

SCI115 – Introduction to Marine Sciences: Marine Issues Paper

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# **PLASTIC TRASH IN THE OCEAN AND THE ONGOING CLEAN UP EFFORTS**

**BY**

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Image 1: The Ocean Cleanup - September 2021

## INTRODUCTION

It started as a question of “Why can’t we just clean this up?” while scuba diving in Greece that led a 16 year old Dutch boy to complete a school project about plastic pollution in the ocean. Two years later, during a *TEDx Talk* in 2012, Boyan Slat at 18 years old, proposed the idea of using technology to collect the garbage from the surface of the Pacific Ocean. As a new entrepreneur, Slat dropped out of the Delft University of Technology and started a new initiative and founded an organization called The Ocean Cleanup (National geographic, 2019). This issue of plastic pollution in the ocean and the impact to all of Earth’s creatures is a very important subject. I found the work of The Ocean Cleanup organization extremely intriguing and their efforts to clean up the ocean most valuable.

## PRESENTATION OF FINDINGS

According to the website, The Ocean Cleanup (2022), Slat had founded the non-profit organization in 2013, then proceeded to raise over \$31.5 million USD in just five years and now employs a team of 120 people that include engineers, researchers, scientists, computational modelers, as well as other supporting roles. According to their website, millions of tons of plastic enter into the Earth’s oceans every year. This garbage pollution affects all of marine life as well as us humans.

Much of the eight million tons of plastic trash enters the ocean via rivers (CNET, 2021). According to Slat, the plastic needs to be removed from the ocean before it can keep breaking down into smaller particles. Further, we need to prevent more plastics from

entering the oceans through an interception process by what he calls “closing the tap” from those rivers.

Between Hawaii and California lies the largest garbage collection point in the North Pacific Ocean. Located in the gyre, which is a large circular motion of looping water movements, is referred the “Great Pacific Garbage Patch” and covers approximately 1.6 million square kilometers of ocean area noted by The Ocean Cleanup. According to NOAA, there are four more large patches worldwide that are also located in ocean gyres and they are located in the North Atlantic Ocean gyre, the South Atlantic Ocean gyre, the South Pacific Ocean gyre, and the Indian Ocean gyre. Because ocean gyres are slow-moving circulating currents, it pulls and traps the garbage into these gyres through conveyor-like belts of ocean currents.

The purpose of The Ocean Clean Up organization is to use large floating machines to

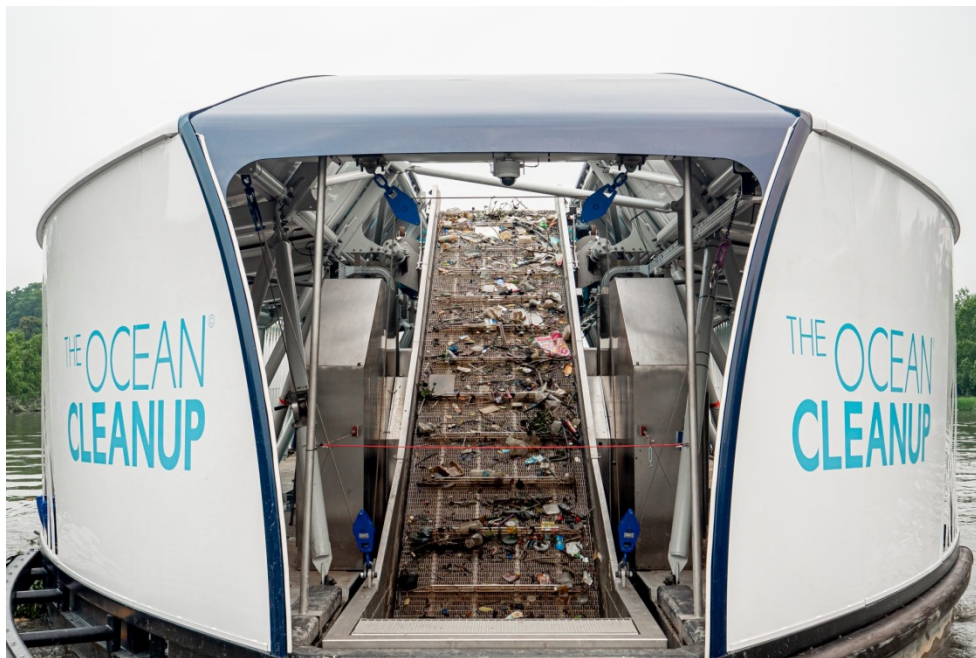


Image 2: Interceptor - Klang, Malaysia (Courtesy of the Ocean Cleanup)

remove plastic debris as little as a few millimeters in size from the ocean. The organization is doing this with machines called Interceptors as seen here, in

Image 2, with the first one announced in 2019. These machines are to be moored at

river beds and collect debris that is floating on the surface waters through the rivers toward the ocean. The Interceptor contains a large conveyor belt that moves the trash into large, onboard dumpsters that is monitored by onboard computers and those dumpsters are emptied daily by a small crew. As of April 2022, they have five Interceptor Originals deployed at rivers, actively collecting plastic trash before it can enter the oceans in Indonesia, Viet Nam, the Dominican Republic, and two in Malaysia. There are also three Interceptors deployed at the mouth of three Jamaican rivers in Kingston Harbour, as seen in Image 3. These units are modified from the original models that include two parts: the Interceptor Barrier and the Interceptor Tender.

While such a major endeavor that is surely to clean up our oceans seems to be a

wonderful idea, many ocean scientists are

very skeptical about an ocean-based collector. One of the many harsh comments came from Netherlands marine biologist Jan van Franeker of *Wageningen Marine Research* who told Stokstad of Science, “It is a waste of effort” to focus cleanup efforts at the gyres (Science, 2018). Franeker also says it’s a lot of money to reduce something that will disappear in 10-20 years providing the input is stopped. Another skeptic tells Parker



Image 3: Kingston Harbour, Jamaica - Interceptor Barrier with an Interceptor Tender (Courtesy of the Ocean Cleanup)

of the National Geographic, “I don’t think it’s going to work, but I hope it does; the ocean needs all the help it can get,” says George Leonard of the *Ocean Conservancy*. Long-time critic of the project led by The Ocean Cleanup crew is Miriam Goldstein from the *Center for American Progress*, who also tells Parker that the cleanup device “can mimic a fish aggregating device,” known as FAD, and will potentially “attract marine animals that will lead to them being entangled” in the equipment. While Goldstein also admits, “it is not known what effect it will have.” One thing is clearly stated by many skeptics, as well as believers, including Slat himself, and that is prevention. Humans need to prevent plastic trash from polluting our waters in the first place. The organization has proposed using several floating collectors in the ocean that will contain long booms to further collect the existing plastic trash. Even with all the skepticism expressed, in September 2018, The Ocean Cleanup introduced their experimental collector named System 001, better known as Wilson, in San Francisco, California to start their initial testing process. With further plans to move 2,200 kilometers off the coast of California by mid-October for a year-long deployment in the Great Pacific Garbage Patch to collect the plastic trash there. The organization is in high hopes to conduct a collection of the gathered trash after six months

of collecting.

At the time of launch, Slat says some of the challenges are predicting how much trash will be collected



Image 3: The Ocean Cleanup Sunglasses (Courtesy of the Ocean Cleanup)



and of Wilson's survivability. The engineers designed the collector to survive destructive wave energy that allows the waves to run through the system without the need to absorb them. Unfortunately, after a few months in the Pacific Ocean gyre, during a routine inspection in January 2019, it was discovered that Wilson had a catastrophic break in its 2,000 foot boom that forced the machine to be towed back to land (National Geographic, 2018).

According to their website, in the milestone section, The Ocean Cleanup learned from their first campaign from the collector named Wilson (System 001), they could make improvements for their next test equipment. After 4-months, System 001/B was launched in June 2019. Finally, after many trial and errors, October 2, 2019, System 001/B successfully captured and collected plastic debris from the Great Pacific Garbage Patch. And finally, in December 2019, the garbage haul was brought to land and the organization announced they will recycle the plastics into durable products that will in-turn, continue to fund the plastic collection of the oceans. Shortly after this, they launched their new product line of sunglasses, shown above in Image 3, that are made specifically of collected plastics from the Great Pacific Garbage Patch.

In July 2021, The Ocean Cleanup launched their next test equipment, System 002, which they have named Jenny, for a 12-week test campaign. Upon conclusion of that campaign in October 2021, the team shared the excitement of "successfully reaching their proof of technology." It was then announced that System 003 was being worked on and that it would be a larger and upgraded ocean collector system. Their plans are for System 003 to be the blueprint design for an upcoming fleet of new systems.



Image 4: Collector Jenny: System 002 - Pacific Ocean (Courtesy of the Ocean Cleanup)

Most recently, The Ocean Cleanup announced in March 2022 they finally met their goal of collecting garbage over an ocean area that is equaled to

500,000 football fields, equivalent to 660,000 acres or 1,031.25 square miles. Today, Jenny is still collecting garbage, seen in Image 5, at the Great Pacific Garbage Patch.

## CONCLUSION

I think the Ocean Cleanup organization has made a historical movement in the fight to clean up Earth's oceans. I found it disturbing there were so many skeptics regarding the endeavor they were taking on. The one thing I failed to see in my research materials as well as on the website is this, what do those skeptics have to say now? All the work they have succeeded in of the plastic trash removal from the ocean, no follow-up interviews were seen of those previously expressing negativity. While the primary goal was to collect plastic trash, the Collectors and Interceptors are collecting other forms of trash as well that include clothing and footwear, fishing gear, various metals, coolers, and anything else floating on the waters. With the successes found by The Ocean Cleanup organization, I do wonder, when will the Great Pacific Garbage Patch no longer be referred to as a garbage patch, but rather just become a body of water?

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*The Ocean Cleanup*, 25 Apr. 2022, <https://theoceancleanup.com/>. All collected images are from *The Ocean Cleanup* website.