

HAWAII NEWS

Hawaii's 'million-dollar reefs' need more funding to protect us, study finds

By [Mindy Pennybacker](#) • April 19, 2021

A new study shows U.S. coral reefs provide \$1.8 billion in flood-risk benefits to property owners and people's livelihoods every year, with top value assigned to the reef stretching offshore of Diamond Head, Waikiki and Kakaako.

Individual reefs in Hawaii and Florida deliver the highest dollar value, according to the study by researchers from the University of California, Santa Cruz, estimating that each kilometer of reef provides more than \$10 million of flood protection.

The study, published Thursday in the journal Nature Sustainability, estimates the Diamond Head, Waikiki and Kakaako reef on Oahu saves an estimated \$154.3 million in damage a year, while another half-dozen Hawaii reefs each block more than \$50 million in flood damage.

Noting that coral reefs are diminishing worldwide due to warming and acidifying seas, the study, titled "The value of U.S. coral reefs for flood risk reduction," warned that if U.S. reefs lose 1 more meter in height, the number of properties in severe flood risk zones would increase by 23%, the number of people potentially affected by annual floods would increase by 62% and potential damage costs would increase by \$5.3 billion.

"This study focused on impacts to people, including vulnerable people," said co-author Michael W. Beck, a research professor at the UCSC Institute of Marine Sciences, noting studies by the U.S. Geological Survey show a loss of 2 to 3 feet of reef height already in the Caribbean and some places in Hawaii.

"The analyses include how much reefs avert direct damage to properties, but also to livelihoods."

In a novel approach for valuation of ecological systems, Beck said, the researchers applied the same modeling tools and methodology as that used by engineers and insurers, the Federal Emergency Management Agency and the U.S. Army Corps of Engineers to prove the value of coral reefs in protecting against disasters, such as coastal flooding in 100-year-storms.

Overlaying computer models predicting storm wave action with high-resolution maps of topography and coral distribution to build risk frameworks for property, economies and infrastructure, the study aims to inform national policymakers and coastal managers, he added.

"Right now we spend tens of billions on gray (man-made) infrastructure and very little on our natural green infrastructure," Beck said. "We want this study to inform policy and practice about how we spend our disaster mitigation and recovery moneys so that we use less money on artificial infrastructure like seawalls and more in conserving natural infrastructure like reefs."

Sarah Severino, a research technician in the Coral Reef Ecology Lab of the University of Hawaii Institute of Marine Biology, praised the study.

"I'm glad they're putting a number on coral reef ecosystem service because, hopefully, this will bring awareness to it in public policy," she said.

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“It’s a great angle to help preserve reefs, because even though we tell people reefs protect us, they still think their only service is providing pretty fish and corals to look at,” said Severino, who has for years been part of a field research team conducting carrying-capacity studies for Hanauma Bay.

The dollar amounts in the study could make for an effective wake-up call, she said, noting, “It doesn’t really hit home until you say it’s providing this much insurance to your house and community,” and if reefs continue to erode, “flood insurance is going to skyrocket in areas of economic growth and concentrated populations like Waikiki, Kakaako and Kailua.”

In addition to Hawaii and Florida, the only states whose waters sustain coral reefs, the study, conducted in partnership with the U.S. Geological Survey, examined reefs in the U.S. territories of Puerto Rico, the Virgin Islands, Guam and American Samoa.

It contains a map, “The million dollar reefs of Oahu,” which provides dollar values, all in the millions, for several of the island’s reefs, including those at Kailua (\$83 million), the Windward Shore (\$62 million), the North Shore (\$18.1 million), Waianae (\$92.4 million) and East Honolulu from Black Point to Portlock Point (\$78.4 million).

Because the focus of the study was impacts on people and man-made infrastructure, unpopulated natural areas with significant coral reefs, such as Hanauma Bay, were not included, Beck said, adding, however, that the research team has started another study using the same methods to monetize the benefits of ecosystem and protection by coral reefs.

“The core thing we’re trying to do is say reefs are really valuable, and by being able to value them clearly, we’re trying to drive new investments into their restoration so that they can help protect us,” he said. Beck said the researchers are also talking with The Nature Conservancy about how to insure coral reefs so that when they are damaged, the public can receive payouts for their repair.

MILLION-DOLLAR REEFS OF OAHU

Each kilometer of coral reefs lying off the Oahu locations below provides \$1 million in flood protection benefits, adding up to:

Diamond Head, Waikiki, Kakaako: \$154.3 million.

Kahala to Portlock: \$78.4 million.

Kailua, Lanikai: \$83 million.

Windward Shore: \$62 million.

North Shore: \$18.1 million.

Mokuleia: \$12.1 million.

Waianae: \$92.4 million.

Ewa: \$77.5 million.

source: J. Kendall-Bar & C. Lowrie, UCSC