

Our Ocean Backyard — *Santa Cruz Sentinel* columns by Gary Griggs, Director, Institute of Marine Sciences, UC Santa Cruz.

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Lituya Bay 1958



Lituya Bay, Alaska, was the site of the highest wave recorded in historic times, 1720 feet. This photo taken a short time later shows the bare areas along the edge of the bay where the wave tore out all of the trees.

On the night of July 9, 1958, a 7.7 Magnitude earthquake along the Fairweather Fault in southeast Alaska shook loose about 40 million cubic yards of rock (4 million dump truck loads) high above the northeastern side of Lituya Bay. This huge mass of rock plunged from an elevation of about 3000 feet down into the bay. The impact of the rock and debris generated a local tsunami that washed 1720 feet up the ridge on the opposite side of the inlet. The wave hit with such power that it swept completely over the spur of land removing all trees and vegetation from elevations as high as 1720 feet above sea level. Millions of trees were uprooted and swept away by the wave, the highest wave ever documented. For comparison, the Empire State Building with its antenna is 1470 feet high.

The wave then continued down the seven-mile length of Lituya Bay, ripping out or snapping off trees on either side of the bay at elevations up to 600 feet and then washed over a sand spit and into the Gulf of Alaska. The force of the wave stripped the soil off down to bedrock and snapped off large Spruce trees, some with trunks up to six feet in diameter.

There were three fishing boats anchored in Lituya Bay on the night the giant wave washed through. Orville Wagner and his wife Mickey were killed when their boat was sunk after being hit by the wave. Bill and Vivian Swanson, who were asleep in the *Badger*, and Howard Ulrich and his 7-year old son Junior, in the 38-ft *Edrie*, all survived. Both boats were anchored about a mile up Lituya Bay from the entrance.

Howard Ulrich reported hearing a deafening crash, resembling an explosion, at the head of the bay about 2.5 minutes after the earthquake was first felt. Based on Bill Swanson's description of the length of time it took the wave to reach his boat after overtopping Cenotaph Island in the middle of the bay, the wave may have been traveling up to 600 mph.

The violent motion of the waters from the earthquake awoke Howard Ulrich who watched the mountains shaking and clouds and dust coming from their peaks. After observing the chaos for about two minutes he noticed a gigantic wall of water coming down the inlet towards them, cutting a swath of trees along both shorelines. He estimated the wave as 50 to 75 feet high and very steep as it got closer. Finally realizing that he had to respond, he got a life jacket on his young son, started the engine but was unable to raise the anchor before the wave struck. He had steered the *Edrie* to face the wave directly and as she rose, the anchor chain snapped. The vessel with Howard and his son was carried toward and possibly over the south shore by the wave, and then toward the center of the bay by the backwash. The water in the bay swashed back and forth for about 30 minutes and then became calm. After keeping the boat under control throughout this violent ordeal, Howard and Junior Ulrich powered out of Lituya Bay at 11:00 that night.

The Swansons were also very fortunate. The *Badger*, still at anchor, was lifted up by the wave and carried completely over the sand spit at the entrance of the bay, stern first and riding the wave like a surfboard. Bill Swanson reported looking down at the top of the trees, estimated at about 80 feet tall, as they were carried over the spit. The wave broke and the boat hit the bottom and began taking on water. The Swansons abandoned their sinking boat, and in a small dingy were fortunately rescued by another fishing boat two hours later.

This wasn't the first event to generate large waves in Lituya Bay, however. Ship logs of the famous French Explorer LaPerouse (who is credited with the discovery of the Bay in 1786) commented on the lack of trees and vegetation on the sides of the bay, "as though everything had been cut cleanly like with a razor blade". Other early explorers had also commented on successive lines of cut trees, indicative of other past large landslides and inundations.

Photographs of trimlines, where all of the trees were removed, taken from 1894 to 1929 show that at least one and possibly two waves occurred between 1854 and 1916. These trimlines were largely destroyed by a huge 1936 wave that uprooted and broke trees off as high as 500 feet around the bay. The 1958 wave, however, removed all of the previous evidence and was the largest wave yet. Because of the unique geologic and tectonic conditions of Lituya Bay, such giant waves will undoubtedly occur again in the future.