

Salvaging Offshore Waste near Massachusetts

From a gun to a moonshine bottle, The Rozalia Project retrieves discarded items from oceans near the shores of the United States. On Dec. 5, Rachael Miller, the project's founder and executive director, presented her work at the New England Aquarium in a talk titled "Meet Your Local Garbage Patch: Surface to Seafloor Marine Debris Cleanup in Boston Harbor and the Gulf of Maine."

It is "hyperbole" that there is a patch of plastic garbage the size of Texas circulating in the Pacific, Miller said. Much of the seaborne plastic has been broken down into small particles, so the sea looks normal.

"What we see as a primary problem is contamination of the human food chain," Miller said. At sea, plastic particles absorb toxins. Researchers from the University of Exeter who partnered with The Rozalia Project have found that plankton are eating these pieces of plastic. Fish also ingest the particles.

Miller said she expects to eventually see research showing cancer in humans who eat fish that have consumed toxic plastic.

The Rozalia Project maps out systems of rotating currents in the ocean, known as "gyres," and goes there in search of slicks containing debris. Staff and interns found one of these slicks on the approach to Portland, Maine. The slick is a brown mass containing both trash and living things. Miller said she plans to use an unmanned aerial vehicle to study slicks like this one in the Gulf of Maine.

The main challenge The Rozalia Project and similar organizations face is to find ways of separating marine life from human-created debris. It would be simple to skim the plastic out of the ocean and remove plankton and fish along with it, but that would be destructive to ocean ecosystems.

"We just want to fish for the trash," Miller said.

Project staff and interns are currently inventing a box that will capture plastic and other trash without removing living things from the ocean. This invention, called the Baleen Basker, uses strings of plastic to capture waste from the ocean. This works well because plastic debris tends to stick to plastics and oils. So far, project staff have caught 90 percent of the trash they sought and reduced the yield of living things by 40 percent, Miller said.

Miller said she hopes the Baleen Basker can be scaled up for use by commercial sailors who can clean the ocean as they travel.

Many of the items The Rozalia Project finds are in good condition and can be cleaned and reused. Miller showed a photo of a power drill battery from the Boston area which was still usable.

Cups, plates and utensils are the types of debris The Rozalia Project discovers most often on the sea floor. Miller showed the audience photos of glass bottles, cans, and water bottles. Cigarettes turn up frequently on the surface of the water and on the sea floor.

Foam and food wrappers are also common. Near Los Angeles, docks with foam undersides are exuding small foam balls into the ocean. As a result, Los Angeles yielded the highest amount of offshore captured waste in the United States at the time of a 10-city study. The Rozalia Project is working to encourage local decision makers to use closed-cell foam in the future.

Exfoliant beads are a surprisingly pernicious problem in the ocean, Miller said. Beauty product manufacturers use these beads instead of choosing biodegradable alternatives like apricot shell. Once they enter the sewage system, these beads travel into the ocean easily, since water treatment technology is not designed to filter them out.

Near Boston, The Rozalia Project's underwater remotely-operated vehicle has discovered many items – from a bicycle in Jamaica Pond to a gun in the Charles River. A pair of jeans turned up near the New England Aquarium. An intern found a witch's hat in Jamaica Pond. And a crab was found moving a pair of zebra-striped sunglasses that one of the interns recognized.

Kids in Jamaica Plain participated in an education program and found it fascinating to watch the remotely-operated vehicle's video. Watching this video is like exploring underwater.

Miller said she estimates The Rozalia Project has conducted education programs for 9,000 people this year. She encouraged the audience to promote responsible waste management near shorelines. Preventing one bucket from entering the ocean in Boston is much easier than retrieving 10,000 plastic particles from the middle of the Atlantic, she said.