

## Why is the world's biggest landfill in the Pacific Ocean?



[Image Gallery: Ocean Conservation](#)

In the vast area of the Great Pacific Garbage Patch, jellyfish and other filter feeders frequently consume or become tangled in floating trash. See more [ocean conservation pictures](#).

Image courtesy [Algalita Marine Research Foundation](#)

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In the broad expanse of the northern Pacific Ocean, there exists the North Pacific Subtropical Gyre, a slowly moving, clockwise spiral of currents created by a high-pressure system of air currents. The area is an **oceanic desert**, filled with tiny phytoplankton but few big fish or mammals. Due to its lack of large fish and gentle breezes, fishermen and sailors rarely travel through the gyre. But the area is filled with something besides plankton: trash, millions of pounds of it, most of it plastic. It's the largest [landfill](#) in the world, and it floats in the middle of the ocean.

The gyre has actually given birth to two large masses of ever-accumulating trash, known as the **Western and Eastern Pacific Garbage Patches**, sometimes collectively called the **Great Pacific Garbage Patch**. The Eastern Garbage Patch floats between Hawaii and California; scientists estimate its size as two times bigger than Texas [source: [LA Times](#)]. The Western Garbage Patch forms east of Japan and west of Hawaii. Each swirling mass of refuse is massive and collects trash from all over the world. The patches are connected by a thin 6,000-mile long current called the **Subtropical Convergence Zone**. Research flights showed that significant amounts of trash also accumulate in the Convergence Zone.

The garbage patches present numerous hazards to marine life, fishing and tourism. But before we discuss those, it's important to look at the role of plastic. Plastic constitutes 90 percent of all trash floating in the world's oceans [source: [LA Times](#)]. The United Nations Environment Program

estimated in 2006 that every square mile of ocean hosts 46,000 pieces of floating plastic [source: [UN Environment Program](#)]. In some areas, the amount of plastic outweighs the amount of plankton by a ratio of six to one. Of the more than 200 billion pounds of plastic the world produces each year, about 10 percent ends up in the ocean [source: [Greenpeace](#)]. Seventy percent of that eventually sinks, damaging life on the ocean floor [source: [Greenpeace](#)]. The rest floats; much of it ends up in gyres and the massive garbage patches that form there, with some plastic eventually washing up on a distant shore.

## The Problem with Plastic

The main problem with plastic -- besides there being so much of it -- is that it doesn't **biodegrade**. No natural process can break it down. (Experts point out that the durability that makes plastic so useful to humans also makes it quite harmful to nature.) Instead, plastic **photodegrades**. A plastic [cigarette](#) lighter cast out to sea will fragment into smaller and smaller pieces of plastic without breaking into simpler compounds, which scientists estimate could take hundreds of years. The small bits of plastic produced by photodegradation are called **mermaid tears** or **nurdles**.

These tiny plastic particles can get sucked up by filter feeders and damage their bodies. Other marine animals eat the plastic, which can poison them or lead to deadly blockages. Nurdles also have the insidious property of soaking up toxic chemicals. Over time, even chemicals or poisons that are widely diffused in water can become highly concentrated as they're mopped up by nurdles. These poison-filled masses threaten the entire [food](#) chain, especially when eaten by filter feeders that are then consumed by large creatures.

Plastic has acutely affected [albatrosses](#), which roam a wide swath of the northern Pacific Ocean. Albatrosses frequently grab food wherever they can find it, which leads to many of the birds ingesting -- and dying from -- plastic and other trash. On [Midway Island](#), which comes into contact with parts of the Eastern Garbage Patch, albatrosses give birth to 500,000 chicks every year. Two hundred thousand of them die, many of them by consuming plastic fed to them by their parents, who confuse it for food [source: [LA Times](#)]. In total, more than a million birds and marine animals die each year from consuming or becoming caught in plastic and other debris.



Image courtesy

## Effects of Plastic and the Great Pacific Garbage Patch

Besides killing wildlife, plastic and other debris damage boat and [submarine](#) equipment, litter beaches, discourage swimming and harm commercial and local fisheries. The problem of plastic and other accumulated trash affects beaches and oceans all over the world, including at both poles. Land masses that end up in the path of the rotating gyres receive particularly large amounts of trash. The 19 islands of the Hawaiian [archipelago](#), including Midway, receive massive quantities of trash shot out from the gyres. Some of the trash is decades old. Some beaches are buried under five to 10 feet of trash, while other beaches are riddled with "plastic sand," millions of grain-like pieces of plastic that are practically impossible to clean up.

Most of this trash doesn't come from seafaring vessels dumping junk -- 80 percent of ocean trash originates on land [source: [LA Times](#)]. The rest comes from private and commercial ships, fishing equipment, [oil platforms](#) and spilled shipping containers (the contents of which frequently wash up on faraway shores years later).

Some efforts can help to stem the tide of refuse. International treaties prohibiting dumping at sea must be enforced. Untreated [sewage](#) shouldn't be allowed to flow into the ocean. Many communities and even some small island nations have eliminated the use of plastic bags. These bags are generally recyclable, but billions of them are thrown away every year. On the Hawaiian Islands, cleanup programs bring volunteers to the beaches to pick up trash, but some beaches, even those subjected to regular cleanings, are still covered in layers of trash several feet thick.

Scientists who have studied the issue say that trawling the ocean for all of its trash is simply impossible and would harm plankton and other marine life. In some areas, big fragments can be collected, but it's simply not possible to thoroughly clean a section of ocean that spans the area of a continent and extends 100 feet below the surface [source: [UN Environment Program](#)].

Nearly all experts who speak about the subject raise the same point: It comes down to managing waste on land, where most of the trash originates. They recommend lobbying companies to find alternatives to plastic, especially environmentally safe, reusable packaging. Recycling programs should be expanded to accommodate more types of plastic, and the public must be educated about their value.

In October 2006, the U.S. government established the Northwestern Hawaiian Islands Marine Monument. This long string of islands, located northwest of Hawaii, frequently comes into contact with the Eastern Garbage Patch. After the creation of the monument, Congress passed legislation to increase funding for cleanup efforts and ordered several government agencies to expand their cleanup work. It may be an important step, especially if it leads to more government attention to a problem that, while dire, has only received serious scientific attention since the early 1990s.