



The Case for Citizen Science on Coastal Waters

Classroom initiatives in New York and Miami prepare students for a changing world—and they're good for the environment, too.

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Students at the Bioblitz at Brooklyn Bridge Park (Christina Tobitsch)

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On a rainy day in mid-September, a group of college kids in shiny yellow rainboots and ponchos crouch in the water of New York City's East River. Others troop by with damp clipboards, plastic hand lenses dangling around their necks.

Over the course of 24 hours, nearly 500 sophomores from CUNY's Macaulay Honors College canvass Brooklyn Bridge Park, tallying up the biodiversity along the shoreline. It's a tricky task: Some critters, like bees and moths, have sought cover from the drizzle.

"I found a yellow jacket on a muffin," one student offers.

"I'm counting it," another shrugs, tucking rain-slicked hair behind her ear.

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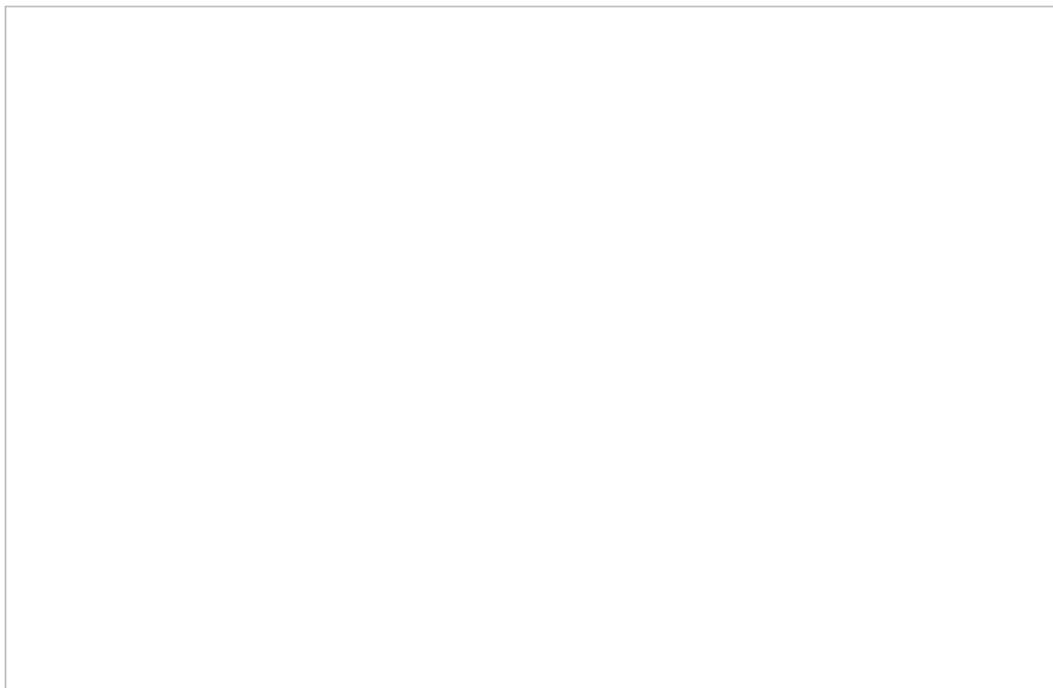
Why Cities Have to Care About Native Plants

Across the U.S., groups are working to fend off invasive species by helping local ones take root.

The [BioBlitz](#) brings students out of the classroom and into the city—full of myriad complex ecosystems. There's plenty of room for hands-on science education amid the biomes tucked between swaths of concrete. "The city is their lab," says Kelly O'Donnell, the director of the Science Forward seminar at Macaulay. The Brooklyn Bridge Park adventure is the fourth such outing for the school. In previous years, cohorts have performed similar studies in Central Park, the New York Botanical Garden, and Freshkills Park, a capped landfill in Staten Island. This time around, one discovery is simple but startling: Some people are surprised to

learn that anything is flourishing in the East River at all, says Eliza Phillips, the education manager at the Brooklyn Bridge Park Conservancy. "People think it's really dirty, but it's actually a really thriving habitat," she says.

In fact, lots of stuff is scuttling or swimming beneath the surface. An American eel is coiled in a bucket, thrashing as people stroke its sides. A spider crab scampers across a volunteer's finger when she opens up a gee minnow trap. Another crab wedges itself among oysters; one stands stock still between a volunteer's feet. Peter Park, an assistant professor of biology at Nyack College who is helping the students with count marine creatures, isn't rankled by the drizzle. "Fisherman like rain," he says, cracking a smile. He's keeping a lookout for tropical fish swept up in the current; they're often surprise visitors to New York in the fall.





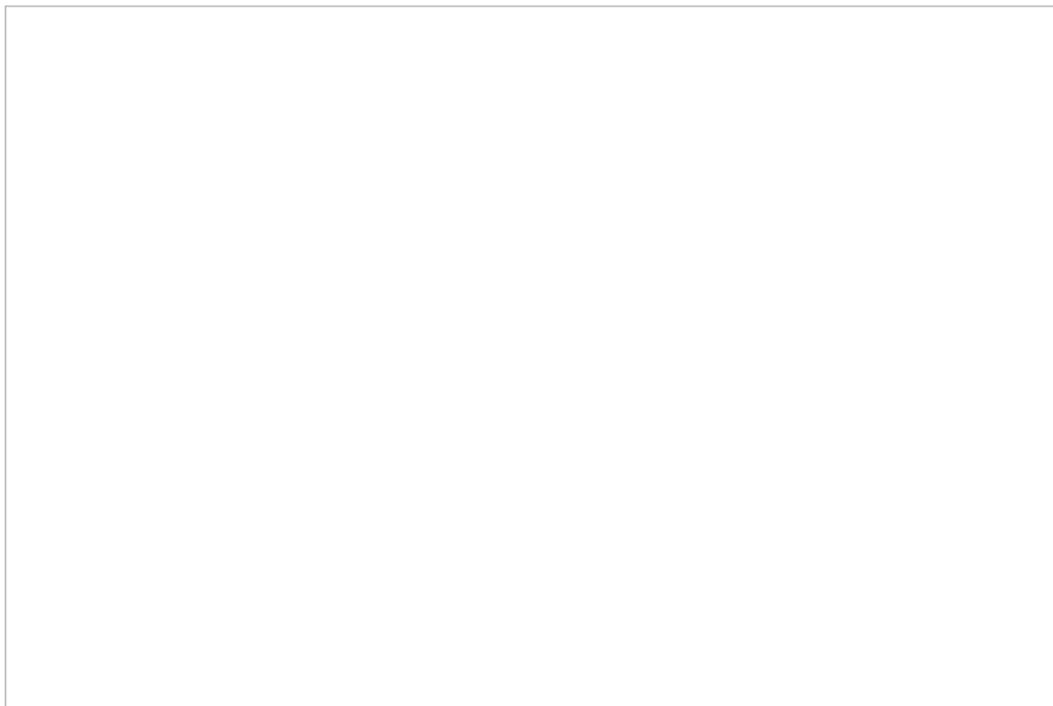
An eel in a minnow trap. (Eliza Phillips)

Other students count lichen (“First, we had to learn what lichen was,” one tells me) or trawl the water with massive seining nets. Still others suck ants up into aspirators, or upend wood chips to look for fungi. One group found stinkwort. “You don’t want to smell it,” says the student Ariella Kornreich, scrunching her nose. The students charted green shore crabs, monarchs, foxgloves, and switchgrass; clover, primroses, and earwigs; mallards, gulls, and Canada geese. They loaded all of their [observations into iNaturalist](#), where they’ll be available to independent researchers and park staff.

As much as the project is geared towards students, it benefits the park, too. Since 2008, Brooklyn Bridge Park has [reimagined an 85-acre industrial waterfront](#) as a recreation space. Piers were transformed into basketball courts and flower meadows; bike paths carve close to the water. The park is full of leisure spots, but it’s also a growing habitat built, essentially, from scratch. “It’s a layer of nature in an industrial site conceived for cargo,” says Rebecca McMackin, the park’s director of horticulture. For three summers, it was quiet. “Then, one year, there were crickets,” McMackin says. Cicadas and katydids have followed, too. Over time, as the park continues to plant robust assortments of native flora and attract pollinators, “we expect things to get more biodiverse,” McMackin adds. But it’s hard to foster biodiversity without knowing what you’re working with. Combining the park alongside professional researchers, students helped establish a baseline roster. As the park establishes its cast of characters, naturalists can hatch a plan for retaining them, and boosting their numbers.

A similar citizen science survey model is the crux of initiatives across the country. In July, the nonprofit Keep Indianapolis Beautiful [recruited young citizen scientists](#) to take stock of local pollinator populations. Over the [course](#)

[of more than 200 counts](#), participants noted a variety of bee species, butterflies, and beetles. With citizen science initiatives, there's sometimes a high margin for error. In this case, many participants didn't know the scientific name, and jotted down generic descriptions ("flowering plants with pink petals"). But even imperfect information can go a long way toward a big-picture overview. Data gleaned from those counts will inform future garden locations and other projects, KIB [said in a statement](#).



Students peer through a microscope on the Miami Science Barge. (David Heischrek: DHPA.com)

In other cities, student-based citizen science initiatives jibe with broader resiliency goals. On the Florida coast, a floating education platform aims to introduce kids to the tools they'll need to live more sustainably in a changing world. The [Miami Science Barge](#) is a hands-on, off-grid space on the Biscayne Bay. Funded by the Knight Cities Challenge last year, it recently began hosting free field trips for kids in grades K-12. The school curriculum just launched in September; the excursions are fully booked through the end of this year, says the project's director, Nathalie Manzano-Smith. Students can look at hydroponic veggies, learn about solar power, and ask questions about the food web by peeping plankton and shrimp in the bay and in onboard aquaculture systems.

Through programming, the Barge team hopes to shift the conversation about Miami's future. As my colleague Natalie Delgadillo has reported, the city is poised to be swamped by the rising sea level; in many areas, residents already reel from the aftershocks of floods. They're bad when it rains, and they can also happen when the sky is clear: by 2045, [Delgadillo reported](#), the Union of Concerned Scientists estimates that there will be 380 sunny-day floods each year. Rising waters could swallow entire neighborhoods.

Sustainability education is one way to push back against potentially cataclysmic environmental effects, Manzano-Smith says. "We don't want to be an organization that focuses on the problem," she says. Instead, she adds, their mission is to arm young folks with information and fan the desire to put it in action in their homes, schools, and neighborhoods. "We want to empower people to make changes to move the city forward, and not think we're going to have to abandon the space in 20 years," she says.

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