

The Plastic Sea

An ocean awash in lethal bags, bottles, pellets, line, tarps and diapers.

Paul Watson 26 Jul 2006TheTyee.ca



Worse than oil spills?

On the beach on San Juan Island, Washington, Allison Lance walks her dogs every morning. She carries a plastic bag in her hand to carry the bits and pieces of plastic debris she picks up. Each morning she fills the bag, but by the next morning there is always another bag to be filled. Joey Racano does the same in Huntington Beach further south in California. The harvest of plastic waste is never-ending. Allison's and Joey's beaches, and practically every beach around the world, is similarly cursed.

Recently in the Galapagos I retrieved plastic motor oil bottles and garbage bags from a remote beach on Santa Cruz Island. Every year during crossings of the Pacific, Atlantic and Indian Oceans, spotting plastic is a daily and regular occurrence.

A June 2006 United Nations environmental program report estimated that there are an average of 46,000 pieces of plastic debris floating on or near the surface of every square mile of ocean.

We live in a plastic convenience culture; virtually every human being on this planet uses plastic materials directly and indirectly every single day. Our babies begin life on Earth by using some 210 million pounds of plastic diaper liners each year; we give them plastic milk bottles and plastic toys, and buy their food in plastic jars, paying with a plastic credit card. Even avoiding those babies by using contraceptives results in mass disposal of billions of latex condoms, diaphragms, and hard plastic birth control pill containers each year.

Every year we eat and drink from some 34 billion newly manufactured bottles and containers. We patronize fast food restaurants and buy products that consume another 14 billion pounds of plastic. In total, our societies produce an estimated 60 billion tons of plastic material every year.

Each of us on average uses 190 pounds of plastic annually: bottled water, fast food packaging, furniture, syringes, computers and computer diskettes, packing materials, garbage bags and so much more. When you consider that this plastic does not biodegrade and remains in our ecosystems permanently, we are looking at an incredibly high volume of accumulated plastic trash that has been built up since the mid-20th century. Where does it go? There are only three places it can go: our earth, our air and our oceans.

Styrofoam foam

All the plastic that has ever been produced has been buried in landfills, incinerated and dumped into lakes, rivers and oceans. When incinerated, the plastics disperse non-biodegradable pollutants, much of which inevitably finds its way into marine ecosystems as microscopic particles.

Back in 1991, my ship, the *Sea Shepherd*, was anchored in the harbour of Port of Spain, Trinidad. It began to rain a hard, steady downpour. A few hours later, the entire surface area of the harbour was dirty white, as if an ice floe had entered this tropical port. The “floe” consisted of Styrofoam, plastic bottles and assorted plastic materials, as far as the eye could see, and it had come down from the streets, gutters and streams into the harbour. And, of course, it was all washing out to sea, dispersed by wind and tide.

What happened to it after that? The sun and the brine broke it down into little pellets of Styrofoam and little pieces of plastic -- each an insidious, floating, deadly mine set adrift in an ocean of life.

And over the years these little nodules have drifted. Many have been ingested by birds and fish. Weeks or months later, the victims decompose on the surface of the water or on a beach, re-exposing the nodules to the light of the sun, to be blown by the winds back into the sea. These vicious little inorganic parasites continue to maim and kill in an endless assault upon life in our oceans.

The simple fact is that when you drop a Styrofoam cup onto the street, you're causing more damage than you would by dropping a stick of dynamite into the ocean. You set in motion an invasion of thousands of killer plastibots that will cause death and destruction for centuries to come.

Eighteen billion of those disposable diapers end up in the oceans each year; Americans alone toss 2.5 million plastic bottles into the sea every hour. Our oceans are full of floating plastic debris. There is no place in the oceans where a fine trawl will not reveal plastic nodules. Studies by Captain Charles Moore and the Algalita Foundation found that even in the middle of the Pacific Ocean, plastic nodules have been found to outweigh plankton by a ratio of six to one. Similar studies in the Atlantic have revealed the same ratio.

Floating out of mind

In the movie *Castaway*, Tom Hanks, marooned on a desert island in the South Pacific, finds a plastic siding of a portable outhouse washed up on the beach. The stuff is everywhere. I have found plastic bottles with Japanese, Chinese, Russian and English writing littering the beaches of even the most remote Aleutian Islands.

And yet we give this global threat very little thought at all. It is out of the sight of land-dwelling humanity, and thus out of mind. The only industry that seems concerned about plastic pollution is the marine insurance business. The intake of plastics into the cooling systems of engines is one of the leading causes of maritime engine failures. Last year, Japanese insurance companies paid \$50 million in claims involving plastic-related engine and prop damage.

Drifting in our seas are tens of thousands of miles of monofilament ghost drift nets and lines. This same netting ensnares ship props and the necks of sea lions and turtles. Over the years, my crew has retrieved hundreds of floating monofilament nets from the sea. All of them contained the rotting corpses of fish and birds.

In a well-documented beach clean-up in Orange County, California, volunteers collected 106 million items, weighing 13 tons. The debris included preproduction plastic pellets, foamed plastics and hard plastics; plastic constituted 99 per cent of the total material collected. The most abundant item found on the beaches of Orange County was preproduction plastic pellets, most of which originated from transport losses. Approximately one quadrillion of these pellets, or 60 billion pounds, are manufactured annually in the United States alone. You never hear about these spillages in the newspaper, and there is not a single plastic pellet spillage response crew anywhere in the world.

The plastic products that end up in the sea because of consumers constitute less than 30 per cent of the total plastics dumped into the oceans each year. The greater amount comes from accidental spillage of plastic resin pellets produced by the petrochemical industry for the purpose of manufacturing consumer plastic products, or the breakdown of finished products into Styrofoam nodules or hard plastic particles. Plastic nodules are lost routinely in both the shipping and manufacturing stages, spilling from shipboard containers or from trucks onto streets and into storm drains.

Lethal threat

Oil spills occur every day in our oceans, and major spills occur on average every two weeks somewhere in the world's marine ecosystem. Although these oil spills are notorious killers of marine wildlife, their deadly impact is confined to relatively small areas geographically, and the impact is reduced with time. The Exxon Valdez spill, for example, was confined to Alaska's Prince William Sound, and although the impact on wildlife was felt for many years, the ecosystem is slowly recovering. Yet this other kind of petrochemical spill is more invasive and permanent. This type of spill is cumulative. The spillage is never cleaned up and removed, but accumulates perpetually.

I don't think that I am exaggerating when I say that the spillage of plastic resin pellets poses a significant and unappreciated threat to the survival of sea life. The oceans are becoming plasticized. This threat becomes more lethal each year as the cumulative amount increases. The impact of this spillage contributes to more casualties than all of the world's annual oil spills, yet we know very little about the problem. In fact, the public does not even recognize plastic resin pellet spillage as a problem at all.

Plastic pellets also pose an additional threat. They act as a transport medium for toxic chemicals. Many of these pellets contain polychlorinated biphenyls (PCBs). The chemicals were either absorbed from ambient seawater or used in the manufacture of plasticizers prior to the 1970s. This transfer of PCBs from ingested pellets into birds was conclusively proven and documented in the fatty tissues of great shearwaters (*Puffinus gravis*). Studies have shown that 75 per cent of all shearwaters examined contained ingested plastic.

Of 312 species of seabirds, some 111 species, or 36 per cent, are known to mistakenly ingest plastic. In Hawaii, 16 of the 18 resident seabird species are plastic ingestors, and 70 per cent of this ingestion is of floating plastic resin pellets. Seabirds in Alaska have been found to have stomachs entirely filled with indigestible plastic. Penguins on South African beaches have suffered high chick mortality from eating plastic regurgitated by the parents, and 90 per cent of blue petrel chicks examined on South Africa's remote Marion Island had plastic particles in their stomachs. It is a global problem, and for seabirds there are no safe places. For most people, the ocean is a big toilet. The belief is that garbage, sewage and plastics are dispersed and taken away.

Garbage 'gyres'

Unfortunately, nothing is really ever "taken away"; it is simply perpetually circulated. The oceans are pulsating with powerful currents, and these currents keep plastic debris in constant circulation. As a result, debris travels in what are called "gyres." The gyre concentrates the garbage in areas where currents meet. For example, one of the largest of these movements in the Atlantic is called the central gyre, and it moves in a clockwise circular pattern driven by the Gulf Stream. The central gyre concentrates heavily in the northern Sargasso Sea, a place that is also host to numerous spawning fish species.

The number of floating plastic pellets found in the Sargasso Sea has been measured in excess of 3,500 parts per square kilometer. The same ratio of 3,500 parts per square kilometer was found in the waters of the southern coasts of Africa. This study found that plastic pollution had increased in South African waters from 1989 to the present by 190 per cent.

Birds, turtles and fish mistake the tiny nodules for fish eggs. Garbage bags, plastic soda rings and Styrofoam particles are regularly eaten by sea turtles. A floating garbage bag looks like a jellyfish to a turtle. The plastic clogs the turtle's intestines, robbing the animals of vital nutrients, and has been the cause of untold turtle losses to starvation. All seven of the world's sea turtle species suffer mortality from both plastic ingestion and plastic entanglement. One turtle found

dead off Hawaii carried over 1,000 pieces of plastic in its stomach and intestines. And recently, a land-based turtle rescued in a Florida waterway by Stephen Nordlinger was unable to submerge due to the amount of Styrofoam trapped in its body, making it permanently buoyant.

Plastic floor

The amount of plastic pellets present on beaches is astonishingly high. In New Zealand, one beach was found to contain over 100,000 pellets per square meter. Thus, it is not so far-fetched to suggest that people are in fact sunbathing on plastic beaches -- literally. I have stopped my ship mid-ocean and found flip-flops, suntan oil bottles, plastic Coke bottles, garbage bags and even large floating industrial plastic sheets. In each place sampled, we have also found plastic pellets.

Once, on the bottom of the Mediterranean off France, I witnessed a scene that appalled me. The entire bottom was made of plastic. Bottles and plastic bags swaying with the tide, replacing the sea grasses and algae. It was especially sad to see one little fish scurry from behind a white plastic bag to take cover from me in a sunken automobile tire. Brushing aside another drifting white bag, I spied a flicker of red on the bottom. What I found was a plastic face staring up at me with a great big smile and two enormous plastic ears. It was the decapitated head of a Mickey Mouse doll.

It's a plastic sea out there.

Paul Watson is founder of the Sea Shepherd Conservation Society, a co-founder of Greenpeace International and the Greenpeace Foundation, was National Director of the Sierra Club USA and is Director of the Farley Mowat Institute. ■