



TOBIAS HUTZLER / TRUNK ARCHIVE (3)

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THE GIVING TREES

Urban canopies help our air, health, and electric bills, but they're shrinking. Proactive cities are determined to bring them back.

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WALK THROUGH BALTIMORE'S NEIGHBORHOODS, AND LOOK UP. THE FAN-SHAPED GINKGO LEAVES AND RUBY-RED PEARLS DANGLING FROM CHERRY BRANCHES ARE THE LITERAL FRUITS OF HOW GENE DESANTIS HAS SPENT THE PREDOMINANT PART OF HIS LIFE. ON SATURDAYS, THE SLIGHT, CAP-WEARING

JON BILLOUS / ALAMY STOCK PHOTO

57-year-old plants trees. By his count, 15,223 of them over the past 40 years.

For DeSantis, an MVP to local greening outfits, the routine began as a form of therapy. The Baltimore native spent some of his childhood in Los Angeles, with an alcoholic stepfather and drug-addicted mother. On the nights his stepfather's drunkenness turned violent, the young DeSantis climbed trees in the yard to find peace. "Trees became my friends," he says. "You could say I kind of grew up there."

One night in 1976, his stepfather shot and killed his mother and then himself. The following year, the 17-year-old moved in with his grandmother in the blue-collar corner of southeast Baltimore where he had been born. That was also the year he would plant his first tree, and discover the act was a way to cope. "I was angry inside because I thought the world was so unfair," he says. "The picking and shoveling helped me reduce a lot of the anger that I had."

The relief DeSantis sought among the branches might be unique to him, but trees' restorative effects are not. Research shows that stress levels, heart rate, muscle tension, asthma rates, and blood pressure all decrease in their presence.

The benefits of urban woods go beyond helping residents take the edge off. They trap pollution, absorb auto emissions, and cool scorching sidewalks. Baltimore's cumulative 14,000 acres of canopy, for instance, ensnares in excess of 550,000 tons of carbon per year—offsetting 54 days' worth of emissions from the city's more than 600,000 residents.

Few amenities better reveal the overall vigor of a city than its canopy: the mix of trees that line streets, envelop parks, and

shade homes. "They're doing so much more to instill true health and wellness to a community," says Dan Lambe, president of the Arbor Day Foundation, the country's largest tree-planting nonprofit.

Yet despite those benefits, America's metropolitan cover is shrinking. Data from the United States Forest Service shows a decrease of 36 million urban trees between 2009 and 2014, or 175,000 acres each year. Trunks are losing actual ground to the constructed infrastructure of cities—sidewalks, buildings, and parking lots—which is rising by more than 167,000 acres per year. "If ever there was a time to be planting trees, now is that time," Lambe says.

Baltimore, despite its reputation as a gritty port town, runs counter to the trend. Its forest is growing by upwards of 5,000 new trees per year, largely in the dilapidated east-

ern and western neighborhoods that have become an icon of the bayside burg. Over the past four decades, by enlisting data and an active cadre of volunteers like DeSantis, community groups, and nonprofits, Charm City has become a standard-bearer for urban reforestation, and a model for what's possible across the nation.

THE TEENAGE DESANTIS HADN'T BEEN BACK IN Baltimore long when, one day in spring 1977, he spotted a group of four city workers turning soil beside a sidewalk to plant a tree. He offered to help. The crew said they couldn't pay him, but he didn't care: He just wanted to put a tree in the ground. DeSantis quickly learned the process bears little resemblance to the folk tale in which Johnny Appleseed sowed seeds as he strode through America's countryside. "A lot of people think that trees are little seedlings," DeSantis says. To ensure that their work will survive on the street, urban foresters plant adolescent specimens. Up to a couple of inches thick and rising from tangled balls of roots and dirt a foot or more in diameter, the saplings require holes at least twice the width and depth of their root ball.

Regardless, DeSantis found the undertaking soothing, and quickly fell into a routine. He'd call the parks department to find out when it would be planting, then walk or ride a bus to get there.

It turned out to be an early but important step into a life of service. The same day he planted his first tree, he'd also spent the morning delivering PB&Js to homeless people near the harbor. Today, he's a live-in health aide for a 106-year-old woman, serves hot meals at a church-sponsored employment center called Our Daily Bread, and bakes cookies for folks at the Karis Home shelter (his oatmeal raisin are especially good). He cites his Christian faith as his main motivation, but good works are also an attempt to ease his childhood traumas. "I try to get past that," he says. "I mean, you can't ever forget it."

In his early years volunteering with the parks department, DeSantis often found himself trading dead elms for Japanese zelkovas. The late '70s had marked the final years of a midcentury blight that killed more than 70 million elms, once the nation's most abundant tree. Dutch elm disease, a beetle-borne fungal infection, had marched across the country over three decades. In Baltimore, withering greenery haunted formerly lush neighborhoods. "It was a massive loss," recalls Gary Letteron, a veteran city forester.

The nation began to reckon with the idea that dead trees might mean more than just uglier cities. Congress allocated about \$2 million to establish four urban forestry research bases, which opened in 1978 in Georgia, California, Illinois, and New York. "Dutch elm was one of the big things that awakened people," says David Nowak, a leading USFS researcher who joined the service in the '80s. If science

could identify tree-dependent upsides for people and the towns they live in, arborists could make a clear case for protecting them against pests, disease, and development.

The effort springboarded a field of study quantifying the benefits of canopies. One report by the Environmental Protection Agency in the late '70s definitively determined that greenspaces trap auto emissions. A look at mobile homes in central Pennsylvania by USFS researchers in the early '80s showed that shade reduced summertime cooling energy needs by as much as 75 percent. An often-cited 1984 study found that hospital patients recovering from gallbladder surgery who could see trees out their windows healed faster and requested fewer pain medications than those left staring at brick walls. And, in '89, Nowak, then a USFS scrub, did the first-ever citywide canopy assessment: Using sample data and a computer program he coded, he calculated that Oakland, California's cover stored more than 160,700 tons of carbon.

Regardless of this evidence, most cities remained more concerned with economic development than trees. Average municipal spending on urban forestry fell steadily throughout the 1980s and 1990s, while high-rise skylines rose to support flourishing white-collar industries. Portland's canopy coverage dropped from 42 percent to 27 percent in the 1990s. Between 1984 and 2002, 9,000 acres of vegetation disappeared in New York City. Baltimore was largely alone on a different trajectory.

IN THE EARLY '90S, DESANTIS BEGAN DIGGING HOLES for a new nonprofit, the Parks & People Foundation, which greened both Baltimore's streets and its vacant lots. Founded in the mid-1980s by the late Sally Michel, an active civic volunteer, the organization was "part of a collective push to increase the tree canopy," according to current president Lisa Schroeder.

This type of grassroots effort drew federal attention. In 1993, the Forest Service awarded the city \$2.5 million for a program called Revitalizing Baltimore, tasked with planting more than 17,000 trees over 10 years. But even well-funded greening, Baltimore would quickly learn, requires a combined effort from city hall, nonprofits, and local businesses. Municipalities themselves manage only about 20 percent of canopied land.

Their realization would influence the landscape beyond Baltimore: It would also help map the support structures, resources, and collaborators necessary for other towns to expand and maintain urban canopies. "The mission was to develop a transferable model for community forestry," city forester Letteron recalls.

As Revitalizing Baltimore learned to coordinate with multiple stakeholders, a separate initiative focused on getting the data Letteron and others needed to defend investment in trees. In 1998, the National Science Foundation bankrolled the Baltimore Ecosystem Study, the



first long-term ecological-research survey in an urban area. The endeavor measured the city's entire canopy and placed a value on its effect on factors including pollution removal and energy usage. The hard numbers that folks like Nowak gathered over the following decade helped prove why planting thousands of trunks is more than just an expensive beautification scheme. Baltimore's trees, for instance, save city dwellers \$3.3 million in climate-control costs each year.

These parallel efforts led to the creation, in 2006, of TreeBaltimore, the city's official planting agency, dedicated to expanding the urban forest by working with communities and residents. "That was very likely a turning point," says city arborist Erik Dihle.

The programs in Baltimore helped spur other innovations. Nowak and his forest-service colleagues used data from the mid-Atlantic city and other towns to develop software that would enable any burg to measure the effects of its tree canopy. Called i-Tree, the application, which debuted in 2006, uses a sampling method to count trunks, and attaches dollar values to demonstrate their worth in removing pollution and trapping carbon, as well as in reducing energy usage.

The data helps more municipalities make stronger cases for building out their own canopies. Atlanta used an early-stage precursor of the software to ink a policy requiring property owners to replace trees they cut down with same-size specimens. Starting in 2007, New York City tapped i-Tree data to undergird a \$400 million, decade-long effort to plant 1 million trees; today, some 7 million trunks in the Big Apple absorb 1.2 million tons of carbon every year. In Philadelphia, which the EPA ordered to reduce its sewer overflows by 85 percent, the software showed planners that a \$2.4 billion investment in new green infrastructure will absorb rainwater; the alternative is spending roughly \$10 billion in updated subterranean pipes. "It takes time to get the information to people so they become educated," Nowak says. "We're into that trend now."

tops in trees

Cities measure canopy by the percent of ground trees cover. These are five of the shadiest.

5. **memphis**

Here, a cooperative effort to root 4 million new stems could boost coverage above its current 37 percent.



4. **san antonio**

Building in this Texas city requires a tree permit, which helps hold its urban forest at 38 percent.



3. **jacksonville**

This Florida burg's 42 percent urban canopy coverage reduces runoff into the nearby St. Johns River.



2. **nashville**

By 2050, the Music City aims to fill its forest (it's already 47 percent trees) with half a million new trunks.



1. **charlotte**

Some 47 percent tree cover saves residents of this Carolina city \$15.4 million in energy costs every year.

STRAIGHT AND THIN LIKE A BREADSTICK IN A BLUE puffer coat, DeSantis walks to the southeast Baltimore neighborhood of Canton. (He's never owned a car—or even a cellphone.) On this cold March Saturday, he's made the trek to help a neighborhood group put three oaks and two maples into the ground—for him, numbers 15,219 through 15,223. Though DeSantis keeps only a mental log of what he's planted, local organizations don't dispute his mighty tally: "Gene has always been on the scene," recalls Amanda Cunningham, former program manager at the Parks & People Foundation.

Despite his planting bona fides, DeSantis' count is only a small piece of TreeBaltimore's overall goal: to increase the city's total canopy from 28 percent to 40 percent by 2037. They based their aim on a recommendation set in the late '90s by national conservation nonprofit American Forests as the optimal tree cover for towns in forested states. (In grassy and desert climates, the targets are, respectively, 20 percent and 15 percent.)

Today, the Baltimore agency has even more incentive to meet that mark. The city is subject to a federal directive to reduce pollution runoff into the Chesapeake Bay. New trees can absorb stormwater that would otherwise flow along surfaces like asphalt and concrete, gathering contaminants before ending up in the iconic estuary. A single mature stalk, according to the USFS, can store more than 36,000 gallons of water a year.

These thirsty trunks, however, can't just plunk down anywhere, so TreeBaltimore collaborates with some 60 local organizations to create a map that pinpoints where new roots can do the most good. A group interested in protecting the bay, for instance, can use the chart to see where impervious surfaces cause frequent flooding, and then target surrounding land for new trees. "You're tying trees to the actual benefit that they're providing," says Charles Murphy, the office's operations lead.

The chart also helps the group identify spots where more shade might benefit people. The traditionally red-lined, segregated swaths of east and west Baltimore, for example, are severely lacking in greenspace, according to USFS data. Others, such as the luxuriant Roland Park in the north end, need only pruning and maintenance. "We don't turn away people who want a tree," Murphy explains, "but if we are targeting neighborhoods for larger-scale planting, then we go to the map."

Their ongoing efforts have tapped residents, especially DeSantis, for more and more help over the decades. Just before his next fall planting season gets underway, he'll turn 58, marking 41 years since his first tree took root. In 2019, TreeBaltimore will put 2,000 new root balls into the ground, and its crew of community and nonprofit collaborators will add thousands more. Organizations will be looking for volunteers to dig those big holes. And, as always, DeSantis will be there, pick in hand, breathing in the fresh air.