

Ocean Cleanup

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Ocean Cleanup

Ecologist and marine/fishery biologist Simon Reddy states, "the weight of ocean plastics will exceed the combined weight of all fish in the seas by 2050" (2018). The matter of climate change and surrounding concerns are often brought up but continuously brushed off by individuals and countries alike. However, after digging deeper into this subject, it quickly becomes apparent how serious this is. This essay explores the severity of plastic pollution in the oceans, explains what the Great Pacific Garbage Patch is, how this issue is impacting both people and animals, and possible solutions, specifically the work being done by the Ocean Cleanup.

It is important to understand the intensity of the issue at hand. About 80% of marine debris is trash found in big bodies of water (National Geographic, 2021), mostly made up of plastic. There are roughly thirty million metric tons of this debris in the ocean. This is proportional to a garbage truck emptying its contents into the ocean every sixty seconds (Reddy, 2018), which could triple in the next twenty years (Corryn, 2021). There are 640,000 tons of fishing equipment introduced to the oceans yearly (World Wildlife Fund, 2021). Ghost nets, which are fishing nets deserted in the ocean, "can be tens of meters wide" (The Ocean Cleanup, 2021a). Plastic, which the Great Pacific Garbage Patch mainly consists of, is not biodegradable, so it breaks down into tinier pieces due to erosion. These small pieces, in turn, make the clean-up process more arduous and allow marine life to consume this debris more efficiently. (The Ocean Cleanup, 2021a). Over two-thirds of marine debris, when denser than water, falls to the bottom of the ocean, not contributing to any surface data (National Geographic, 2021). Nonetheless, the abundance of plastic is due to it being an easy, sturdy, and cheap raw material to manipulate in factories in copious amounts. The rate at which plastic enters the oceans is genuinely concerning.

Ocean Cleanup

The Great Pacific Garbage Patch (GPGP) is the largest accumulation of marine debris in the Pacific Ocean (The Ocean Cleanup, 2021b). One article specifies: "The GPGP covers an estimated surface area of 1.6 million square kilometers, an area twice the size of Texas or three times the size of France" (The Ocean Cleanup, 2021b & Corryn, 2021). There is an Eastern Patch between Hawaii and California and a Western Patch near Japan (The Ocean Cleanup, 2021a & National Geographic, 2021). The following statistics illustrate the extent of the situation: one study from 2018 calculated that the Patch is composed of about 79,000 tons of plastic (Corryn, 2021), and another study discovered that almost 50% of the mass of this debris is made up of fishing nets (National Geographic, 2021). In addition, for every person on the planet, there are 250 pieces of trash in the Great Pacific Garbage Patch alone, for a sum of 1.8 trillion individual pieces of plastic (The Ocean Cleanup, 2021b). Furthermore, "Floating at the surface of the Great Pacific Garbage Patch (GPGP) is 180x more plastic than marine life" (The Ocean Cleanup, 2021b). 84% of sampled material contained harmful chemicals, as well. A large proportion of the debris in the GPGP is very tiny bits of plastic that have been weathered down to that size rather than large pieces of garbage. However, the combined weight is "equivalent to 500 jumbo jets". Remarkably, "If the less-dense outer region was also considered in the total estimate, the total mass would then be closer to 100,000 tonnes" (The Ocean Cleanup, 2021b), or 625 jets. The Great Pacific Garbage Patch is just one example of many that illustrate the significance of plastic pollution.

Animals and humans are greatly impacted by marine debris. Yearly, 100,000 ocean animals die from plastic pollution (WWF, 2021), including 800 animal species (Reddy, 2018). They are impacted by marine debris, which can lead to entanglement, suffocation, starvation or malnutrition, and drowning (The Ocean Cleanup, 2021b & Reddy, 2018). Plastic and/or fishing

Ocean Cleanup

nets that entangle animals can lead to cuts, infections, stunted growth, and other injuries (WWF, 2021). About one in six species affected by marine debris is on the Red List of Threatened Species (The Ocean Cleanup, 2021b). Even corals, which are often overlooked, have an 89% chance, rather than a 4% chance, of getting diseases after coming into contact with plastic. In fact, the whole food chain is affected: first, pollution blocks sunlight from extending far enough for plankton and algae under the surface. Because these organisms are at the bottom of the food chain, they are essential for animals that we usually pay more attention to, like turtles, birds, whales, and of course, humans (National Geographic, 2021). About 50% of all sea turtles consume plastic. According to one article, "sea turtles by-caught in fisheries operating within and around the patch can have up to 74% (by dry weight) of their diets composed of ocean plastics" (The Ocean Cleanup, 2021b). In addition, turtle reproduction can be threatened because of consequential temperature fluctuations in the sand (Reddy, 2018). Another article states that one million seabirds die annually because 60% ingest plastic, which could eventually become 99% within the next thirty years (Reddy, 2018). Furthermore, it is "estimated that 56% of whale, dolphin, and porpoise species have consumed plastics" (WWF, 2021). Humans are impacted by tiny bits of plastic that can end up in seafood, and chemicals found in these plastics that were ingested by the animals we eat. Every year, roughly 6 to 19 billion dollars are spent due to the cost of pollution in the oceans. This is due to "its impact on tourism, fisheries and aquaculture, and (governmental) clean-ups [but costs] do not include the impact on human health and the marine ecosystem (due to insufficient research available)" (The Ocean Cleanup, 2021b). If we want to keep ourselves and marine life safe, we need to address this problem.

Now that the issue has been presented, it is necessary to consider setbacks and solutions. *National Geographic* states, "The National Ocean and Atmospheric Administration's Marine

Ocean Cleanup

Debris Program has estimated that it would take 67 ships one year to clean up less than one percent of the North Pacific Ocean” (2021). Some setbacks include the fact that no country is taking responsibility because the GPGP itself is far from any country’s coasts, the oceans are massive and extensive, and animals can get trapped in nets designed to collect garbage (National Geographic, 2021). Some solutions include stopping more plastic from flowing into the ocean and cleaning up what is there already (The Ocean Cleanup, 2021a). It is “estimated that 1.15 to 2.41 million tonnes of plastic are entering the ocean each year from rivers," which means cleaning up rivers could be much more cost- and time-effective than whole ocean patches (The Ocean Cleanup, 2021). Furthermore, scientists concur that cutting back on our practices involving non-biodegradable materials like plastic while utilizing earth-friendly materials will be most advantageous to us (National Geographic, 2021). One organization, Ocean Cleanup, tackles this issue by concentrating the plastic for easier removal by creating artificial coastlines. Then, debris is led by a system capable of gathering pieces of plastic of all sizes, minuscule or massive. However, their goal of removing "90% of floating ocean plastic by 2040" will require using ten of these systems. They are also hoping to use more carbon-efficient technology in the future. The organization is moving along with a recent announcement of System 002, also known as Jenny (The Ocean Cleanup, 2021a). This excellent half-mile piece of equipment had captured one hundred tons of debris, regularly dumped on a ship and later recycled. The boats that pull Jenny move between 1-2mph, allowing any caught animals to be led out of the nets through lights and escape passages. Impressively, “In Jenny’s final test run, the team found the system scooped 19,841 pounds of debris from the Great Pacific Garbage Patch” (Corryn, 2021). Despite the impediments faced, organizations like Ocean Cleanup are putting forth substantial efforts.

Ocean Cleanup

Plastic pollution in the oceans is damaging fragile ecosystems and causing substantial difficulties for us here on land. The Great Pacific Garbage Patch, as massive and serious as it is, is still only a fraction of the bigger picture. Ocean Cleanup has an important goal and is making considerable advancements. However, this issue needs to be addressed, as it affects everyone in numerous ways. As individuals, governments, and organizations, we cannot afford to ignore this any longer. Everyone's future is at risk.

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