

## A Plague of Plastic



Nicole Chatterson  
Patagonia  
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**In the North Pacific Gyre, lost or abandoned fishing nets catch plastic and other debris.**

What we do on land affects even the most remote parts of our planet including our oceans. In the North Pacific Gyre, a rotating body of ocean currents roughly 1,000 nautical miles northeast of the Hawaiian Islands, the magnitude of human impact is powerfully clear. Trash, notably plastic waste, is accumulating here and turning our oceans into a synthetic soup. Everything from tiny plastic fragments to fully intact car tires litter the water column.

The Algalita Marine Research Foundation first visited the gyre 10 years ago, only to discover plastics outweighed zooplankton (the base of the food chain) by a ratio of 6 to 1. In a 2008 survey of the same area, that ratio had increased to 8 to 1.

Many of us have witnessed the sad state of our gutters and storm drains. It is this land-based debris that ultimately enters the ocean via rivers and drainage outlets. Of the trash found in the North Pacific Gyre, 80 percent originates on land. Some of this debris eventually breaks down. But the plastic debris is different.

Plastic is essentially a permanent material. Plastics do not biodegrade and return to basic natural materials. Most microbes can't decompose their chemical structure. Instead, plastic just becomes more and more brittle, and breaks into progressively smaller pieces. Water samples taken from the North Pacific Gyre consistently produce plastic particles less than one half a millimeter in size (much smaller than the diameter of a pinhead).

The small size of these plastics makes it nearly impossible to remove them from the oceans. Plastics of this size are easily ingested by marine

organisms, including many of the organisms that make up the base of the ocean's food chain. Algalita has identified plastic in several small mesopelagic fish species collected on a February 2008 trip to the gyre. These small fish are near the base of the marine food chain. As the fish are consumed by animals further up the food chain, the contaminants are released into the tissues of the predators. Predators highest on the food chain (humans are the top) have been shown to exhibit the highest levels of contaminants.

Several species of seabirds have been found to ingest plastics of larger sizes. The Laysan albatross is one well-studied example of the effects of plastic pollution on animals. Not only do the mature individuals consume plastic debris, such as bottle caps and cigarette lighters, but the birds regurgitate the plastic when they feed their chicks. The gut of the baby bird becomes filled with indigestible plastic, and the bird starves.



**Concentrated on the right are all the items retrieved from inside the bird: Plastic lighters, bottle caps, and other plastics that are carelessly tossed often wind up floating on the ocean surface, where they are occasionally consumed by foraging seabirds and other marine creatures.**

Studies have also shown that plastics accumulate and concentrate contaminants. One study found that oceanic plastics had as much as 1,000,000 times more pollutants than the surrounding seawater. In addition, several plastic additives can leach out into the environment - whether the environment is water or body tissue. These compounds such as phthalates and bisphenol-A, have been shown to have adverse effects on human health. These endocrine disruptors are suspected of a wide range of human health impacts, from cancer, to brain damage, to reproductive interference.

So how do we stop this? Stop the source of the pollution. We have created a synthetic polymer that lasts almost forever and we often use it to package one-time-use products. Stop buying over-priced plastic bottled drinking water. A reusable (glass or stainless steel) water bottle is better for the environment, for your health and your pocketbook. Make the choice to bring your own reusable shopping bag to the store. Pick up trash on your next visit to the beach. Simple steps, small lifestyle changes and concrete action multiplied throughout a community and a nation can have a big impact.

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