

Tsunami Debris on Kaho'olawe?

It is early morning at the small Kihei boat harbor on Maui. We, the members of the IPRC marine and tsunami debris project (**Nikolai Maximenko**, **Jan Hafner**, and **Gisela Speidel**) are with the Hawai'i State International Coastal Cleanup Coordinator **Chris Woolaway** and with a Japanese team from NHK television network: **Jun Matsuda** (Program Director of NHK's News Features Production Center), **Tsuyoshi Namekawa** (camera man) and **Yasue Drabble** (project coordinator). The NHK team is here to film a documentary on marine and tsunami debris with the explanation: "Hawai'i is the last place for the marine debris, which floats around the Pacific Ocean, to end up, and in the future, a lot of debris from the March 2011 Tohoku tsunami will arrive here."

We are all going to the tiny volcanic island of Kaho'olawe. The island was once a military training ground that has only partly been cleared of un-



exploded ordinance. Now as a Native Hawaiian cultural heritage site, the island can be visited by special permission only. We are meeting **Michael Naho'opi'i**, Executive Director of the Kaho'olawe Island Restoration Commission (KIRC). Less than a year ago, 15 tons of marine debris were airlifted off Kanapou beach, the beach to which we are going. New debris is already accumulating, and Naho'opi'i, concerned about marine debris on this special island, is giving us the opportunity to

study its accumulation in Kanapou Bay.

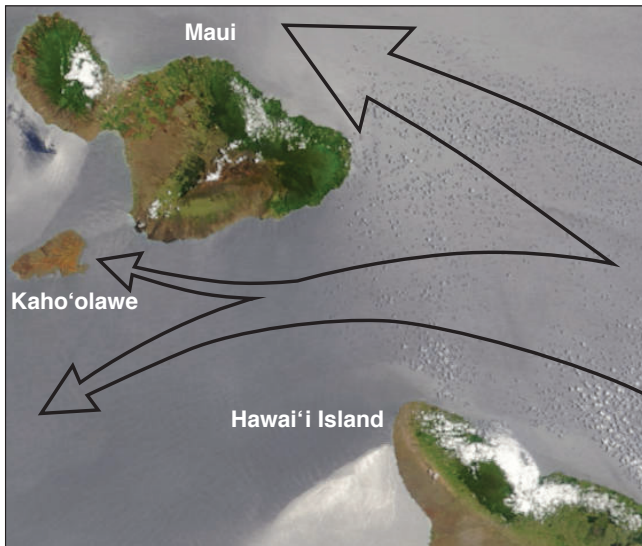
IPRC's marine debris project leader, Senior Scientist Nikolai Maximenko, was at first surprised to hear that Kaho'olawe gets much marine debris as it lies in the wind shadow of Maui. The Hawaiian Islands collect marine debris mostly along their windward-facing beaches.

We travel to the island on the KIRC boat, a flat-bottomed, 40-foot-long landing craft with a rectangular bow that can be lowered to drop people and cargo off in the water. After a high-speed trip of some 30–40 minutes out of Kihei, we approach Kanapou Bay. The vertical cliffs look forbidding and inaccessible. But finally a narrow, mud-brown strip of sand appears wedged between the sheer cliffs.

Some 100 yards from shore, the bow is lowered. We must jump into the deep water and swim to shore with our gear. Already as we step on to the sand, a thick rim of debris greets us above the waterline. It is hard to believe that the beach was cleaned by KIRC volunteers less than a year ago!







Likely path of wind-driven debris.

Why does this beach, which appears to be protected by Maui to the windward and which has no visitors except for the occasional KIRC volunteers, collect so much debris? “The combined funneling of the northeast trade winds and prevailing currents choke the five miles of the Bay with debris from the ocean,” explains the KIRC brochure.

In addition to heaps of tangled, derelict fishing nets and gear, much intact debris is strewn across the beach: blue barrels, about 3-5 feet tall, different-colored crates and buckets, lots of fins, and hard hats, and even a child’s baseball bat and ball. US Coast Guard and Navy buoys are scattered in the sand.

Much of the debris is still usable. Even though some objects have Japanese, Korean, or Chinese characters printed on them, the pieces are astonishingly free of barnacles, which commonly cling to objects on their long ocean voyages. Maximenko says that on no other Hawaiian beach did he ever see such large debris with so little wear and tear, not even on remote Kamilo Bay on the southwest corner of the Big Island. These items, he concludes, must be local debris, and because of the prevailing currents, the debris must have come from Maui and Hawai’i Island, or have been lost from boats navigating near these two islands (see map).

The typical international marine debris that accumulates on the beaches of the Hawaiian Islands is also here: the hag fish traps and the oyster spacers from Asia. Also typical of other wind-facing beaches is the large amount of microplastic, the end condition of plastic objects that have either chemically disintegrated or have been ground into tiny piec-

es by machines, water or sand. **Jennifer Vander Veur**, the KIRC ocean specialist, has studied the accumulation of these tiny plastic pieces on the beach here. It collects further up on the beach, and she says that when she dug deeper down, the amount seemed to increase with depth, something that Maximenko has also noticed on other beaches, such as the rocky beach near South Point (*IPRC Climate*, vol.12, no. 1).

Most intriguing are two large, red light bulbs with Japanese characters. Such bulbs have recently been found on Hawaiian shores and are thought to come from Japanese fishing boats lost in the tsunami. A further hint of the tsunami is a huge oyster buoy that lies only a few feet from the water’s edge. Numerous oyster buoys have washed up on the Washington State coastline and are thought to be from the tsunami. How long has this buoy been here? We do know that it arrived after the last cleanup in 2011. Does it mean tsunami debris has arrived here, as on other islands?

Suddenly we are told to pack up. The boat is back, the captain is impatient, urging us to the boat. “Never stay till after noon!” It is nearly noon and the wind is picking up. If the waves get any higher, we’ll have trouble swimming out to the boat and might get stranded on the beach.

Reflecting on what he has observed, Maximenko thinks that a marine debris monitoring site at Kanapou Bay on Kaho’olawe would have great advantages: it would allow gathering systematic information about the nature of marine debris accumulation free from outside influence other than wind, ocean currents and waves, and the shape and structure of the bay and beach. The type of objects we saw suggests moreover that the beach would be ideal to study the footprint of local debris, produced by ocean activities around the Hawaiian Islands, as well as debris from the whole North Pacific subtropical gyre.

Story and photos by Gisela E. Speidel.

