

BOYAN SLAT: THE GREAT



Boyan Slat speaks to reporters prior to the launch of the System 001.

by Pat Betteley

Plastics are polluting the oceans, rivers, and beaches of the world, and studies show that even the tiniest pieces pose a large threat.

If you've walked a beach lately, you've seen plastic littering the coast. Although most of the plastics in the ocean are too small for the average person to even notice, what you don't see can hurt you. These microplastics (tiny pieces of plastic) are just the right size to enter the ocean's food webs and end up on our dinner plates. Quantities of microscopic litter were measured from 35 national parks across the United States in a 2013 study done by the U.S. Park Service, Clemson University, and the NOAA Marine Debris Program. Researchers found microplastics

in every sample, no matter how protected or remote the park. The tiny bits of plastic are transported through the air and released when ice caps melt. They have been found in salt, beer, and bottled water.

What is the source of these microplastics? Some are microbeads (small plastic pieces) that were used in face wash and toothpaste until 2015. Others are fragments from larger pieces of plastic. But most are microfibers (small strands) from synthetic clothing (fabric made from a chemical process), fishing nets, carpets, wet wipes, and cigarette butts. These fibers are so small that they can pass through washing machine filters, travel through the water cycle, and end

PACIFIC GARBAGE PATCH KID

up in oceans where they get tangled in the guts of the organisms that eat them.

How long will it take for plastic to completely biodegrade (break down)? Scientists' estimates range from 450 years to never. Meanwhile, nearly 700 species of marine animals are known to have been affected by ocean plastics. Some may develop tumors or liver damage because the plastics are sponges for soaking up pollutants such as mercury, flame retardants, and pesticides. These toxins make their way up the food chain. Says Chelsea Rochman, a marine ecologist at the University of Toronto, "We have a systemic problem. We're mismanaging our waste, and that's coming back to haunt us on our own dinner plates and in our drinking water."

BOYAN SEES A NEED

What to do about the confetti soup of plastics in our oceans? Enter 16-year-old Boyan Slat from the Netherlands. While

scuba diving in Greece, he noticed more plastic than fish. After digging deeper into the world's plastic pollution problem, Boyan was surprised to find that no one has made any serious attempts to tackle the issue. "Why don't we just clean it up?" he thought. The teen designed his high school science project around the problem. His research identifies five major zones in the world's oceans where the ocean's currents converge (come together). These are often called "garbage patches." The sun's UV rays in these zones slowly breaks down plastics into microplastics.

The "Boyan Wonder" quickly realized that cleaning the oceans using ships and nets would take thousands of years, cost billions of dollars, and harm sea life. What else will work? The creative teen has an idea. Instead of going after the plastic, he will create a "passive concentration system." In this system, the ocean currents bring the plastic to him.

Boyan's research identified five major zones in the world called "garbage patches."



THE GREAT OCEAN SYSTEM 001

HOW IT WORKS SYSTEM 001

CONCENTRATE THE PLASTIC AND TAKE IT OUT

CAPTURE As the system moves, plastic floats to the surface and is captured in the skirt of the system.

ACCUMULATION As the system moves, the plastic will collect in the center of the skirt.

EXTRACTION A vessel sitting in a group zone of the skirt will remove the captured plastic from the system.

RECYCLING Plastics will be processed on shore and recycled for re-use.

2 MAIN COMPONENTS

The system is made of a 600-meter long floater that sits at the surface of the water and a tapered 10-meter-deep skirt attached below.

FLOATER
Provides buoyancy and prevents plastics from floating over it.
LENGTH: 600 METERS, 2000 FEET

SKIRT
Prevents plastics from escaping underneath.
DEPTH: 3 METERS, 10 FEET

COMPONENTS AT THE FLOATER

ELECTRONICS AND INSTRUMENTATION

- 2X** SURFACE PFD: Instruments sit with the system's surface and monitor location.
- 1X** SKIRT PFD: The surface pfd will detect when the skirt is touching the ocean floor.
- 2X** NAVIGATION PFD: Keeping the system located with other vessels, including a nearby support vessel.
- 9X** LIGHTING: To ensure visibility at all times, including the monitoring of the system.

50+ SENSORS - An array of sensors more than 100 meters across and 100 meters deep continuously monitor the integrity of the system.

MORE ABOUT THE SKIRT

TIGHTLY WOVEN TEXTILE

STRONG AND FLEXIBLE - Which is needed for withstand the different hydrodynamic scenarios it will be subjected to.

AS THE CURRENT APPLIES PRESSURE ON THE SKIRT, THE SYSTEM NATURALLY ADOPTS A U-SHAPE

The U-shape enables the system to concentrate plastic in its center.

The skirt is made of a material that is strong and flexible. It is designed to be able to withstand the different hydrodynamic scenarios it will be subjected to.

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Find out more on: www.theoceancleanup.com/technology

THE OCEAN CLEANUP



System 001 is transported to a collection zone.

After graduating from high school in 2012, Boyan presented his idea at a TEDx conference, but his plan was not noticed by the science community. Six months after beginning studies to become an aerospace engineer, Boyan couldn't stop thinking about the problem of plastics in the ocean. He quit school and used 300 euros of savings (about \$350.00 U.S. currency) to start The Ocean Cleanup. Then, in March 2013, his fortunes changed. Boyan's TEDx video was picked up by several news sites and went viral. Hundreds of thousands of people liked his idea.

TEEN ENTREPRENEUR TO THE RESCUE

Five and a half years later, Boyan's staff of 70-plus engineers, researchers, and scientists, have designed System 001. This massive, floating, 2000-foot long barrier acts as an artificial coastline. This unmanned system moves with the currents and traps plastics in a 10-foot-deep skirt. From the collection zone, plastics are loaded onto a boat and taken for recycling. Boyan imagines that eventually, up to 60 devices that will ride the waves, collecting thousands of tons of debris a year. On September 8, 2018, the System 001 was launched from San Francisco Bay. However, 23-year-old Boyan was not aboard. Although the Great Pacific Garbage Patch Kid thinks a lot about the ocean, he gets violently seasick. Instead, he continues to work from land toward the goal of cleaning up half the Great Ocean Garbage Patch by 2025.

His story reminds us that creative ideas come from people of all ages and that kids really can change the world.





System 001 was launched from San Francisco Bay Harbor on September 8, 2018.

WHERE in the World?



Answer is on page 48.

Do you know where our friend Globey is enjoying his copy of FACES?

HERE IS A HINT: A Nobel Peace Prize winner makes her home where this library is located.