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HAWAII NEWS

Hawaii's reefs provide more than \$835M in flood protection, study shows

By [Nina Wu](#) • May 4, 2019

A new study places a dollar value on Hawaii's reefs — not for their natural beauty or as a tourist attraction, but for their function in providing flood protection.

Hawaii's reefs are valued at more than \$835 million, according to a [report](#) recently released by the U.S. Geological Survey, The Nature Conservancy and the University of California-Santa Cruz. That's how much they provide in flood protection, more than any other state or territory in the nation.

Reefs across the U.S. provide more than \$1.8 billion in flood protection every year, the report found, including about \$12 million on Kauai, \$395 million on Oahu, \$377 million on Maui and \$51 million on Hawaii island.

In a 50-year storm, TNC said, coral reefs off Honolulu alone could provide more than \$435 million in flood protection.

"Most people have no idea how valuable coral reefs are for coastal protection," said co-author Michael Beck, a research professor at UC-Santa Cruz, in a news release. "Now we do. Reefs act as submerged breakwaters, 'breaking' waves and dissipating up to 97% of their energy offshore. While these may look like general, 'back of the envelope' numbers, they are not. They are based on what are now the best flood risk maps available for U.S. coastlines, predicting risk at 10 meters by 10 meters, which is about one one-hundredth the area of a city block."

Standing at a beach in Waikiki, for example, Beck said waves might lap at one's feet. But if one were to look offshore, one would see the reef breaking the wave energy from afar.

“What you sort of forget is that if that reef wasn’t offering that protection, you and that beach would not be there,” he said.

Beck, a former lead scientist for TNC’s Global Oceans Program, said the team worked with the engineering and insurance industries to create the models estimating the values for almost 2,000 miles of coral reef coastline across the U.S. They included the coastlines of Hawaii, American Samoa, Guam, the Commonwealth of the Northern Mariana Islands, Florida, Puerto Rico and the U.S. Virgin Islands.

The two-year-long study used supercomputers to calculate these values, he said, using data from the Federal Emergency Management Agency and U.S. Census to derive the economic dollar figures. They factored in the value of people, buildings and infrastructure.

“Our goal in this study was to provide sound science to identify where, when and how U.S. coral reefs provide significant coastal flood reduction benefits to ultimately save dollars and protect lives,” said USGS research geologist and lead author Curt Storlazzi in the news release.

The U.S. spends an average of \$500 million per year mitigating coastal hazards with seawalls or other structures, said Beck, but should consider a natural solution — coral reef restoration — to address these coastal risks from future storms. FEMA is now considering how to include reefs as part of its policies on flood mitigation.

“We’re working with them, even with values in this report, so we can make the case together that investments in reefs are good investments and cost-effective flood protection,” he said.

The research is a game-changer for Hawaii, according to Kim Hum, TNC’s Hawaii Marine Program director.

“We know that Hawaii benefits in many ways from healthy coral reefs,” she said in the news release, “and now we can quantify those benefits and identify specifically who receives them — whether they be coastal businesses, resorts, homeowners or critical government infrastructure like military bases, roads and sewage treatment plants.”

Reefs are important to sustaining ocean life, she said, and as cultural and recreational resources. Knowing the dollar value of the coastal infrastructure protected by reefs is an important step toward directing investments toward their restoration. Reef restoration work can help reduce the risk in areas prone to flooding, she said.

“We see houses impacted on the North Shore, and roads on Maui and Oahu getting inundated by waves,” she said. “Reefs can help provide protection and mitigate that wave energy.”

While the role of coral reefs is promising, they are in trouble at the same time.

In 2015 an estimated 50% of the live coral cover on Maui, and up to 90% of some West Hawaii reefs, were lost to a mass bleaching, according to TNC. Recent studies have shown, however, that reefs can recover under proper management.

The impacts of sea level rise, another growing concern, were not factored into this study, said Hum, but are being considered for future studies.

The dollar figures also allow the insurance industry to get involved. In Mexico, for instance, the government, TNC and other partners have set up an innovative [trust fund for a reef insurance policy](#). If severe weather damages the reef, insurance would be available for restoration efforts. Hum said TNC is now conducting a feasibility study for a similar reef insurance policy for Hawaii's reefs.

“We should be investing in reef management and insuring our investment so that we can keep those benefits in the years to come,” she said. “If you have a resource that is worth more than \$800 million, you want to insure it against damage.”