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Commentary from our Social Research Analysts

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Plastic Waste: Deep Trouble in the Deep Blue

What comes to mind when you think about the ocean? A favorite vacation spot or recreational activity? A favorite food? Maybe you think about the ocean's importance as a resource or how it helps sustain us with the basic elements of life? How about pollution?

Ocean pollution is a global problem. It threatens wildlife and marine habitats, presents health and safety concerns for humans, and imposes costs to society. Many people may not realize the magnitude of the problem. Until fairly recently, it was widely assumed that because the ocean was so vast and deep, no matter how much waste or trash was dumped into the sea, the consequences would be minimal; it would all be diluted and dispersed to safe levels. This assumption, however, has proven to not be the case.

Ocean trash, which consists largely of plastic waste, is among the top ocean pollutants and ranks as one of the most serious pollution problems of our time. There is no part of the world that is untouched by debris and its impacts; litter is found in all the world's oceans and seas, even in remote areas far from human contact and obvious sources of the problem. Today, the amount of plastic in the ocean has reached crisis levels. Each year, approximately 8 million tons of plastic waste are added to the oceans. That is the equivalent of one garbage truck pulling up to the beach and dumping its contents every minute.¹ Estimates suggest that there are currently over 150 million tons of plastics in the ocean.² If business proceeds as usual, by 2025, the ocean is expected to contain one ton of plastic for every three tons of fish.³

<i>Top 5 Items Collected during Ocean Conservancy's International Coastal Cleanup</i>	• Cigarette Butts
	• Plastic Beverage Bottles
	• Food Wrappers
	• Plastic Bottle Caps
	• Straws, Stirrers

Ocean Conservancy International Coastal Cleanup 2015 Annual Report

The impacts from plastic pollution are long-lasting and possibly devastating. It not only compromises the health of wildlife, but also the health of humans and the livelihoods that depend on a healthy ocean. Marine animals and birds often ingest debris because they mistake it for food or accidentally ingest it with other food. For example, sea turtles are known to mistake plastic bags for jellyfish, their favorite

food. When ingested, the plastic can lead to loss of nutrition, internal injury, intestinal blockage, starvation, and even death. Marine animals may also become entangled in plastic debris such as fishing nets and six-pack rings causing strangulation or preventing them from performing vital activities like swimming. Debris can damage important marine habitats that serve as the basis of marine ecosystems and are critical to the survival of many other species.

Further, plastic never truly degrades or disappears; instead it breaks down into progressively smaller pieces when exposed to sunlight. Thus, plastic pollution in the ocean is increasingly in the form of microplastics, pieces of plastic smaller than 5mm. Microplastics pose additional threats. Colorants and chemicals like bisphenol-A (BPA) that are added to plastics may leach out into the seawater; conversely, microplastics have been shown to absorb persistent organic pollutants like flame retardants and PCBs, that are already in the water. If these plastic bits are accidentally ingested by marine life, pollutants and other toxins can enter the food chain, thus endangering human health.

Plastics and other marine debris have economic impacts, too. Trash in the water is an eyesore along shorelines around the world. It degrades the beauty of the coastal environment and threatens the tourism, recreation, and fishing industries. Marine debris can also damage vessels and complicate shipping and transportation by creating hazards.

An estimated 80 percent of the plastics in the ocean comes from land-based sources; the remainder comes from plastics released at sea. Sources include intentional or accidental dumping and littering on shorelines and at sea. Litter from much further inland can also make its way to the ocean. Trash can be blown by the wind or carried by storm water runoff into storm drains. From there, the debris is carried to a nearby river, stream, or directly to the ocean. Ineffective and improper waste management, such as poorly lined or open and uncontrolled landfills, contribute to the ocean trash problem. In some countries, particularly developing countries, waste management infrastructure is lacking. High winds, heavy rain, flooding, and tidal surges resulting from extreme natural events like hurricanes, tsunamis, and floods can also deposit almost any kind of trash into the ocean.

BAN THE MICROBEAD

Microbeads are tiny plastic particles that are commonly added as abrasives to personal care products like exfoliating facial scrubs, body washes, and toothpastes. These microbeads flow from the bathroom drain into the sewer system and are too small to be filtered out at wastewater treatment plants. They eventually enter the marine environment and are a direct source of the microplastics that are polluting the world's oceans.

In December of 2015, President Obama signed the Microbead-Free Waters Act of 2015. This legislation is designed to phase out microbeads in personal care products over the next few years beginning in mid-2017. While this legislation has been praised by some, it has also been criticized for applying only to rinse-off products and failing to restrict the use of microbeads in other products like detergents and cosmetics that can be left on the skin. Several of the world's largest personal care companies have made voluntary pledges to phase out microbeads; however, there is concern that these commitments fall short of the ideal.

Once in the ocean, some of the plastic is washed up on the beaches with the waves and tides, some is eaten by marine animals, some sinks, and some floats. Floating marine debris can travel thousands of miles around the world's oceans. Due to wind patterns and currents, it often accumulates in particular regions known as gyres, huge spirals of seawater formed by colliding currents, and sometimes referred to as "garbage patches". The earth has five major gyres: the North Pacific Gyre, the South Pacific Gyre, the North Atlantic Gyre, the South Atlantic Gyre, and the Indian Ocean Gyre. The North Pacific garbage patch, also called the "Great Pacific Garbage Patch", is the most well-known and studied, but trash accumulates in all the major gyres and in many smaller ones worldwide. Despite how it sounds, there is no visible island of trash forming in the middle of the ocean; rather, much of the debris found in these gyres is made up of microplastics. It is also difficult to estimate the size of these "patches" because the borders and content constantly change with ocean currents and winds. The small size of the debris makes it untraceable to its source and extremely difficult to remove from ocean environments.

Plastics are an integral part of many of the products and services that we use on a daily basis. Because they are extremely durable, lightweight, cheap, and versatile, we are continually increasing production and developing new uses for plastics. However, much of what we use is for single-use items and packaging, making plastics a big part of our waste stream. Recycling rates are low and not all plastic is recyclable. Citizens and policymakers have begun to take action to address the environmental impacts of plastics. For example, there are more than 60 cities in California that have banned polystyrene foam take-out containers.⁴ Investors are engaging with companies on their use of plastic, not only because of the environmental impacts, but also because of the business case for managing plastic use. The Plastic Disclosure Project (PDP) is an initiative that requests annual reporting and transparency regarding the production, use, and handling of plastic and plastic waste. Much like calculating a carbon, water, or forestry footprint, the PDP encourages organizations to calculate a "plastic footprint". By taking this measure, organizations will be able to manage their plastic use to be more efficient, innovative, cost-effective, and sustainable. The idea is to treat plastic as a valuable resource to be captured and used instead of a waste to be disposed of. Companies that consider their plastic footprint will be better positioned to avoid reputational, regulatory, liability, and economic risks and to take advantage of opportunities.

Considering the importance of plastic and how much we use along with the fact that most of it is thrown out as garbage, it's easy to understand that plastic ocean pollution is a big problem. The good news is that while we may not be able to clean up everything that is already in the ocean, we can prevent the problem from growing. It will be challenging; keeping trash from entering the ocean is difficult due to the many sources. Effective prevention strategies will require changes in the behavior of businesses, governments, and individuals; reductions in waste generation and increases in the reuse and recycling of plastics; and improvements in global waste management, infrastructure, and recycling. Working together is the key to solving the plastic pollution problem and preserving our oceans.

¹ World Economic Forum, Ellen MacArthur Foundation and McKinsey & Company, *The New Plastics Economy – Rethinking the future of plastics* (2016), <http://www.ellenmacarthurfoundation.org/publications>

² Ibid.

³ Ibid.

⁴ "Ocean Plastics." As You Sow. Web. 01 Dec. 2016. <www.asyousow.org>.

Additional Resources:

Global Partnership on Marine Litter. <<http://unep.org/gpa/gpml>>

Marine Conservation Society. <www.mcsuk.org>

National Oceanic and Atmospheric Administration Marine Debris Program. <<https://marinedebris.noaa.gov>>

Ocean Conservancy. <www.oceanconservancy.org>

Plastic Disclosure Project. <www.plasticdisclosure.org>

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