



50 STATES, 50 FIXES

In New Jersey, Benefits Bloom in Tiny Forests

A nonprofit planted five “microforests” to tackle environmental problems in Elizabeth, N.J. Scientists say they’re making a big difference.

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Reported and photographed in Elizabeth, N.J., home to the first “microforests” in the state.

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It’s a tiny space, no bigger than a couple shipping containers really. But standing there, the midsummer heat recedes. So does the roar of nearby airplanes and the fishy stench of the market next door.

In this thicket of elderberry plants shaded by honey locust trees, John Evangelista finds his respite.

“This is one of the only places in Elizabeth where you can stand in the middle of a forest,” said Mr. Evangelista. “I just love being in here.”

This 45 foot by 40 foot plot, tucked inside a small urban farm behind a library in the city of Elizabeth, N.J., was the state’s first “microforest.” It’s exactly what it sounds like: a miniature forest, packed with more than 260 native plants (and one anomaly, a Kentucky coffee tree).

The project was the brainchild of Mr. Evangelista, a farmer and executive director of Groundwork Elizabeth, a nonprofit that planted the forest in 2021 with support from the New Jersey Conservation Foundation. Over the past four years, with gardening help from a paid city youth program, the group has added four more microforests. Two are outside city-owned senior housing developments and one is in a cemetery. Yet another is growing at an elementary school in a nearby town.





John Evangelista and Daniela Shebitz in a microforest behind a library in Elizabeth, N.J.



The microforest at the Elmora branch of the Elizabeth Public Library.

For all these plots, the group employed a decades-old but [recently trending](#) technique known as the Miyawaki method, which crowds together native plants, encouraging them to grow rapidly as they compete for resources. Experts say this means outsized benefits like improving air quality, absorbing storm water and cooling down the surrounding area.

Elizabeth is an industrial hub that hosts both a major containership

port and Newark International Airport and is intersected by the New Jersey Turnpike and Garden State Parkway. It sits in a county with some of the least amount of tree cover in the state as well as an elevated flood risk.

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Within five years, “you’ll get the same oxygen production and carbon sequestration that a forest that’s 50 years or older is producing,” Mr. Evangelista said. “So you can make a huge impact quickly.”

In May, analysts at Earth Economics, a nonprofit, studied three of Elizabeth’s microforests and found that for each dollar invested, the public will gain on average \$10.90 in benefits like air quality and heat reduction. Thermal drone images show that the microforests can be 4 degrees Fahrenheit cooler than mature trees, and 50 degrees cooler than the asphalt in adjacent parking lots, which can reach 132 degrees in the summer.



Noel Casanova, a student at Rutgers University and youth program manager at Groundwork Elizabeth, removes invasive weeds. American elderberry, a native plant, grows in the microforest behind the library.



Preliminary research has shown that even microforests, small as they may be, can provide a habitat for wildlife and pack away planet-warming carbon, too. Daniela Shebitz, a professor of environmental and sustainability science at nearby Kean University, has been working with Mr. Evangelista to monitor his projects.

“It’s one thing to say that these densely planted forests are going to

...one thing to say that these heavily planted forests are going to be great at absorbing storm water, at sequestering carbon or providing biodiversity,” she said. “But it’s another thing to put the data behind it.”

A yet-to-be-published study by Dr. Shebitz and a former student of hers, Andres Ospina Parra, found that Elizabeth’s microforests have soil that is up to 50 times more permeable than it was before, helping the ground absorb storm water and allowing the roots access to more water and oxygen. Samples also show the microbial activity in the soil had nearly quadrupled, boosting nutrients for plants. All the planted species have grown at least twice as fast compared with stand alone plantings, while some, like the hackberry trees, have shot up seven times faster.

Doug Tallamy, an entomologist at the University of Delaware, said that research on microforests in the U.S. remains limited. When he first heard about the idea, he worried that the competition among plants would result in only a few trees surviving. But now, after seeing projects like Elizabeth’s succeed, he’s a believer.

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The group runs youth programs at the microforest.





The O'Donnell Dempsey Senior Center microforest.

“The downsides are few, and the potential benefits could be large,” Dr. Tallamy said. Because the forests start with small seedlings and require little maintenance after the first few years, he said, microforests are one of the cheapest options for boosting nature and biodiversity in cities.

But depending on the particulars of each project, Dr. Tallamy said, the first step of the Miyawaki method — thoroughly preparing the soil to mimic a healthy native forest — can get pricey. Particularly in industrial areas like Elizabeth, where the ground might be contaminated with pollutants, this step can make or break a project.

At O'Donnell Dempsey Senior Center, Mr. Evangelista and Dr. Shebitz ran an experiment, only fully treating and preparing one section of the soil, leaving another area entirely untouched. After three years, tulip and chokeberry trees on the treated side towered over their stubby counterparts planted in untreated soil.

Other benefits of the microforests are harder to quantify on a spreadsheet. “It smells better, it just makes me feel better,” said Jane Teran, a college student who works on Groundwork Elizabeth's projects during summer break. To cure a headache or take a break from the heat, she said, she pops into the microforest.