

## An Artificial Blanket Plagues Our Ocean

By Jacqueline Sanchez

In the form of an endless, patched shawl, a corrosive blanket made of plastic uncaringly hugs the seven blues. The sea that brings solace to everyday life with its vast beauty and individual proportions of essential sustenance is being clouded by approximately 296,000 tons of pieces of thrash, almost the weight of 1,500 whales (Wilcox). Every day, people contribute to its expanding fabric with a simple inconsiderate act, increasing its suffocation of marine life, its potential harm on the health of human beings, and the depletion of the opportunities at our disposal for learning more about the ocean's depths. As inhabitants of the Earth, it's our moral duty to take action and prevent the mass destruction of the environment—after all, the child that makes the mess in the house is the one responsible for cleaning it up.

The prelude to the incorrect disposal of plastic by consumers began with good intentions. In 1862, Alexander Parkes, created what he named Parkesine by “dissolving cellulose nitrate in a minimum of solvent” to use for his rubber industry (“History of Plastics”). By adding the chemical compound, camphor, the Hyatt brothers made the material more malleable, renaming it celluloid. After a series of more plastic alterations, the demand for plastic grew, especially during the decade after World War II. It is during the period of 1930-1940 that the large scale production of polyethylene, a thermoplastic polymer, took place, resulting in a price drop and making it more available to people in the form of plastic bags, bottles, and boxes (“History of Plastics”). Today, it's almost impossible for one to not find plastic as an essential. The new pair of sunglasses you wore to the beach, the decorative container you used to plant a baby seedling,

or the fan that allows you to survive the summer heat are just a couple of examples to name a few.

The problem herein lies not in the worldwide consumption of plastic, since the material has already been created, but its mass production, resulting in harmful combinations of chemical components and its shift into the water ecosystems. According to the Worldwatch Institute, “Some 299 million tons of plastics were produced in 2013, representing a 4 percent increase over 2012” (“Global Plastic Production”). The threat of having such a large amount is that plastic is known to carry chemical additives to improve its resistance, such as Bisphenol-A, mercury, lead, cadmium, and phthalate DEHP, resulting in health concerns over the reproductive organs, cancers, and acute toxicity. Furthermore, these contaminants are then transferred into the ocean by people who are not aware of their impact. It takes a lazy second to toss an empty water bottle into a river, months for it to reach the nearest ocean through wind currents, and years for the non-biodegradable plastic to be substantially reduced into a microplastic, silently acting as an artificial prey for animals and a poison for humans, never really disappearing. With the help of “ultra-violet rays from the sun or waves” it slowly becomes invisible to the eye (Anderson).

People continue to litter on a daily basis, wittingly or unintentionally, amounting to 8.8 million annual tons of plastic in the ocean, at this rate, eventually doubling to “100 million pounds per day” by 2025 (Royte). The reasons as to why pollution ends up in the environment can be attributed to a variety of reasons, including “deliberate tossing of litter from vehicles, accidental litter from items blowing out of vehicles or from unsecured loads, and litter left behind by pedestrians” (“Why People Litter”). Additionally, some people are just lazy, may rely on the hands-on work of other individuals to clean up their mess, or happen to not be nearby disposable bins. If each person began to realize and live by the ethics required to sustain a clean life, which

can be as simple as holding on to their plastic candy wrapper or attempting to make their neighborhood look more appealing for their distant relatives' next visit, so much plastic thrash would not be preserved in our water sources "for decades or even centuries", due to the "dark, cold conditions" (Nuwer).

Along with the macroplastics that pollute the sea, microplastics represent the different colored threads of the ocean debris overlay. Despite their miniature size, microplastics are dangerous, "as the increased surface area as they break down can exacerbate the release of toxins like cadmium and mercury" ("Australia: Pursuing Plastic"). They can be found on the surface, the bottom, or languish in the middle of the ocean. A study showed that these materials were found "in deep-sea sediments collected at four locations representing different deep-sea habitats ranging in depth from 1100 to 5000 m" (Van Cauwenberghe). They are also present in "ice cores, remote shores and on the ocean floor" ("Ocean pollution"), increasing the perils marine life is exposed to. To further enhance their potential destruction, as they carry on along their path, microplastics absorb chemical pollutants, ultimately being transformed into "hazardous waste" ("Ocean Pollution").

Woven into five confetti-patched patterns, the microplastic threads form gyres or garbage patches. These clusters of thrash are "a worldwide network of surface currents created by the Earth's wind patterns and the spinning of the planet" and originated in the 1970s when Styrofoam began to appear in the waves (Biba). The plastic pieces in them are reduced in size and eventually get sucked in by a vortex located in the middle of a gyre, yet they don't necessarily stay there forever. If someone in the East Coast of the U.S. happened to throw away a piece of plastic into the ocean, it would travel for six weeks until it finally reached the center of a garbage patch (Biba).

But before masses of debris fall into one of the five gyres, mathematical simulations of ocean currents used by researchers at a university in Sydney, demonstrated that pieces of plastic travel more than an elder who has saved up all of his lifetime for sightseeing. Portraying a period of about a year, the results showed that it was possible for “garbage flung towards the Indian Ocean from southern Australia” to end up in the Pacific, and “litter that sets sail off South Africa” could “anchor in the Atlantic rather than the Indian Ocean” (Mole). These shocking results prove that an individual’s pollution can have an impact on an animal or another person hundreds of miles away from him.

Falling prey to lifeless material, marine life suffers from the darkness created by this plastic cover. Fish, sea turtles, seals, whales, and birds either mistaken plastic for food, get strangled by the material, or die from infections caused by deep wounds. Cases are repeatedly reported about finding sea animals with plastic debris in their stomachs. A turtle hospital in Florida reports that about 10-20 turtles get treated annually after swallowing plastic (Smith). Two stranded adult whales found on the coasts of Ireland were found with macroplastic in their digestive tracts (Lusher). Out of 67 northern fulmars in the northwest coast of North America, a research group found an average of 36.8 pieces per bird, which is the equivalent of “a human carrying 50 grams of plastic in our stomach - about the weight of 10 quarters” (“Seabirds study”). Additionally, it is estimated that “20 percent of small fish have plastic in their bellies” (Wilcox) and “over 100,000 marine animals die every year from plastic entanglement” (“Ocean Crusaders”). Unfortunately, the list of animal atrocities caused by plastic in the sea can go on and on.

Even the colonies of life that have formed as a result of adapting to plastic pollution in our ocean pose a threat to predators. A sheer layer of accumulated nutrients that hover over the

small pieces of plastic in the ocean have attracted bioluminescent microbes. After attaching to a piece of plastic, the microbes begin to reproduce, thus resulting in these colonies of single-celled plants. Furthermore, as a result of producing nutrients that are enticing to the fish that come out at night, these predators are now not only consuming the microbe, but the plastic it's attached onto.

Food web transfer experiments revealed that the corridors of this widespread plastic litter are potentially reaching the human population through trophic levels. In Finland, zooplankton that had ingested microplastic were fed to mysid shrimps to test whether microplastics could be transferred from one organism to the other (Setälä). After observing the shrimps' intestines, the presence of the zooplankton, along with microspheres were noted, thus showing for the first time this possible transfer of microplastic. This study brings alarming awareness for those who consume seafood, because if it was possible for the material to be passed from one trophic level to a higher one, then it is possible that eating a fish with litter in its stomach will be transferred to the person that consumes it.

An innocent victim, the ocean calls for our help as it becomes asphyxiated with the progressively growing plastic blanket that not only covers the surface, but drapes over its depths. How can we learn about the ocean when it itself is drowning? 95% of it remains unexplored, yet we've caused so much destruction to it already. Jacques-Yves Cousteau, a determined explorer and activist of the ocean's wellbeing from the 20th century, spoke the truth when he stated, "The greatest resource of the ocean is not material but the boundless spring of inspiration and wellbeing we gain from her. Yet we risk poisoning the sea forever just when we are learning her science, art, and philosophy and how to live in her embrace" (Jacques-Yves Cousteau). We need to help her.

You arrive to a seafood restaurant with your fiancé, but the food is contaminated. You live by the seashore and must prohibit your children from swimming in the warm water, because it is contaminated. Your children have no idea what a whale looks like, because they've nearly become extinct; the water was contaminated...A world like this seems so distant from the present, but it's plausible if individuals don't work together now.

Pollutant after pollutant, we are entering a crisis called "the rise of slime" (Sielen). According to *Foreign Affairs*, these past five decades have been so disruptive to the ecosystems of the ocean that we are close to "experiencing evolution in reverse" (Sielen). Despite the aura of science-fiction these news give off, it does sound probable. 3.5 billion years ago, the algae and bacteria that inhabited the ocean required very little oxygen to thrive, but then the organisms began to evolve, resulting in the rich amount of biodiversity we have today. With the amount pollution, among other human activity threats, such as climate change and overfishing, we are reversing the current complex ecosystems into simple ones.

A study coordinated by the Stockholm Environmental Institute revealed future estimates of the amount of money needed to be utilized to care for degraded ocean health. The disconcerting results are as follows: "by 2050, the anticipated decline in ocean health will cost the global economy about US\$428billion per year, rising to US\$2trillion per year by 2100" (Rustad). By implementing environmental conscious efforts into your lifestyle, you can definitely help in saving "more than US\$1trillion per year by 2100" (Rustad). Those steps have to be taken now though.

Nations around the world have already become aware and are making a difference, so why shouldn't you? For example, Bangladesh has banned polythene plastic bags from being

used, Ireland has placed a tax of 15 cents per plastic bag, resulting “in an estimated 90% reduction in plastic bag use in the first year,” Italy has completely banned single use plastic bags, and in the United States, “most parts of California have now banned plastic bags” (“Ocean Crusaders”).

For starters, you can resist the urge to toss your ice-cream wrapper on the beach, even if you have to get up from your comfortable spot and walk a distance of 20 feet. Understand that you don’t have to live near the shore in order to make a difference, since water from rivers all across the nation will eventually wind up back in the ocean. Inform children that they shouldn’t litter, because it’s better to develop the habit of not doing so at a young age. Participate in community cleanups for the sake of letting your neighborhood breathe. Reuse your plastic containers, recycle, and don’t let plastic get near the ocean.

As more discoveries are made with time, researchers are finding solutions that can be used to reduce the amount of plastic waste in our environment. The production of bioplastics, which “are made from renewable resources such as corn, tapioca, potatoes, sugar and algae and breaks down faster than traditional plastics,” is growing in Asia, South America, and Europe (“Global Bioplastics Industry”). On a trip to Ecuador, undergraduates from Yale University “discovered a fungus that eats only polyurethane” (Anderson). Researchers have also found microbes in waxworms that “could degrade polyethylene without a pretreatment step (“Plastic is well-known”). These findings have potential, but why make the situation more complex, when the solution is ourselves.

The desired visual is a marine panorama of vivid blue, scenery in which the ocean can inhale and exhale, an environment in which life on Earth is not jeopardized.

A crystal clear utopia in the future seems far-fetched from the present, but we can make a difference by bringing a halt to those that continue adding threads to this vast, artificial blanket that stifles both animal species and ourselves. Once we do that, we can begin to unweave it from the ocean one thread at a time.

## Works Cited

- Anderson, Stacey. "The Plastic-Eating Fungi That Could Solve Our Garbage Problem; The jungles of Ecuador may hold a secret weapon against plastic pollution." *Newsweek* 26 Dec. 2014. *Student Resources in Context*. Web. 8 June 2015.
- "Australia : Pursuing plastic pollution at the atomic level." *Mena Report* 3 Oct. 2014. *Global Issues In Context*. Web. 8 June 2015.
- Biba, Erin. "The Garbage Eaters." *Newsweek* 18 Apr. 2014: 1. *Student Resources in Context*. Web. 6 June 2015.
- "Global Bioplastics Industry 2018: Market Size, Share, Growth Drivers and Forecasts Analysis." *PR Newswire* 5 May 2015. *Student Resources in Context*. Web. 8 June 2015.
- "Global Plastic Production Rises, Recycling Lags." *Global Plastic Production Rises, Recycling Lags*. 28 Jan. 2015. Web. 8 June 2015. <<http://www.worldwatch.org/global-plastic-production-rises-recycling-lags-0>>.
- "History of Plastics." *SPI*. Web. 6 June 2015.  
<<http://www.plasticsindustry.org/AboutPlastics/content.cfm?ItemNumber=670>>.
- "Jacques-Yves Cousteau." *Encyclopedia of World Biography*. 2nd ed. Vol. 4. Detroit: Gale, 2004. 276-277. *Gale Virtual Reference Library*. Web. 8 June 2015.
- Lusher, Amy L., et al. "Microplastic and macroplastic ingestion by a deep diving, oceanic cetacean: The True's beaked whale *Mesoplodon mirus*." *Environmental Pollution* 199 (2015): 185+. *Global Reference on the Environment, Energy, and Natural Resources*. Web. 10 June 2015.
- Main, Douglas. "BPA Is Fine, If You Ignore Most Studies About It; The FDA insists BPA is safe, despite all the science to the contrary." *Newsweek* 13 Mar. 2015. *Student Resources in Context*. Web. 7 June 2015.
- Mole, Beth. "Sea trash defies ocean boundaries: plastic garbage swirls around globe, obscuring its sources." *Science News* 4 Oct. 2014: 13. *Student Resources in Context*. Web. 8 June 2015.

- Nuwer, Rachel. "Deep-sea dump." *Science World/Current Science* 7 Oct. 2013: 6. Student Resources in Context. Web. 10 June 2015.
- "Ocean Crusaders." *Ocean Crusaders*. Web. 8 June 2015. <<http://oceancrusaders.org/>>.
- "Ocean pollution is causing a sea of troubles." *Daily Star [Beirut, Lebanon]* 18 Mar. 2015. *Global Issues In Context*. Web. 7 June 2015.
- "Plastic is well-known for sticking around in the environment for years without breaking down, contributing significantly to litter and landfills." *Science and Children* Feb. 2015: 11. *Student Resources in Context*. Web. 9 June 2015.
- Priesnitz, Wendy. "Twenty-five ways to reduce your plastic footprint." *Natural Life* Jan.-Feb. 2013: 22+. *Student Resources in Context*. Web. 6 June 2015.
- Royte, Elizabeth. "Plastic planet: a beachcombing artist's stunning images show we're in a sea of trouble." *Smithsonian* May 2015: 68+. *Student Resources in Context*. Web. 8 June 2015.
- Rustad, Harley. "Protecting ocean health could save billions." *Geographical* May 2012: 13. *Student Resources in Context*. Web. 6 June 2015.
- "Seabirds study shows plastic pollution reaching surprising levels off coast of Pacific Northwest." *Energy Weekly News* 20 July 2012: 1372. *Global Issues In Context*. Web. 7 June 2015.
- Setala, Outi, Vivi Fleming-Lehtinen, and Maiju Lehtiniemi. "Ingestion and transfer of microplastics in the planktonic food web." *Environmental Pollution* 185 (2014): 77+. *Global Reference on the Environment, Energy, and Natural Resources*. Web. 7 June 2015.
- Sielen, Alan B. "The devolution of the seas: the consequences of oceanic destruction." *Foreign Affairs* Nov.-Dec. 2013. *Student Resources in Context*. Web. 9 June 2015.
- Smith, Natalie. "Plastic problem: how trash in the ocean is harming the environment--and what you can do about it." *SuperScience* Apr. 2015: 4+. *Student Resources in Context*. Web. 10 June 2015.
- Van Cauwenberghe, Lisbeth, et al. "Microplastic pollution in deep-sea sediments."

Environmental Pollution 182 (2013): 495+. Global Reference on the Environment, Energy, and Natural Resources. Web. 6 June 2015.

"Why People Litter." Tips to Solve Arizonas Litter Problem DontTrashAZcom. Web. 7 June 2015. <<http://donttrashaz.com/highway-littering/>>.

Wilcox, Christie. "Five Trillion Pieces Of Plastic Are Floating In An Ocean Near You [Interactive]." Popular Science. Web. 6 June 2015.

## Reflection

Summer is just around the corner, and I have a habit of sleeping with a cover, despite the agonizing heat. I felt that this feeling was a perfect analogy to compare how the ocean might feel, if it had feelings, suffocated by plastic. In my analytical essay, I bring the image of the plastic as an asphyxiating blanket that hovers not only on the surface of the ocean, but over its depths. I discuss its intricate components, its effects, and how the general public can 'unweave' its plastic threads.

Before writing this essay, I really had no idea about any of the things that I wrote about. The research I did significantly brought plastic pollution to my awareness, and upon taking breaks from my writing, actually noticed how many of my household products are made of plastic. Additionally, it has also inspired me to make a difference by recycling more often and nudging my family to do so as well. Overall, I hope people can learn something from my writing and become activists, or at least non-thrashers, themselves.