

November 1997

Plastic pollution in North Pacific affects seabirds

Surveys of seabirds caught as bycatch in the pelagic, or open-ocean, waters of the eastern North Pacific has underlined the existence of widespread plastic pollution in the ocean, and suggests that ingestion of plastic by seabirds is a serious problem.

Writing in *Marine Pollution Bulletin*, researchers Louise Blight and Alan Burger note that plastic particles were found in the stomachs of 8 of 11 seabird species studied. Plastic was found in every single surface-feeding bird (from two storm-petrel, one albatross, one petrel and one fulmar species), and in 75% of shearwaters.

Blight and Burger note: "Increasing plastic production since the 1960s and a corresponding rise in the amount of plastic debris in the oceans correlate with an increase in the consumption of plastic in seabirds. The uncertainty over the long-term, cumulative effects of this pollution on seabirds makes it important to monitor plastic ingestion worldwide. Our results confirm the high frequency of plastic particles in surface-feeding birds, as well as in some pursuit-divers, from the eastern North Pacific. This provides further evidence of widespread pollution of the pelagic ocean by both user and industrial plastic."

Source: L.K. Blight and A.E. Burger. 1997. Occurrence of plastic particles in seabirds from the eastern North Pacific. *Marine Pollution Bulletin* 34(5): 323-325

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Plastics in Our Oceans

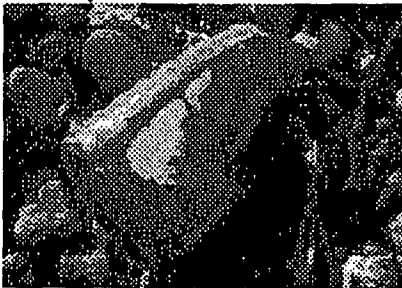
by Kimberly Amaral

Strolling through the average supermarket, shoppers find literally hundreds (if not thousands) of items to make their lives easier.

Individually wrapped snack cakes, plastic baggies to store sandwiches for lunch, unbreakable soda bottles, and disposable razors, diapers, and shampoo bottles. Unless specifically requested, even the bags we use to carry home our goods are often plastic.

To humans, these are items of comfort, if not necessity. But to marine animals, they can be a floating minefield.

Photo by K. Amaral

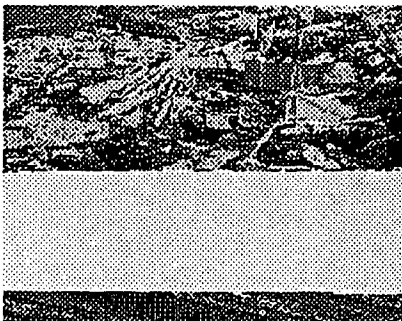


Plastic--whether it be for a container, a wrapper, or the product itself--has become an everyday part of our lives. This isn't necessarily a bad thing--plastic is also the material diabetics use for their disposable syringes; arthritic patients have for their replaced hips; and construction workers wear to protect their heads.

But when plastic reaches our waters, whether it be plastic bags or drifting fish nets, it poses a threat to the animals that depend on the oceans for food. To a sea turtle, a floating plastic bag looks like a jellyfish. And plastic pellets--the small hard pieces of plastic from which plastic products are made--look like fish eggs to seabirds. Drifting nets entangle birds, fish and mammals, making it difficult, if not impossible to move or eat. As our consumption of plastic mounts, so too does the danger to marine life.

Before the days of plastic, when fishermen dumped their trash overboard or lost a net, it consisted of natural materials--metal, cloth or paper that would either sink to the bottom or biodegrade quickly. But plastic remains floating on the surface, the same place where many genuine food sources lie--and can remain so for 400 years. Plastic is durable and strong--precisely the qualities that make it so dangerous if it reaches the ocean.

It can get there from here



But how would a syringe that a diabetic uses make it into the ocean? If plastic objects make it into the main sewer system (say, by being flushed down the toilet, or carried by the rain into a street drain), and the water treatment plants are overwhelmed by excessive rain, then those floating objects can float right out to sea. This is precisely what happened on the New York and New Jersey beaches in 1988, when medical waste was floating up onshore. After an unusually dry spring, litter began accumulating on the streets and in storm sewers. When heavy rains arrived in mid-summer, they swept the streets

clean and overloaded combined sewers. After floating out to sea, the debris was blown back onto the

shores.

In a more direct route, boaters may dump their trash right into the sea. In the past, this has been the main cause of plastics in the ocean. In 1975, the National Academy of Sciences estimated that 14 billion pounds of garbage was being dumped into the ocean every year. That's more than 1.5 million pounds per hour. More than 85% of this trash was estimated to come from the world's merchant shipping fleet in the form of cargo-associated wastes. According to the Academy, the United States could be the source of approximately one third of this ocean pollution.

Fortunately, since the last day of 1988, it has been illegal for ships to dump plastics into the ocean. But that law is difficult to enforce, and cannot account for the thousands of miles of driftnets and other gear set by fishermen, which can ensnare and kill birds diving for the fish below, or come loose, only to be discovered later by an unfortunate humpback whale.

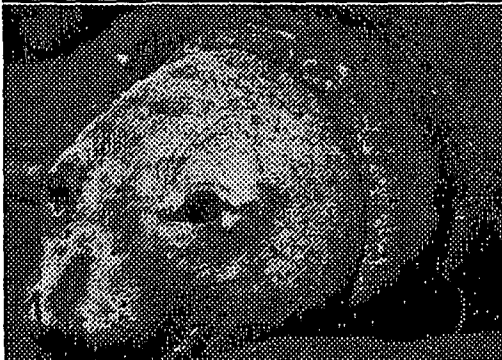
It's a great big world out there

Anyone who's been on a boat far from the sight of land will tell you how enormous the ocean feels. Wouldn't this debris simply get dispersed, virtually eliminating the possibility of an encounter with a marine animal? The answer is no. While the ocean does disperse the trash, it also runs in currents, which can keep the floating trash traveling constantly in "gyres," concentrating it in areas where currents meet. The largest of these movements, is called the central gyre. It moves in a clockwise circular pattern, moving inside the Gulf Stream, and dominates the western North Atlantic. Studies begun in 1984 have tracked how these currents keep plastics migrating, with heavy concentrations in the northern Sargasso Sea (coincidentally, a favorite spawning place for fish). The Northeast United States, "upstream" of the central gyre, has currents that keep most of the locally generated marine debris local. Usually the only ways to escape this constant circular pattern is if the plastic decays enough to sink, or lands onshore to be (hopefully) picked up by a passer-by.

And apparently, the ocean isn't large enough to avoid marine life encounters with debris. Plastic's devastating effect on marine mammals was first observed in the late 1970s, when scientists from the National Marine Mammal Laboratory concluded that plastic entanglement was killing up to 40,000 seals a year. Annually, this amounted to a four to six percent drop in seal population beginning in 1976. In 30 years, a 50% decline in Northern Fur Seals has been reported.

Elephant seal entangled in fishing line. Photo by John Domont.

Courtesy of the Center for Marine Conservation.



These curious, playful seals would often play with fragments of plastic netting or packing straps, catching their necks in the webbing. The plastic harness can constrict the seal's movements, killing the seal through starvation, exhaustion, or infection from deep wounds caused by the tightening material. While diving for food, both seals and whales can get caught in translucent nets and drown. In the fall of 1982, a humpback whale tangled in 50 to 100 feet of net washed up on a Cape Cod beach. It was starving and its ribs were showing. It died within a couple of hours.

Along Florida's coasts, brown pelicans diving for fish sometimes dive for the bait on a fisherman's line. Cutting the bird loose only makes the problem worse, as the pelican gets its wings and feet tangled in the line, or gets snagged onto a tree.

Plastic soda rings, "baggies," styrofoam particles and plastic pellets are often mistaken by sea turtles as authentic food. Clogging their intestines, and missing out on vital nutrients, the turtles starve to death. Seabirds undergo a similar ordeal, mistaking the pellets for fish eggs, small crab and other prey, sometimes even feeding the pellets to their young. Despite the fact that only 0.05% of plastic pieces from surface waters are pellets, they comprise about 70% of the plastic eaten by seabirds. These small plastic particles have been found in the stomachs of 63 of the world's approximately 250 species of seabirds.

Wildlife is not the only area to suffer from the effects of marine debris. Plastic bags are the leading external cause of marine engine damage in Massachusetts. Other plastic items foul propellers and interfere with fishing tackle.

What's being done about plastics

In 1987, a law was finally passed restricting the dumping of plastics into the ocean. The Marine Plastic Pollution Research and Control Act (MARPOL) went into effect on December 31, 1988, making it illegal for any U.S. vessel or land-based operation to dispose of plastics at sea. It is part of an international treaty, where countries representing at least half of the shipping fleet tonnage in the world agreed to Annex V of the treaty, preventing "pollution by garbage from ships." It prohibits the dumping of plastics anywhere in the ocean, and the dumping of other materials, such as paper, glass, metal, and crockery, closer to shore.

The plastics industry has also stepped in, taking measures to reclaim plastic resin pellets that often get lost during production or transport. The Society of the Plastic Industry has produced many public service ads for trade magazines, and was a strong supporter of MARPOL Annex V.

Plastics manufacturers are also investigating ways to create "degradable" plastics. Although all materials eventually break down, a plastic soda ring can take up to 400 years to biodegrade. So researchers are working with two types of degradable plastics: photodegradable and biodegradable.

Photodegradable plastics are made to become weak and brittle when exposed to sunlight for prolonged periods. At least 16 states--Massachusetts, New York and Rhode Island included--have passed laws requiring six-pack holders be biodegradable (these are marked by a small diamond between the rings).

Biodegradable plastics are made with cornstarch, so bacteria and other organisms eat away at the plastic, breaking it up into smaller pieces. Neither of these methods, however, solve the problem of plastic in the oceans, since they are only broken up into smaller pieces--creating an even more dangerous situation for animals that mistake smaller plastic pieces for food.

Perhaps the most effective method right now for solving the persistent plastic problem is beach cleaning. Coastal cleanups gather volunteers to collect trash that has washed up on the beach--or has been left by beachgoers to be carried out by the surf--and removed it from the marine cycle.

The Center for Marine Conservation has been coordinating coastal cleanups since 1986. (The first nationwide cleanup took place in 1988, just four months before the MARPOL treaty took effect. Canada and Mexico joined in on the act in 1989.) The CMC also keeps careful track of all the debris that is collected. Data cards list 85 debris items in eight categories: plastic, styrofoam, glass, rubber, metal, paper, wood and cloth. During the 1993 coastal cleanup, over 3.1 million pounds of trash was collected--more than half of that was plastic.

The CMC also divides their data into debris found, listing the "dirty dozen"--twelve items found most frequently:

- 1) cigarette butts
- 2) paper pieces
- 3) plastic pieces
- 4) styrofoam
- 5) glass pieces
- 6) plastic food bags
- 7) plastic caps and lids
- 8) metal beverage cans
- 9) plastic straws
- 10) glass beverage bottles
- 11) plastic beverage bottles
- 12) styrofoam cups

Debris that can be traced to recreational fishing and boating, galley-type wastes, and cruise ship debris all declined in 1993--perhaps a glimmer of hope resulting from the MARPOL treaty. The laws, enforced by the Coast Guard in the United States, are difficult to monitor. Instead, they rely heavily on an educational campaign, bringing about "voluntary compliance through awareness."

There is still much debris floating around our seas and endangering marine animals. But as more laws are passed, and as more people become involved in projects like beach clean-ups, perhaps the only plastic will be in our supermarkets.

What you can do

- 1) Look for alternative materials or avoid excessive packaging when deciding on purchases. Use paper bags, milk and juice in cardboard, and cloth diapers. Insist on paper bags and glass bottles.
- 2) Recycle. Many communities currently offer pick-up recycling programs for #1 and #2 plastics. Other forms of plastic may be accepted by a local recycling business. If your community doesn't have a recycling program, contact your city or town hall to request one.
- 3) Educate others about the problem of marine debris, enhancing "voluntary compliance through awareness."
- 4) Get involved. Locate or start a coastal cleanup in your area.

For Further Reading:

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