

## HAZARDS AND THREATS

### TSUNAMI HISTORY

#### History of Tsunamis/High Waves that have Impacted Los Angeles County Operational Area

**July 10, 1755:** An earthquake in Los Angeles triggered two large swells that hit Dana Point.

**1927:** A tsunami hits Southern California raising the ocean by six feet.

**December 12, 1937:** High surf waves hit Los Angeles County coastline as three piers were ripped out.

**April 1, 1946:** Aleutian Islands in Alaska triggers a tsunami that hits San Pedro showing a two and one half jump in the tide.

**May 22-24, 1960:** An 8.5 magnitude earthquake hits Chile that caused a tsunami that contributed to a scuba diver death, damage to small crafts and \$1 million in damages.

**March 28, 1964:** An 8.4 magnitude earthquake hits Alaska that triggers tsunami that reached all of California including Los Angeles County.

**November 29, 1975:** A 7.2 magnitude earthquake hits Hawaii. Tsunami reached Santa Catalina Island.

**January 22-29, 1983:** A series of storms produced surf up to 20 feet high. High tides and surf produce the peak of the damage on January 26. Several piers were heavily damaged in Santa Monica, Seal Beach and Crystal Pier in Pacific Beach. Flooding damage occurred to numerous businesses and homes in Malibu, Venice and Redondo Beach. Residents from Seal Beach and Sunset Beach were evacuated. Several injuries were reported due to people being swept off the rock areas.

**March 2-3, 1983:** Waves of 15-20 feet hit the Los Angeles County coastline areas.

**May 29, 1988:** Gale force winds cause stormy seas. Avalon Harbor was closed after several boats were driven ashore or scattered. Piers were closed and surf claimed part of a restaurant in Redondo Beach. Boats were reported as capsized around San Pedro. Two boaters died as a result of the stormy seas. Several boats were reportedly smashed against the rocks in Avalon Harbor.

**July 24-26, 1996:** Seven to 10 foot surf with sets of 12 foot waves were generated by an intense South Pacific storm located south of Tahiti. 500 rescues were made at Southern California beaches.

**September 29, 2009 “America Samoa Earthquake and Tsunami”:** A magnitude 8.0-8.3 earthquake struck about 20 miles below the ocean floor, 120 miles from America Samoa, a U.S. territory, where there are 65,000 people living 125 miles from Samoa, at California time 10:48 a.m. (PDT). The earthquake flattened villages, killed 34 people, a number of people were either missing or swept out to sea. The Federal Emergency Management Agency (FEMA) deployed teams to the island areas to provide support and assess the damages. The National Oceanic Atmospheric Administration West Coast Alaska Warning Center in Palmer, Alaska issued a Tsunami Advisory for the coastal areas of California and Oregon, from California-Mexico to Oregon-Washington borders at 5:21 p.m. (PDT). The effects of the tsunami, which brought strong currents and dangerous waves, manifested in the San Pedro area at 9:06 p.m. (PDT) and in the Santa Monica Bay area at 9:11 p.m. (PDT). The Los Angeles County Chief Executive Office, Office of Emergency Management with support from County Beaches and Harbor and Fire Lifeguard Department in coordination with the California Emergency Management Agency kept watch of the County and Los Angeles County Operational Area city beaches and harbor areas. The Tsunami Advisory served as a wake-up call for the residents, renters and businesses who live in the County beaches and harbor areas to prepare for, respond to and recover from this type of hazard and threat.

On October 6, 2009, a motion sponsored by Los Angeles County Supervisors Mark Ridley-Thomas and Don Knabe was introduced at the County Board of Supervisors meeting, that approved for sending a flier encouraging all County departments and agencies to promote donations to the American Red Cross and the International Red Cross to assist the victims of the America Samoa Tsunami. The motion also called for sending a letter to California Governor Arnold Schwarzenegger and California Emergency Management Agency’s Acting Secretary Matthew R. Bettenhausen that Los Angeles is standing by and is prepared to offer its assistance, if FEMA decides the State and local resources are needed for rescue and recovery efforts. Due to the fact that Los Angeles County is home to nearly 13,000 Samoans, more than any county in the nation, Supervisor Ridley-Thomas called the tsunami a tragedy felt strongly in the county.

**March 11, 2011 “Tohoku or Great East Earthquake and Tsunami”:** A magnitude 9.0 earthquake was centered 43 miles east of the Oshika Peninsula of Tohoku, Japan that generated tsunami waves that caused extensive damage in the harbor and coastal cities. One of the tsunami waves measured as high as 133 feet. The tsunami caused nuclear power plant level 7 meltdowns at three of the reactors at the Fukushima Daiichi Nuclear Power Plant complex. More than 15,000 dead, 6,000 injured, and 3,000 were missing. The World Bank estimated economic cost at \$235 billion making it most expensive natural disaster in world history. 10 hours later a tsunami reached the California and Los Angeles County beaches and harbor areas.

## **March 11-12, 2011 “Tohoku Japan Tsunami Reaches Los Angeles County Beaches and Harbor Areas”**

At 12:51 a.m. (PST), the National Oceanic Atmospheric Administration West Coast and Alaska Tsunami Warning Center located in Palmer, Alaska placed the State of California including the Los Angeles County beaches and harbor areas on a Tsunami Advisory for a 24-hour period. The Tohoku, Japan Tsunami reached the Los Angeles County coastal areas between 10 a.m.-2 p.m. The waves capsized vessels berthed near the Santa Catalina Island, caused little to minor damage in Marina del Rey, Redondo Beach and Santa Monica. Other parts of the state were impacted including the counties of Del Norte, Santa Cruz and Monterey. Following the tsunami, a State of Emergency was proclaimed by Governor Edmund G. Brown, Jr. and a Major Federal Disaster was declared for the three Northern California counties by President Barack Obama as the Federal Disaster damage estimates was about \$50 million, but post-event field assessments and interview with harbor masters put the unofficial estimate closer to \$100 million, in either case this was the largest, most damaging tsunami to hit California since 1964.

### **Other Pacific Ocean Tsunamis**

**July 9, 869 “Sanriku Earthquake and Tsunami”:** An 8.6 on the surface wave magnitude scale earthquake hit the area around Sendai in the northern part of Honshu, Japan on July 9, 869. Following the earthquake a tsunami caused flooding in the Sendai plain. It is believed that more than 1,000 died when the tsunami wave hit. Other residents were killed due to the earthquake and landslide.

**1755:** Thousands of coastal residents in Spain, Portugal and North Africa were killed by tsunami waves triggered by an Earthquake in Lisbon, Spain.

**Aug. 27, 1883:** A volcanic eruption of Anak Krakatau located in Indonesia series of tsunami waves measuring as high as 90 feet slammed the coastline areas and wiped out the coastal community now known as Indonesia. The tsunamis killed more than 36,000 people following the explosion of the volcano Krakatau in the Sunda Strait near Java.

**June 15, 1896 “Meiji-Sanriku Earthquake and Tsunami” (7:32 p.m.):** In Kamaishi and along Sanriku coast of Honshu, Japan, residents were celebrating the return of the soldiers from the First-Sino Japanese War and a Shinto holiday when a magnitude 7.6 earthquake hit at 7:32 p.m. Approximately 35 minutes later, the ocean water receded as the Sanriku coastline was hit by the first tsunami wave, followed by a second wave minutes later. The tsunami waves coincided with high tide as it was believed that the waves were as high as 115 feet in some places when the tsunami waves hit. Entire villages along the coastlines were washed away during the evening. Nearly 9,000 homes were destroyed and 22,000-27,000 were dead or missing. The tsunami also caused damage in Hawaii as the waves measured as high as 30 feet.

**April 2, 1868:** A locally generated tsunami swept over the tops of palm trees and claimed 81 lives in Hawaii.

**Aug. 13, 1868:** A massive wave struck Chile, carrying ships as far as three miles inland at Arica. Deaths totaled 25,000 or more.

**Jan. 31, 1906:** A strong tsunami struck the coast of Ecuador and Colombia, submerging half of Tumaco, Colombia, and washing away half of a nearby island. The death toll has been estimated at between 500 and 1,500.

**February 4, 1923 Kamchatka Earthquake and Tsunami”:** An estimated 8.3-8.5 magnitude earthquake hit the Kamchatka in Russia on February 4, 1923. The earthquake triggered a tsunami that caused damage and deaths in Kamchatka. The tsunami also reached the Hawaiian Island that contributed to at least one death.

**March 3, 1933 “Sanriku Earthquake and Tsunami”:** A magnitude 8.4 earthquake hit the Sanriku coast of the Tohoku region of the island of Honshu, Japan that triggered a tsunami wave measuring as high as 94 feet. The tsunami destroyed 7,000 homes of which 4,885 were washed away. The tsunami also hit the Hawaiian Islands. More than 1,500 were killed and missing, and 12,000 injured.

**April 1, 1946 “Aleutian Island Earthquake and Tsunami”:** During the early morning, a magnitude 7.8 earthquake hit near Unimak Island in Alaska's Aleutian Island chain. It was followed by a Pacific-tsunami that destroyed the U.S. Coast Guard's Scotch Cap lighthouse on Unimak, killing all five of its occupants. The lighthouse was a steel-reinforced concrete structure standing about 90 feet above sea level. With the lighthouse unable to send out a warning message to the Hawaiian Islands. The tsunami waves traveled a crossed the Pacific Ocean and arrived at the Hawaiian Islands at approximately 7 a.m. The tsunami destroyed the Big Island Hilo's waterfront area, 96 people died (overall total statewide death toll was 159), including children attending the elementary and high school at Hawaii's Laupahoehoe Point. The tsunami waves measured as high as 45-130 feet, including 33-55 feet waves that impacted the islands of Kauai, Hawaii, Oahu and Maui. The tsunami caused \$26 million in damages. The affects of the tsunami was also felt along the United States' coastline, especially in Los Angeles and Long Beach harbor areas.

As a result of this tsunami, in 1948 the United States established the Pacific Tsunami Warning Center located in Hawaii.

**March 4, 1952 “Hokkaido Earthquake and Tsunami”:** The people of the Hokkaido region were remembering the anniversary of the 1933 Sanriku Earthquake where the residents held evacuation drills and other disaster preparedness trainings on March 3, 1952. The next day a magnitude 8.1 earthquake hit in the sea near Tokachi District of Hokkaido located to the northern part of Tohoku region on March 4, 1952. In Hamanaka in the Akkeshi District of Hokkaido, a tsunami destroyed homes. Eight years later, a tsunami would once again slam into the area due to the 1960 Chile Earthquake. The 1952 Hokkaido Earthquake and Tsunami killed 28 people, five people were missing and

287 injured. This was the first large tsunami after the inception of Japan's tsunami warning system

**November 4, 1952 “Kamchatka Earthquake” (4:58 p.m.):** A magnitude 9.0 earthquake struck off the coast of Russia's Kamchatka Peninsula at 4:58 p.m. on November 4, 1952. The earthquake generated a tsunami. The waves struck the Kamchatka Peninsula, the Kuril Islands and other areas of Russia's Far East, causing considerable damage and loss of life. There was also damage in Hilo, Hawaii, Haleiwa, Oahu, Peru, Chile and New Zealand. The waves beached boats, caused houses to collide, destroyed piers and moved pavement roads in Hawaii.

**March 9, 1957 “Andrean of Islands”:** A tsunami was generated by an 8.3 magnitude earthquake in the Aleutian Islands. The earthquake triggered a 24 feet wave that hit the Adak Island. The Hawaiian Islands were once again hit by a tsunami that caused five million dollars in damages. The highest wave in Hawaii was measured at 12 feet.

**May 23, 1960:** A magnitude 8.3 earthquake in Chile generated a tsunami. A 35 foot wave hit Hilo, Hawaii causing 61 deaths and \$23 million in damages.

**March 28, 1964:** A magnitude 8.4 earthquake struck in Prince William Sound, Alaska triggered a tsunami that caused damage in southeastern Alaska, Vancouver Island, British Columbia, Canada in addition to Washington, California and Hawaii. The hardest hit was Crescent City, California, where waves reached as high as 20 feet and destroyed half of the waterfront business district. There was also extensive damage in San Francisco Bay, marinas in Marin County as well as Los Angeles and Long Beach harbors.

**Aug. 16, 1976:** A magnitude 8.0 earthquake hit near the Moro Gulf Coast of the Philippines Islands of Mindanao and Sulu that triggered a tsunami. At least 5,000 people lost their lives due to the earthquake and tsunami. It is one of the most devastating disasters in the Philippines Islands history.

**September 26, 2003 “Tokachi-Oki Earthquake and Tsunami” (4:50 a.m.):** A magnitude 8.3 offshore earthquake impacted Hokkaido, Japan that caused extensive damage and destroyed roadways, power outages and landslides. The Tokachi-Oki Earthquake and Tsunami was responsible for one death, one missing person and 589 injuries.

**December 26, 2004 “Indonesian Earthquake and Tsunami”:** A magnitude 9.3 earthquake struck off the northwest coast of the Indonesian Islands of Sumatra and generated tsunami waves as high as 100 feet that swept across the Indian Ocean, killing almost 230 people from 14 countries. It was estimated that 150,000 people were killed in that event.

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