhibits that were made with using some of the data from the interviews.

Emily Breen: What do you think inspired you in terms of this desire to capture the tsunami survivors' stories and your grandfather's story? Why do you think it's so important to you personally?

Jeanne Johnston: All I can say is it's been my passion to do this, the memory of my grandparents and the wish that I had recorded their stories has really propelled me into doing more of these. And also, I know the importance of having them archived at the museum, and there is so much information there that scientists in the future can research these stories and they can do studies and that they can find ways to impart the message of safety, tsunamis safety, or any hazard safety. There's just a lot to be learned from these individual stories that hasn't been saved in any other manner. One thing that I noticed is that there's a lot of apathy towards tsunami safety and a tsunami preparedness. And I think that's because they're so rare that they're not top of the mind like hurricanes are here, but certainly in Hawaii more lives have been lost due to tsunamis than all the other disasters combined.

Emily Breen: Why is public awareness and educating citizens regarding the dangers of tsunami, an important mitigation action?

Jeanne Johnston: I just think stories are very compelling. A story of survival is an exciting thing for people to hear. And there are many, many wonderful stories that we have in the museum. Indigenous people for instance, have known for centuries, that stories are the way to pass on the knowledge to the next generation. And many of

those tsunami stories that we have in the United States come from the tribes that have mythologies and stories they passed down generation to generation to keep the next generation safe from these disasters.

Voice Over: Jeanne and her colleagues want all people, whether they live in Hawaii or Nebraska, to know the early warning signs of a tsunami.

Jeanne Johnston: Well, if you're on a coast, any coast, and there's an earthquake that shakes so hard that it knocks you off your feet, run, don't walk, run as fast as you can out of the area. Or if there's a steel reinforced building there, you can go up above the sixth floor. And so if you're at the ocean and the water recedes far enough so that you can see the reef and it looks unusual, that's another warning sign that it's time to evacuate.

Voice Over: There are many tsunami mitigation actions that coastal communities can implement to keep their people and critical infrastructure safe, including adopting and enforcing building codes and design standards that require tsunami resistant design. And requiring coastal structures to be built to standards that allow for proper vertical evacuation and to be specially designed and constructed, to resist both tsunami and earthquake loads. So far, we've learned about tsunami awareness work in Hilo on the island of Hawaii. Now we'll travel 200 miles northwest to the island of Oahu to learn about tsunami resilience work occurring in Honolulu. Crystal van Beelen is the disaster preparedness officer for the city and county of Honolulu.

Voice Over: She and her colleagues are working on various projects to help protect and prepare communities for disasters, including tsunamis. Following the devastating earthquake and tsunami that hit Japan in 2011, which claimed over 20,000 lives, the city and county of Honolulu decided to undertake a mapping project that would better prepare residents for large tsunami events. Completed in 2014, the maps designate a new extreme tsunami evacuation zone and use local historical knowledge to validate the maps. The new zone will inform the tsunami evacuation routes currently being developed to move 300,000 people to safety.

Emily Breen: Can you tell us a little more about how these maps were developed?

Crystal van Beelen: Sure. We have a wonderful array of subject matter experts from our Hawaii State Earthquake and Tsunami Advisory Committee. A lot of our subject matter experts are from the University of Hawaii at Manoa. And after the 2011 tsunami earthquake out of Japan, we sent our scientists as well as our structural engineers to do the research. We had a group of them checking on structure engineering, what buildings would survive. And then our scientists actually came back to the islands to look, to see if there were any paleo tsunami deposits that could actually verify or validate the modeling that our team of scientists were doing to ensure that the modeling results that they were coming up with could actually have happened. So finding those paleo tsunami deposits around our

island helped to justify that a large tsunami wave actually had impacted the islands in the past.

Emily Breen: How was the community involved in developing these maps?

Crystal van Beelen: From one evacuation zone, we came up with three zones, one for the historical data, which more or less 99% of our events would occur. Then another zone, which would be the extreme tsunami evacuation zone, and then the safe zone. But we wanted the community input. So we involved the community from the get-go. As soon as we had the draft modeling and the results, we took it to the people. We did several outreaches all around the coastal areas, hitting almost every community living along the coast. The outreach was tremendous. It was amazing to see how many people were interested in it. It was probably the most exciting for our scientists and subject matter experts because we had people in the community that actually remembered some of the historical events that impacted the islands. And they actually took our scientists after the fact to certain points to say, "this is a run-up area," or "this is how high the wave got." "See those coconut trees. We had fishes in the top of the trees." But of course the trees were much lower at that point, but it gave the indication and helped to validate the modeling. So it was really exciting for our scientists and subject matter experts who were part of this study to actually get real time stories or real life historical knowledge to help justify their study.

Emily Breen: That's really interesting. And how did you gather this community input? It sounds like you did visit some communities in person.

Crystal van Beelen: Yes. Following up this, we had an archive project. After hearing a lot of the community's input we wanted to ensure that we captured a lot of that. So we came up with the tsunami archive project and basically we went to our state libraries and had people come bring their photos, bring their stories, we would record it. And then it would be housed at our International Tsunami Information Center led by Dr. Laura Kong. A lot of that information also was provided to the Pacific Tsunami Museum on the big island. So it was a great way to validate and capture that information before that historical knowledge was lost. We have *'Ōlelo Noeau* or historical phrases that have been passed down to generation through chants and phrases. And so as a child, we all grow up with that number one saying, never to turn your back to the ocean. It was because of those tsunami events that have taken lives, that the Hawaiian indigenous people here on the islands wanted to ensure that that information got passed down to the next generation, basically to have respect for the ocean.

Emily Breen: That's so important and sounds like such a meaningful component of this project. So shifting gears a little bit, how have you made the community aware of these new maps?

Crystal van Beelen: It was a road show. Once we got the feedback from the community, we took those maps, we did some editing because as I said, a lot of them had more input along certain rivers or streamlines because as you know, tsunami waves can

travel up any waterway. So we did take those into consideration and we redrew the maps, the evacuation lines, went out back into the community and really started showing pictures and explaining the different zones and why it was so important. A lot of people know when we have a tsunami to go inland, but they just don't know how far inland. A lot of them felt that, "hey, I'm safe where I am. I'm pretty far inland." So the education process was pretty grueling. A lot of interaction with the community saying, "I've lived here 50 years, never had a problem." But once they started seeing some of the study, and thank goodness, we had a lot of the subject matter experts with me attending our community outreach, we were able to gather and answer a lot of the questions, prepare frequently asked question in advance based on community feedback from our previous engagement and basically got communities, especially those around the coastal areas, to realize the different hazards and how far that energy could take that wave inland.

Emily Breen: Sounds like having the experts with you is really helpful. I'm wondering if you could tell us a little bit about the outreach you've done with the tourism industry and why that's important?

Crystal van Beelen: Sure. When we have tsunamis, our local residents, majority of them are aware, but you have those that are snowbirds. You have those that are staying at our resort hotels, which are all along the coastal area. So the hotel industry really became a wonderful partner to help us get the word out. So getting that education piece out to our visitors, who we rely on so much as an industry here, tourism is our number one industry on the islands, we wanted to ensure that we safeguard them. And so we got our hotel industry people involved. We created pictograms to ensure that though people may not speak English as a primary language, that they would get the basic gist of what the instructions were to do during such an event. So a lot of partnership in getting that information out, we train the security we train hotel staff.

Emily Breen: So what do you find most inspiring or exciting about your work today?

Crystal van Beelen: Probably the most exciting and inspiring work is based on the people. I just see so much passion and resiliency among our people here on the islands. We're a big family here on the island. You continuously talk to people and you find out you're somehow related or what have you. But during disasters, you see the best of people come out. The Aloha spirit really comes shining through. And the fact that people want to actually help each other in these times of crisis is probably what inspires me the most. It provides me that energy to continue moving forward.

Voice Over: When it comes to the colossal force of tsunamis, preparedness and mitigation go hand in hand in creating more resilient communities. Jeanne and Crystal have used storytelling, participatory mapping, and education to help Hawaiians and visitors stay safe in the event of a tsunami. Their work conveys important tsunami safety messages and keeps memories alive for future generations. In addition to preparedness actions and education, there are many tsunami

mitigation actions that coastal communities can implement. Locating new and relocating existing infrastructure and critical facilities outside of the tsunami hazard area and elevating existing buildings above the inundation level. No matter which actions you take lessons from the past, still play a critical role in creating plans for the future. As Jeanne says:

Jeanne Johnston: I always start with my story.

Voice Over: Thank you, Jeanne and Crystal for sharing yours with us. To learn more about the topics and programs mentioned in this episode, check out the show notes. This episode of Level Up was produced by FEMA Region 9's Mitigation Division and *Resilience Action Partners*. It was made available to you through a partnership with the Georgetown Climate Center. The Georgetown Climate Center serves as a resource to state and local governments working to cut carbon pollution and adapt to climate change impacts. We thank them for helping to strengthen our community of hazard mitigation and climate adaptation professionals. For additional information and to access the Climate Center's Adaptation Clearinghouse, with thousands of free legal policy and planning resources and case studies, visit georgetownclimate.org.