The EPA is dunking giant 'pool skimmers' in Philly river to suck out trash—and find plastic waste

June 9 2022, by Frank Kummer

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A black canister with yellow filter inside—resembling a cross between a trash can and big pool skimmer—was dunked in the Schuylkill River at Bartram's Garden park in Philadelphia and emptied daily from May to June to see what it would catch.

But the device, known as a Seabin, wasn't looking for fish. It was looking for plastic. And it hauled in a bountiful load.

The Seabin, created by an environmentally conscious Australian surfer, sucked 890 pounds of plastic trash from 15 million gallons of water over the 30-day period. Of 66,238 individual pieces collected, 90% were microplastics, or less than the size of a small bead.

The U.S. Environmental Protection Agency is hoping Seabins placed in the Schuylkill and Delaware rivers yield insight on the types of plastics polluting the city's waterways and where they come from.

The agency has joined with the nonprofit Partnership for the Delaware Estuary to install four Seabins on waterfronts in Philadelphia and Camden as the first pilot of its kind in the U.S. Two Seabins have been installed at off Pier 3 marina on the Delaware River in Philadelphia, and another will be placed at Wiggins Park in Camden.

What does a Seabin do?

At low tide, the banks of the Schuylkill are covered in plastic trash, so it's no surprise that the machine is sucking in plastic bags, bottles, and other debris.

But the Seabin also collects bits that normally remain unseen. It has a pump that sucks in the river water and leaves the debris in the canister, which Seabin staff empty and catalog. The debris collected so far is dotted with blue, green, red and other microbeads of plastic.

The devices can help clean trash from the water, but that's not its main purpose at Bartram's Garden. The amount of plastic in the Schuylkill is too overwhelming.

Where do microplastics come from?

"In addition to removing trash, the Seabin pilot project … is helping us get a real handle on what kind of debris is floating downstream," Kathy Klein, executive director of the Partnership for the Delaware Estuary, said during a demonstration Tuesday. "For most people, seeing is believing. When I first saw what's being collected in the Seabins, it really was an eye-opening experience, especially to see all the different kinds of plastics that are floating down the Schuylkill River here and the Delaware."

Microplastics make their way into the food chain as marine life, such as crabs and fish, ingest them, Klein said. Microplastics are less than 5 millimeters long (one-fifth of an inch).

They can come from several sources. Tiny pieces of polyethylene plastic known as microbeads and used in health and beauty products, such as cleansers and toothpastes, easily pass through most filtration systems and find their way into waterways through sewage treatment plants. And they come from disintegrating plastic bags, bottles, and foam objects.

A big 'science experiment'

During the demonstration, Seabin staff placed the device in murky water flowing behind the dock at Bartram's Garden and a bulkhead. The rim of the Seabin floated just at the surface. The staff ran an electrical cord and turned on the Seabin (some are solar-powered), which started sucking water at the rate of 55,000 liters per hour down into its filter, trapping

litter that was placed in the water for the demonstration.

Plastic bottles and an unplanned Herr's potato chip bag floating nearby got sucked down quickly. Seabin staff have noted the large amounts of organic debris, such as chunks of wood, twigs and tree limbs that also flow in the river. Microplastics cling to the twigs like synthetic barnacles.

Adam Ortiz, the EPA's Mid-Atlantic regional administrator, likened the pilot project to a "science experiment" designed to collect debris in a systematic, automated, and consistent way. EPA provided technical expertise and $25,000 to the Partnership for the Delaware Estuary to support the project.

The Seabins will remain in the water through October, followed by six months of data analysis. The company plans to launch its second North American project this year in Los Angeles.

Seabin is not getting paid for the installations in Philly and still owns the devices. The company hopes the pilot project will help them hone their methods and yield insights into plastic pollution.

Where did the idea come from?

Pete Ceglinski, cofounder of Seabin, and a friend, Andrew Turton, learned about plastic pollution while traveling the world as surfers and boatbuilders.

Ceglinski is from Byron Bay, along Australia's southeastern coast, where he said there is little plastic litter in the water. He learned of plastic pollution in the oceans while traveling the world, including Mexico and Indonesia.

Turton came up with the idea of putting rubbish bins in the ocean to collect the trash and shared it with Ceglinski, who had a "light bulb moment," realizing he could use his background as a product designer to create such a device.

Ceglinski quit his job in 2014 and took his life savings to set up a factory in Mallorca, Spain. He taught himself to weld from YouTube videos.

As of now, Seabin workers manually count the plastics that the devices collect. But Ceglinski said the company has a partnership with IBM "where we're utilizing artificial intelligence software."

He said the company is expanding but still run like a "bootstrap" operation. He pulled staff from various countries to come to Philly.

"I love surfing," Ceglinski said, which is part of the motivation for his company. "I don't want to go to any beach with trash, and I don't want to swim in trash. No one wants to. Hopefully we can make the difference in the world."