

Extreme Natural Events and Coastal Communities

Coastal communities face a variety of threats from tsunamis to hurricanes, Nor'easters, and Lake Effect Snowstorms. All can imperil life, property, and commerce. Dense development in the coastal area coupled with these threats can lead to significant economic impacts. The cumulative cost of the 16 separate billion-dollar weather events in the U.S. in 2017 alone totaled \$312.7 billion, exceeding the previous record of \$214.8 billion set in 2005.



Nor'easters

A storm along the East Coast of North America with winds out of the Northeast. Symptoms include: heavy rain or snow, gale force winds with associated rough seas, and sporadic coastal flooding.



Tsunamis

Highest risk along Pacific and Caribbean coasts in the US. Large fast moving waves propagated as result of large and sudden displacement of the ocean. Tsunami can flood coastal areas more than a mile inland.



Extreme Precipitation

Storms that produce high precipitation amounts – extreme rain and snow within a day or two such as during an “Atmospheric River” on the west coast and intense narrow bands of snow producing 2 to 3 inches per hour in the Midwest.

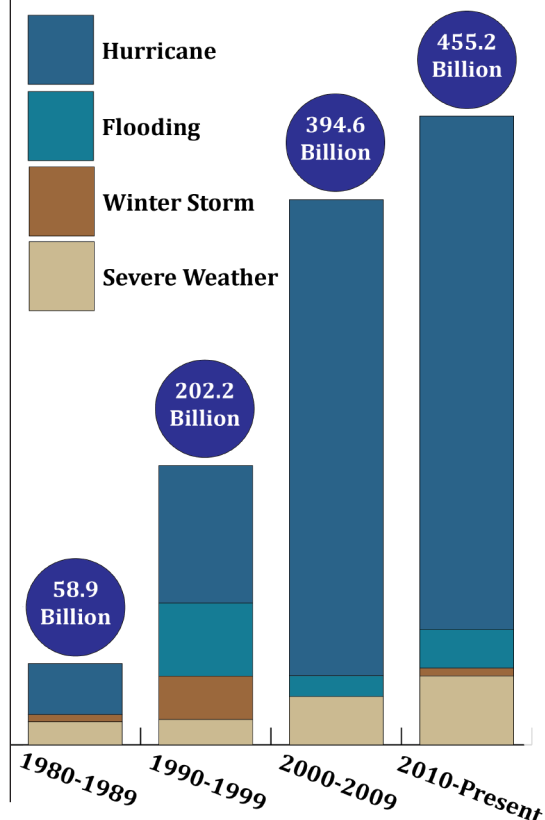


Hurricanes and Typhoons

Tropical cyclone with sustained surface wind of at least 74 mph. Hurricane in Atlantic / Caribbean, and Typhoon in Pacific.

The Rising Costs of Extreme Events

Coastal counties in the United States account for less than 10% of land area but are home to nearly 40% of the population and this number is growing. Estimates forecast that by 2025 nearly 75% of the population will live within 50 miles of a coast.



Extreme Natural Events And Coastal Management

West Coast In the Pacific Northwest, one of the greatest hazards facing the coastline are the tectonic shifts of the Cascadia Subduction Zone (CSZ) that could cause an earthquake and tsunami at any time. Both the Oregon and Washington Coastal Management Programs coordinate with local communities to help prepare for these hazards. Oregon's program works with partners to create Tsunami Inundation Maps that project the risks of tsunamis to improve evacuation maps and routes to help Oregonians "beat the wave." Washington's program helps communities face these perils by collaborating with over 100 partners on the Washington Coastal Hazards Resilience Network. Results of this collaboration include the three-year Coastal Resilience Project improving risk projections and providing guidance for land use planners – tools that coastal communities need to become resilient.

Pacific Islands Emergency Disaster Proclamations were enacted in Kauai, Hawaii after national record-breaking rainfall resulted in major flooding events on April 14 and 15, 2018. In response, Kauai CZM staff prioritized assisting the public with emergency evacuations and damage assessments. The County didn't waive requirements for compliance with their shoreline setback ordinance (one of the most restrictive setback ordinances in the country) when permitting the rebuilding or repairing of damaged homes along the shoreline. CZM staff continues to inspect and document shoreline erosion events to ensure accuracy when reviewing shoreline setback determination applications. This diligence will help ensure life and property are protected from future coastal flooding.

Gulf of Mexico The Florida Office of Resilience and Coastal Protection funds resilience and adaptation projects for coastal communities via the Resilience Planning Grants and the [inaugural] Adaptation Action Initiative - both aimed at addressing the 2015 "Peril of Flood" statute that ties together the risks from both storm surge & sea level rise. Highlighting this work to build resilient communities that also takes into account the exacerbating effects of SLR on coastal flooding.

Great Lakes In July 2016, Wisconsin's Lake Superior Basin experienced a 1000-year rain event when nearly a foot of rain fell in just 12 hours and resulted in damages of greater than \$35 million and, tragically, two lives lost. To address issues associated with extreme precipitation events, the Wisconsin Coastal Management Program applied for and received a 2018 Project of Special Merit grant from NOAA with a goal of reducing risks to infrastructure during significant rain events by mapping culvert vulnerabilities in order to better inform their maintenance cycles. This project leverages the capabilities of a regional coastal mapping community of practice, breaking down the silos between those with GIS expertise and decision-makers, and enhancing local government hazard policies.

Northeast Sand dunes play an important role in buffering the Hampton and Seabrook coastlines from erosion and flooding; however, the dunes along the New Hampshire coast face continued pressure from storm surge, dune die-off, and trampling of beach grass by users of the area. The New Hampshire Coastal Program initiated a community based restoration effort in 2015. Building on those successes and lessons learned, the work expanded and refocused restoration and planning efforts to identify and address existing vulnerabilities in the communities of Hampton and Seabrook. Community volunteers and students engaged in the planting of native species to help stabilize eroded areas and restore dunes. The project collected seasonal data and found restored dunes weathered storms, including Nor'easters, protecting landward areas better than areas without dunes.

Mid-Atlantic Maryland's Chesapeake & Coastal Service (CCS) assists coastal communities to address short- and long-term coastal hazards through the CoastSmart Communities program, an integrated program of funding, data, and technical assistance. CoastSmart delivers essential coastal mapping data through the Coastal Atlas and provides technical assistance and training to municipal governments and private practitioners to implement mitigation practices. The CoastSmart Scorecard helps communities assess risk and plan for mitigation. CCS leverages CZMA \$ 309 funding with state and EPA funds to support community projects in the Community Resilience Grant Program, which has invested over \$1.5 million in 23 counties to develop local flood mitigation plans, update floodplain ordinances, and create a comprehensive hazard mitigation plan for the City of Baltimore.

Southeast The South Carolina Department of Health and Environmental Control (DHEC) Office of Ocean and Coastal Resource Management hit the ground running after Hurricane Matthew slammed the state's coast in 2016, where it caused nearly \$341 million in damages. Within two weeks, DHEC coastal specialists had evaluated 1,466 sites and issued more than 200 emergency permits for structure repair. DHEC emergency orders enabled residents to use sand bags, sand scraping, and beach nourishment for oceanfront protection. For structures damaged beyond repair, the program offered technical engineering assistance to complete assessments and guide property owners through regulatory processes for rebuilding or, in the case of erosion-control structures, removal.

