

HAWAII NEWS

Plastic marine debris on Hawaii's windward coasts comes mostly from abroad, study finds

By [Nina Wu](#) · Oct. 12, 2019

A study conducted at Hawaii Pacific University has found that the majority of marine debris washing up on Hawaii's shores is not from the isles, but from abroad.

While the pollution on leeward beaches typically originates from Hawaii tourists and residents, the greater volume of debris on the windward side of the isles is being swept in from faraway places.

“The far majority of plastic pollution in the Hawaiian marine environment is washing ashore from long, long distances on our windward beaches, where we have fewer residents and tourists,” said Jennifer Lynch, co-director of HPU's Center for Marine Debris Research. “So our residents and tourists aren't to blame for the far majority of marine debris here in the islands. We need to be looking outside of the state for the sources of what's coming to us.”

The study was recently published in *Environmental Science & Technology*, a peer-reviewed journal.

While pollution found on leeward beaches typically originates from Hawaii residents and tourists, the study found the greater volume of debris on the windward side of the isles was swept in from as far away as 3,000 miles — possibly from the coasts of Asia as well as the Americas.

This study is the most comprehensive of its kind to date, not only due to the sample size, said Lynch, also a research biologist for the National Institute of Standards and Technology, but due to the groundbreaking methods used to collect the data.

Researchers assessed and compared plastic marine debris from four different environmental categories: the sea surface, the seafloor and windward and leeward shorelines.

In all, the research team collected 4,671 pieces of plastic debris from three sea surface tows, the seafloor at three dive sites and 11 beaches.

The research team identified the different types of plastic using a special technique — Fourier Transform Infrared Spectroscopy — to analyze the chemical composition of each piece collected.

Each different environmental category offered varying characteristics.

Items on the sea surface included a weathered toothbrush, an oyster spacer and a plastic bottle cap. On the leeward side there were fewer weathered plastics and items that would sink in sea water. On the windward side there were many floating plastics.

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Lynch said based on weathering and chemical composition, many of the plastic pieces on the windward side were similar to those in the sea surface category, indicating they likely floated in from thousands of miles away.

The ones collected from the leeward side, on the other hand, were less weathered and heavier types of polymers.

On the seafloor there were many local sources, such as monofilament fishing lines, which are made of nylon, and fishing lures made of polyvinyl chloride, as well as sunglasses — and a toy shark that was found off the coast of Maui.

What's alarming about the toy shark, said Lynch, are what appear to be bite marks on its fins, which means marine mammals had been feeding on it.

Polymers lighter than seawater float, she said, while heavier ones sink near their original source. So a plastic bottle cap, for instance, will float for thousands of miles on the sea surface, while a cigarette butt, made of cellulose acetate, will sink near the person who disposed of it along the shoreline.

The results of the study support others that focus on fisheries practices as a solution for plastic marine debris in Hawaii, she said.

The newly established Center for Marine Debris Research worked in partnership with NIST, the University of Hawaii at Manoa as well as local beach cleanup groups including Surfrider Foundation, Sustainable Coastlines Hawaii, 808 Cleanups, Hawaii Wildlife Fund, Swell Consulting and SHARKastics.

Its goal is to help eliminate plastic waste from the ocean through research of its sources, transport, fate and impacts.