

The Ocean Cleanup Foundation <https://www.theoceancleanup.com>

Over 5 trillion pieces of plastic currently litter the ocean.

This trash accumulates in five ocean garbage patches, the largest one being the Great Pacific Garbage Patch (1), located between Hawaii and California is about the size of Texas. If left to circulate, the plastic will impact our ecosystems, health and economies. Solving it requires a combination of closing the source and cleaning up what has already accumulated in the ocean.

The Ocean garbage patches are vast and dispersed. Ocean currents concentrate plastic in five areas in the world: the subtropical gyres, also known as the world's "ocean garbage patches".



Once in these patches, the plastic will not go away by itself. The challenge of cleaning up the gyres is the plastic pollution spreads across millions of square kilometers and travels in all directions. Covering this area using vessels and nets would take thousands of years and cost billions of dollars to complete. How can we use these ocean currents to our advantage?

Research shows the majority of plastic by mass is currently in the larger debris. By removing the plastic while most of it is still large, we prevent it from breaking down into dangerous microplastics. Our passive systems are estimated to remove half the Great Pacific Garbage patch in just five years, and at a fraction of that cost. This is how it works:

Create coastlines where there are none. The system consists of a 600-meter-long floater that sits at the surface of the water and a tapered 3-meter-deep skirt attached below. The floater provides buoyancy to the system and prevents plastic from flowing over it, while the skirt stops debris from escaping underneath.

Take advantage of natural oceanic forces. Both the plastic and system are being carried by the current. However, wind and waves propel only the system, as the floater sits just above the water surface, while the plastic is primarily just beneath it. The system thus moves faster than the plastic, allowing the plastic to be captured.

Expected Impact Our floating systems are designed to capture plastics ranging from small pieces just millimeters in size, up to large debris, including massive discarded fishing nets (ghost nets), which can be tens of meters wide. Models show that a full-scale cleanup system roll-out (a fleet of approximately 60 systems) could clean 50% of the Great Pacific Garbage Patch in just five years. After fleets of systems are deployed into every ocean gyre, combined with source reduction, The Ocean Cleanup projects to be able to remove 90% of ocean plastic by 2040.

Monitoring and Safety. Each system will be equipped with lanterns, radar reflectors, navigational signals, GPS and anti-collision beacons. The AIS will continuously broadcast the location of the systems to passing vessels and the GPS will track the location of our systems, should they veer out of the patch. The US Coast Guard will chart the area as a special operations zone and will issue a Notice to Mariners concerning the presence of our systems.

They have also conducted an Environmental Impact Assessment (EIA) through an independent agency, CSA Ocean Sciences, which did not identify any major risks of our method to the environment.

Surviving Storms. The system (System 101) has been engineered and tested to utilize and withstand the forces of the ocean. While designing the structure, we considered load cases that are only expected to occur once every hundred years. The key to survivability is flexibility. We designed the system to be limber enough to be able to follow the waves, and because the system is free-floating, it can drift when subjected to high current speeds.



In May 2018, a 120-meter section of the system successfully passed a tow test in the Pacific Ocean, being subjected to waves of up to 5 meters.



Hundreds of scale model tests were conducted throughout the years to refine the design and predict the behavior and performance of the system

Rivers Recognizing that the majority of ocean plastic originates in rivers, they developed the **Interceptor**. Working together with government leaders, individuals, and private corporations, their goal is to tackle the 1000 most polluting rivers all over the world, in five years from rollout. The Interceptor is The Ocean Cleanup's answer for river plastic waste. It is the first scalable solution to prevent plastic from entering the world's oceans from rivers. It is 100% solar-powered, extracts plastic autonomously, and is capable of operating in the majority of the world's most polluting rivers.



Conveyor belt in the Interceptor™



Operational Interceptor™ in Klang River, Malaysia Interceptor™ 002 in Klang River, Malaysia
Placement of Interceptor™, allowing vessels to pass