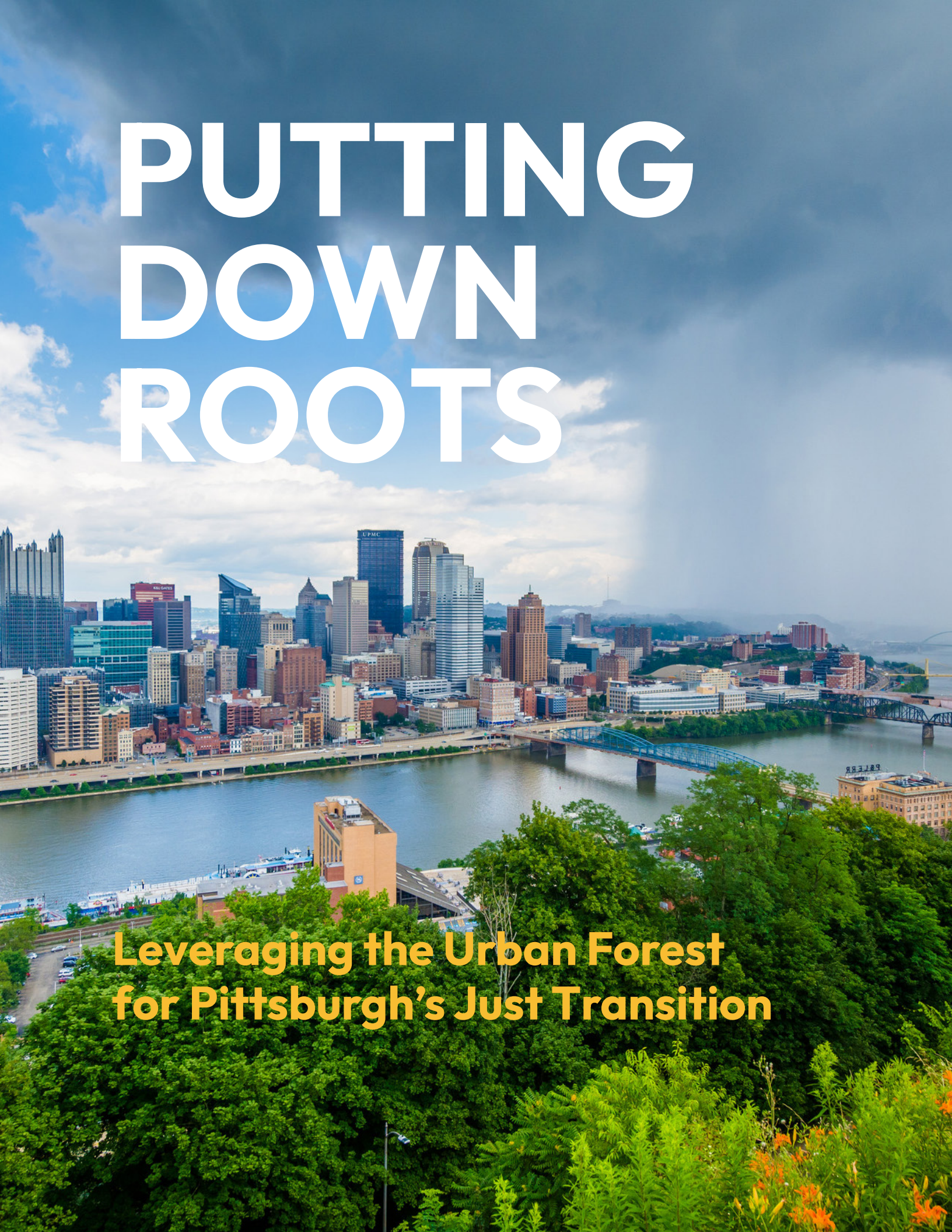

PUTTING
DOWN
ROOTS
Leveraging the Urban Forest
for Pittsburgh's Just Transition

As Pittsburgh undertakes its first ever Comprehensive Plan that addresses all 90 neighborhoods, the City has a unique opportunity to leverage its urban forest to mitigate climate risks like extreme heat and rainfall while supporting overall community well-being and quality of life. Seizing this opportunity will require increased investment and a strengthened commitment to planting and maintaining trees throughout the City's nine council districts. Elevating the urban forest and trees from a "nice to have" to a part of the city's critical infrastructure that must be nourished and maintained will result in an immense return on investment, providing dividends to all communities throughout the City. This report examines the opportunity of trees to serve as the keystone of Pittsburgh's neighborhoods, helping the City realize its vision of safe, welcoming, and thriving communities for generations to come.

BOX 1

ABOUT THE PROJECT

Beginning in 2023, the City of Pittsburgh partnered with Resilient Cities Catalyst, a New York-based nonprofit, to develop a data-driven, replicable approach for urban forest management that advances the city's Climate Action Plan Urban Canopy goals The project, funded by Google.org via ICLEI USA's Climate Action Fund, sought to focus Pittsburgh's urban canopy investments such that they could achieve multiple co-benefits, preparing climate-vulnerable neighborhoods to manage risk while offsetting carbon emissions and reducing energy consumption. As part of the project, the City acquired best-in-class data sets, including climate risk data from First Street Foundation, which is already being used to help target planting efforts towards areas where trees will provide the greatest climate resilience benefits to the city..



Why Trees?

Trees have long been identified as a priority for the City of Pittsburgh and its leaders. Pittsburgh has a publicly stated goal of planting 100,000 trees by 2030. Likewise, the City's Climate Action Plan calls for increasing the overall City canopy cover from 42% to 60% by 2030, halting "tree canopy loss due to development," and using green infrastructure (including trees) to manage stormwater. The 2021 Equitable Street Tree Investment Strategy goes further to recognize the uneven distribution of trees and the benefits they provide including "improvements in air quality, reduced stormwater runoff, reduced heat island effect, energy savings, increased sense of community, habitat for wildlife and the creation of economic opportunities provided by the urban forest." The document identified 10 priority low-income/low-canopy neighborhoods for investment and outlined a strategy to increase tree canopy cover in those neighborhoods, including both planting and maintenance efforts.

Despite the clear benefits of more trees, trees in Pittsburgh remain at risk. Data shows that Allegheny County has been losing close to 2% of its tree canopy every five years since 2010. Residential properties accounted for more than 90% of this canopy loss between 2015-2020, with a total net decrease of more than 4,100 acres (more than 3,000 football fields worth of tree canopy) across the County.

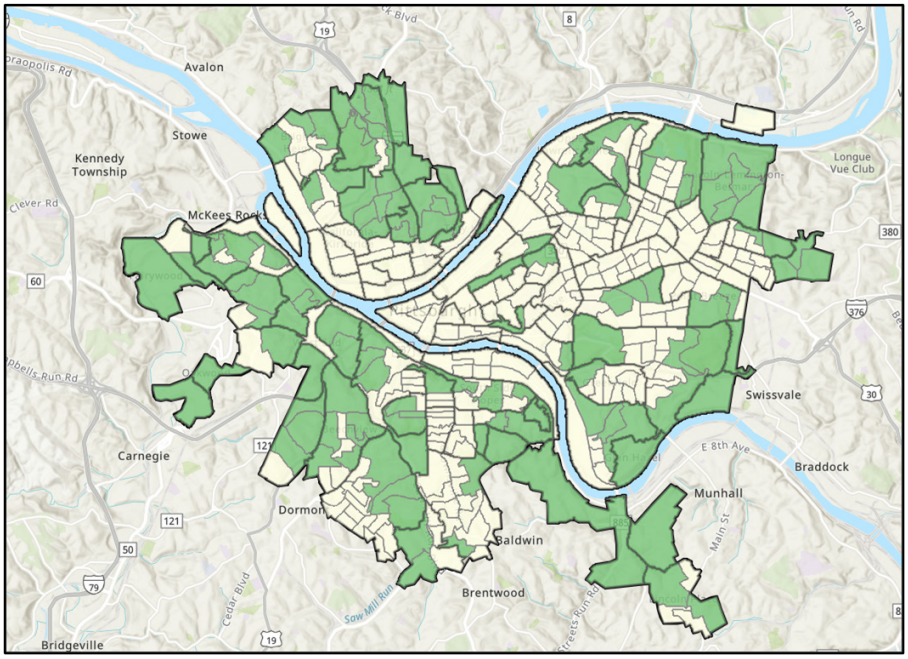


Those 4,100 acres represent a major loss for the region. Trees provide much more than just aesthetic benefits—they serve as an important and often overlooked component of Pittsburgh's critical infrastructure. However, unlike hard or grey infrastructure—roads and bridges, sewer systems and water treatment plants, electrical grids and telecommunications networks—trees are not resourced as critical assets. Furthermore, planners, developers, homeowners, and utility companies often treat trees as inconveniences, impediments, or project costs that hinder the development and maintenance of other infrastructure. This framing is out of step with reality, failing to recognize that investing in the urban tree canopy and forest offers a tremendous opportunity to improve the vitality and health of Pittsburgh's neighborhoods.

One of the most impactful benefits that trees provide is a reduction of the urban heat island effect (UHI). UHI threatens the health of city residents, especially children, the elderly, pregnant people, and those facing additional health challenges like cardiac and respiratory illnesses. Heat, which generates less media attention than other disasters like hurricanes or extreme precipitation, is now understood to be the deadliest climate-related hazard. Risk is increased in urban environments, where temperature is amplified when asphalt and other impervious surfaces absorb solar energy and vehicles and other machines emit additional heat. In Pittsburgh, the risk posed by heat is rising: the 2021 Pennsylvania Climate Impacts Assessment predicts that by midcentury there will be more than 37 days over 90°F statewide annually, a 640% increase from the 1990s.

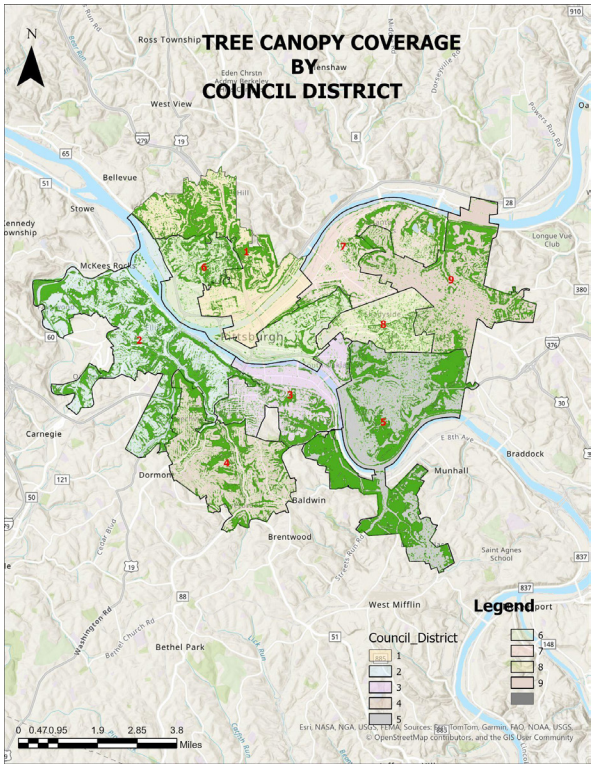
The power of trees to reduce the impact of rising temperatures is immense—scientists have called trees "perhaps the most effective and least costly approach to urban heat island mitigation and adaptation." Shade from trees can reduce "globe temperatures," a measure used to approximate the heat stress a person experiences, by 9-12 degrees fahrenheit and can reduce surface temperatures even more—outperforming artificial shade structures. And while each individual tree reduces the air temperature around it, a canopy cover of 40% or more produces the greatest cooling effect.

(2024) - City of Pittsburgh - Map of Pittsburgh block groups with under and over 40% tree canopy coverage



Trees also play a significant role in reducing energy consumption and related costs. Well-positioned trees can reduce summer cooling costs by 30% and winter heating costs by up to 8% by blocking wind. And it's not just temperature that trees help to manage: they help to mitigate flooding by capturing stormwater through both interception of rainfall in their branches and leaves as well as infiltration through the soil. The Pittsburgh Urban Forest Master Plan estimated that the City's street trees alone—which conservatively account for less than 5% of the urban canopy—capture more than 41 million gallons of stormwater annually. For Pittsburgh, a city where almost 20,000 properties are currently at risk of flooding during a 100-year precipitation event, this avoided runoff matters.

Moreover, trees reduce pollution in both nearby water bodies and in the air—absorbing pollutants like ozone, carbon monoxide, nitrogen dioxide, particulate matter, and sulfur dioxide which are known to have negative effects on health and exacerbate other risk factors like the UHI. Once again, the Urban Forest Master Plan provides an estimate of this benefit afforded by the urban canopy: removal of 532 tons of air pollution per year. Though hard to quantify, this improved air quality can lead to decreased spending on health care costs.



Not all of the benefits from trees are easy to measure. Studies have shown the presence of trees is correlated with improved mental health and social cohesion, reduced crime rates, and increases in property values and economic activity. Additionally, the benefits described above are further amplified when the interaction with other infrastructure is considered—trees reduce the strain on power grids, sewer systems, and water treatment plants, for example, and their shade extends the usable life of asphalt. And unlike most infrastructure, trees appreciate in value and service delivery over time.

Taken together, the research tells a clear story: trees play an essential role in Pittsburgh's infrastructure network, especially when it comes to supporting community resilience. Trees aren't just ornamental—they cool neighborhoods, clean air, manage stormwater, improve health, and make communities more vibrant. Historically, however, committing and maintaining investments, year after year, in trees and other nature-based solutions has proven difficult and benefits have gone unrealized. In undertaking the Pittsburgh 2050 Comprehensive Plan, the City has a chance to change that: seizing the opportunity to ensure that trees are valued in a way that maximizes the benefits they provide.



Maximizing Benefits: A Two-Pronged Approach

In order to maximize the benefits described above, investing in trees both in the right of way (street trees) and on private property is essential.

Growing and Managing Trees in the Public Right of Way

The first component of Pittsburgh's urban tree canopy consists of the trees in the right of way (ROW), which as of March 2025 are managed by just seventeen full-time employees in the Forestry Division of Pittsburgh's Department of Public Works. There are nearly 50,000 street and park trees according to the latest street tree inventory completed by Davey Resource Group in early 2025. The Forestry Division is tasked with removal of trees, pruning, planting, inspection/investigation, permits, holiday tree installation, maintaining the tree database, ordinance enforcement, and integrated pest management.



All of the Forestry Division's funding through the City of Pittsburgh budgeting process currently goes to reactive maintenance—planting of trees is funded exclusively through grants and Shade Tree Commission Fund dollars. Because of the limited budget and staff, planting trees in the right of way has historically been done largely in response to resident requests and has amounted to a few dozen trees per year, far below the 715 street trees per year recommended by the Davey Resource group in the 2015 Street Tree Management Plan as a minimum to offset tree canopy losses. Currently, there are more than 7,000 vacant tree pits that represent an immediate opportunity to add ROW trees without having to put in additional tree pits. In addition, investments in stormwater, mobility, and sidewalk improvements can create new locations for trees and greatly expand the ROW opportunity. Internal coordination between departments is absolutely critical to capitalizing on these tree planting opportunities—a detailed agreement between departments may be necessary to ensure that collaboration outlasts staff turnover and changes in leadership.

The City's by-request approach to tree planting has resulted in an inequitable distribution of resources— trees are planted where residents have the time and energy needed to request them, not necessarily where they are needed most. Further, the process favors property owners, which reduces opportunities to support trees in communities with a high percentage of rentals. More recently, the City has made efforts through the Equitable Street Tree Investment Strategy adopted in 2021 by the Pittsburgh Shade Tree Commission to rectify the inequalities in the canopy. The Investment Strategy identifies 10 priority low income/low canopy neighborhoods yearly where the City will invest in both maintenance and planting of street trees. The current list of priority neighborhoods as of mid 2025 is: California-Kirkbride, Homewood West, Homewood South, Knoxville, Esplen, Homewood North, Beltzhoover, Arlington Heights, Larimer, and Middle Hill. Without additional funds and staff dedicated to ROW tree planting, however, supporting impactful tree infrastructure is difficult.

In addition to planting, the importance of dedicating significant funds to maintenance of ROW trees cannot be overstated. On average, street trees live between 19 and 28 years, a fraction of the lifespan of their wild counterparts (60-150+ years depending on species). Because many of the benefits of trees increase exponentially as they mature and their canopies grow, these shorter lifespans leave some of the benefits unrealized. High mortality rates of trees in urban environments suggest that planting alone may not be enough to counteract the loss of urban canopy— regular maintenance and stewardship has a key role to play. Moreover, lack of maintenance can deter residents from tree planting or requesting street trees, particularly in neighborhoods that have seen widespread infrastructure deterioration due to historic disinvestment. Though organizations like UrbanKind have worked hard to overcome negative perceptions of trees spurred by this disinvestment through programs like Trust Trees, their work will be undermined if tree maintenance is not prioritized.



Adding Trees on Private Property

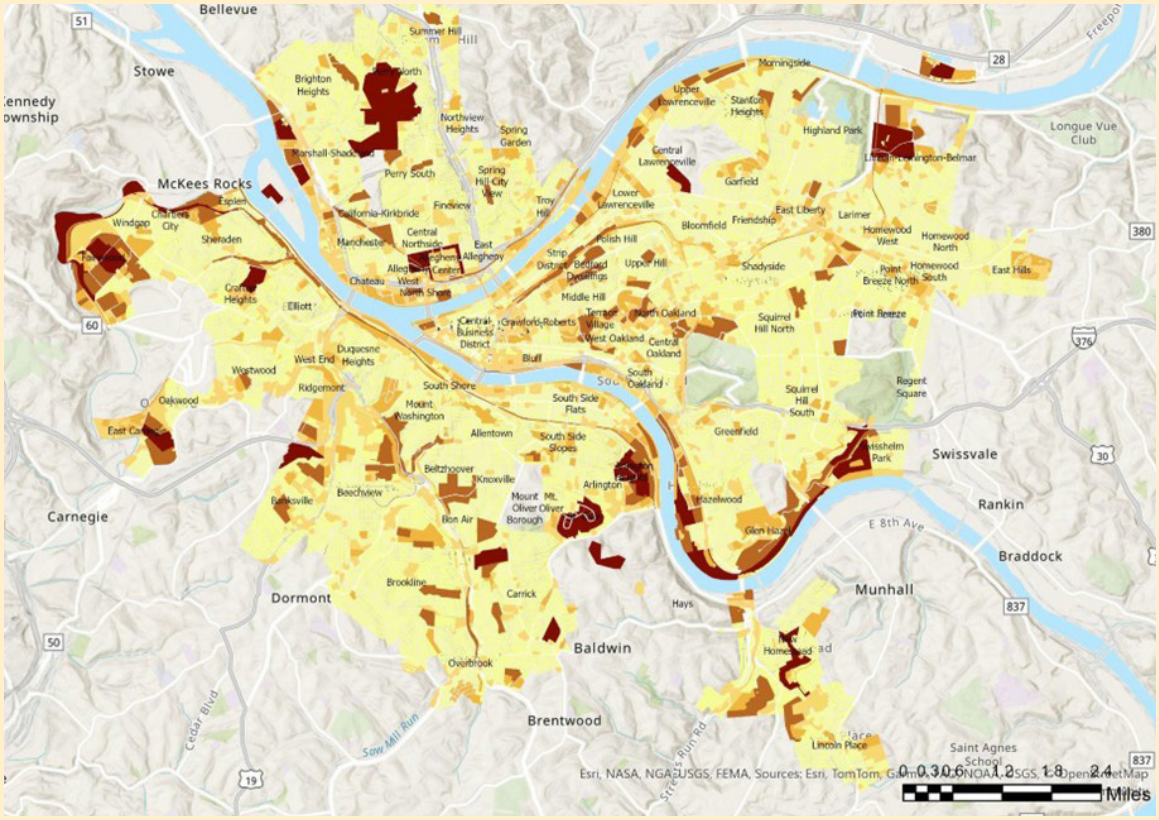
Street trees account for less than 5% of the City's urban tree canopy—the rest are on private property and are planted and managed by property owners. As such, no urban tree canopy strategy is complete without an eye toward the trees that exist outside of the right of way.



The potential to grow Pittsburgh's urban canopy on private property is immense. To begin to understand the scale of this opportunity, the City's data team produced parcel-level geospatial data that showed the percentage of specific parcels that are covered by canopy, the site of a building or other built structure, or "empty" (where empty refers to space that is neither tree or building). The team at Resilient Cities Catalyst was able to manipulate the data further to create an estimated "tree potential" score for each parcel, approximating the number of trees that could be reasonably planted on the parcel based on the amount of empty space. This allowed the project team to create a companion map to the City's urban canopy map showing not where trees already are, but where trees could be. This parcel-level analysis identified significant tree planting potential on empty spaces throughout the city—room for more than 667,000 trees. Even activating a small percentage of this potential would have a meaningful impact on Pittsburgh's urban forest and the benefits it provides to residents.

Map showing the estimated tree potential of each parcel in the City of Pittsburgh

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The Need for Increased Investment

Treating trees as critical infrastructure, and the increased investment in tree planting and maintenance that comes with that, would allow the city to tap into the immense benefits that trees provide. Such an investment also aligns with the Climate Action Plan strategy calling for the City to "allocate adequate resources to sustain the public open space system."

Current Resources Compared with Peer Communities

According to a 2014 study, Pittsburgh is slightly below average for the number of full time equivalent urban forestry employees for cities in its size bracket. The same study said a mean of $8.76 per capita and 0.52% of municipal budgets are spent on urban forestry nationwide. According to the Bureau of Labor Statistics inflation calculator, this $8.76 is worth approximately $11.99 in May 2025, suggesting Pittsburgh's budget for urban forestry should be at least $3.6 million. Likewise, 0.52% of Pittsburgh's $785 million budget for 2025 amounts to $4.08 million. Both of these numbers are more than three times the $1.16 million budget the Forestry Division was allocated in FY2025. Moreover, even bringing Pittsburgh's urban forestry up to the mean may not be sufficient: only 24% of cities in Pittsburgh's size bracket responded that their budget was adequate. Communities that felt their budget was inadequate felt it was on average 87% below what was needed.

Table 1: Peer City Urban Forestry Budgets and Full Time Employees

City	Urban Forestry Budget	Per-Capita Budget	Number of FTEs
Pittsburgh	$1.16 million	$3.83	17
Cincinnati	$3.3 million	$10.93	12.75
Cleveland	$6 million	$16.52	28
Baltimore	$9.5 million	$16.86	32
Milwaukee*	$15.3 million	$27.22	158
Philadelphia	Unknown	Unknown	33

* Note, Milwaukee's Forestry Services division of the Department of Public Works also maintains vacant lots, foreclosed properties, and boulevards.

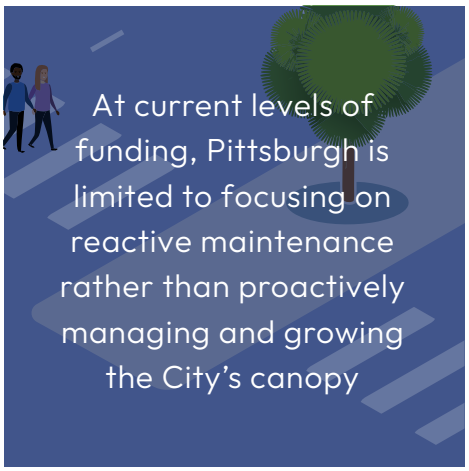
BOX 2

URBAN FORESTRY JOBS

One of the core principles of the Department of City Planning's Just Transition Strategy Framework is Regenerative Economies and Life-Affirming Work—urban forestry jobs meet this criteria. Building out a city apprenticeship program for arborists is one way to approach the need for additional staff in the Forestry Division—San Francisco and Milwaukee provide two examples of such a program. By investing in urban forestry, Pittsburgh has the opportunity to not only green the city, but also create quality jobs that contribute to community wellbeing and climate resilience.

At current funding levels, Pittsburgh is limited to focusing on tree maintenance rather than growing the City's canopy. Staying committed to growing the tree canopy and tree planting goals requires prolonged investments in new trees and tree maintenance. This also means increasing the staff in the Forestry Division—even if labor for tree planting and maintenance is contracted out, additional staff members and resources are required to support the growth in the canopy program.

Proactive Maintenance: A Critical Component



In addition to enabling increased tree planting, an expanded forestry budget would allow the City to move from reactive maintenance to proactive maintenance. In the 2015 Street Tree Management Plan, Davey Resource Group recommended a proactive maintenance approach that includes watering and mulching of young trees, pruning cycles (every 2.5 years for young trees and every 8 years for mature trees), and inspections (both routine and in the aftermath of severe weather events) in addition to tree planting. Proactive maintenance supports the health of the tree population, maximizes the benefits the trees provide, and helps counteract the narrative of trees as liabilities by reducing the frequency of hazardous situations involving trees. A late April storm in 2025 further emphasized the importance of maintenance, particularly the removal of dead or unhealthy limbs and branches, as high winds led to widespread power outages, damage to property, and several deaths in Allegheny County. There were reports of more than 180 trees down in the area—a number which may have been lower if more funding and staff were available for proactive maintenance.



Actualizing an Expanded Tree Canopy

To capitalize on trees as key components of the City's critical infrastructure and protect vulnerable populations from increasing climate threats, Pittsburgh needs to build out its urban forestry program to include significantly more planting and dedicated funding for proactive maintenance. Based on the city's previous commitments and the significant tree opportunity identified by the City's Innovation and Performance department and Resilient Cities Catalyst, recommitting to a goal of planting 100,000 trees over the next ten years through ROW and private property plantings is appropriate. By making this investment now, Pittsburgh will reap significant benefits over the next 15-30+ years in terms of reduced energy costs, improved public health, enhanced property values, and greater climate resilience. Adding 100,000 trees to the urban forest will require creative funding approaches, bolstered partnerships, enhanced municipal code, and a streamlined standard operating procedure.

Financing a Robust Urban Forest

An expanded and well-designed urban forest program will complement many goals and support the wellbeing of neighborhoods across the city. Funding for such a broad-reaching tree planting and maintenance program will require innovative approaches. In addition to leveraging a greater portion of the Public Works budget that comes from the General and Capital Funds, the City of Pittsburgh has other existing sources it can draw funding from for tree work. These include:

- **Shade Tree Trust Fund:** According to the City of Pittsburgh's 2025 budget, there is $890,273 in the Shade Tree Trust Fund, which gets its revenue primarily from the City's contract for advertising on City-owned bus shelters. It can be used for "any and all expenses incurred during the implementation of tree related projects, programs, or promotions recommended by the Shade Tree Commission."

- **U.S. Forest Service funding:** The City of Pittsburgh received a $1,000,000 Urban and Community Forestry grant from USFS to mitigate the heat island effect in underserved neighborhoods through tree planting and maintenance. This is not a recurring funding source.

- **Department of Mobility and Infrastructure funding:** The forestry team at the City of Pittsburgh can align tree planting projects and the installation of tree pits with DOMI efforts to expand sidewalks and other right of way work—sharing costs and getting more out of both teams' time and resources.

- **Stormwater Fee funds:** Tree planting that is designed to reduce stormwater runoff and strain on stormwater systems, such as through the implementation of stormwater tree pits, could utilize funding from the Stormwater Trust Fund.

- **Parks Trust Fund:** Tree planting in the City's parks can be funded through the Parks Trust Fund, which itself is funded through a 0.50 mill tax that raises around $10 million annually.

Beyond these existing sources, the City can consider creating new funding streams for urban forestry. RCC did initial modeling work for several potential approaches (see Box 3).

BOX 3

POTENTIAL INNOVATIVE FUNDING STRATEGIES

Fees			Additional Annual Revenue
	$1.5	Additional $1.50 fee on enplaned people at Pittsburgh International Airport	~$6 million
	$2	Additional $2.00 fee on rental cars at Pittsburgh International Airport	$1.6 to 2.4 million
	$1	Additional $1.00 fee on parking at Pittsburgh International Airport	over $6.5 million
	$1.5	Additional $1.50 fee on downtown parking spaces	over $5 million
	$150+	$150 - $300 fees on Payment in Lieu of Taxes (PILOT) properties	~$5 million
	$0.011	$0.011 per square foot fee on vacant properties	~$5 million
	$17.50	Property tax increase (0.25 mill) or per property tree planting fee ($17.50)	~$5 million
	0.10+	0.10 - 0.25 mill Park Tax increase	$2m to $5 million
	$3.50	$3.50 fee per night on hotel stays in Pittsburgh	over $5 million
	$250	New $250 per $100,000 fee on deed transfers within Pittsburgh	over $5 million
	$50+	New $50-$100 fee on mortgage recordings within Pittsburgh	$1m to $3.6 million
	$2	$2 per $1000 fee increase on construction permits in Pittsburgh	$1.4m to $2.4 million
	0.7%	Additional 0.7% fee on casino revenue	over $5 million

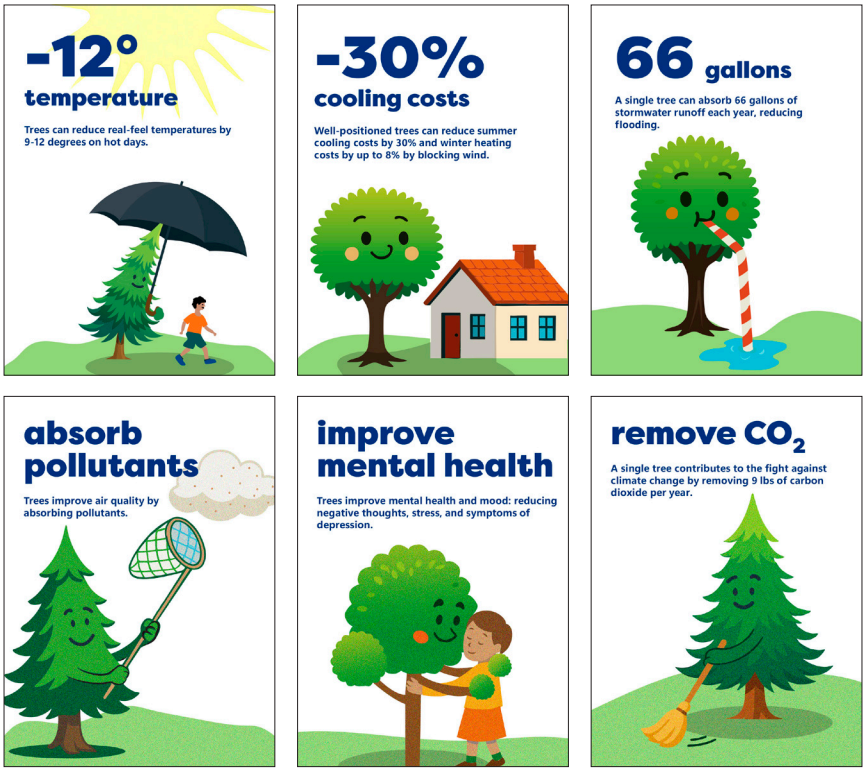
Strengthening Partnerships

Even with an increased budget, the City cannot manage the urban forest alone—it needs the support of an array of partners. Existing City partners for tree planting work include: Tree Pittsburgh, the Western Pennsylvania Conservancy, Congress of Neighboring Communities (CONNECT), UrbanKind, and many more.

Nonprofit organizations have much more flexibility to plant on private property than the City of Pittsburgh does, so they can play a key role in counteracting canopy losses through tree planting. Coordinating efforts between the public, private, and nonprofit sectors is essential to maximize the impact of urban forestry investments across Pittsburgh. In some cases, MOUs with key nonprofits could solidify ongoing partnerships. The partnership between Tree Pittsburgh and the City of Pittsburgh in particular exemplifies how collaboration can enhance urban forestry efforts. Over the course of this project, Tree Pittsburgh and the City of Pittsburgh started meeting on a more regular basis to discuss and align tree planting work. Tree Pittsburgh also gained access to the climate risk data that the City purchased from First Street Foundation so that they could also better prioritize their planting alongside the city.

Nonprofit partners can also help the City think creatively about citizen participation and outreach. An ongoing challenge for the City of Pittsburgh is resident willingness to have trees planted on or in front of their homes. Educating community members via trusted representatives on the benefits of trees to both individuals and their wider communities could help to reduce resistance to trees. For trees in the ROW, particularly in areas where maintenance has been lacking, explaining the City's increased investment in proactive maintenance could also increase resident comfort levels with accepting new trees. Dedicating resources as part of an increased planting and maintenance program towards this tree education and outreach will be critical.

Graphics created to help communicate the benefits of trees to community members.



Enhancing Municipal Code

Another way to augment the tree canopy over time and protect against canopy loss is through updates to the municipal code guiding Off-Street Parking Areas, Street Trees, Tree Protection and Replacement, and Tree Density. Updates to code can help ensure that tree planting and maintenance occurs on private property in addition to in the right of way. These updates could also be an important piece of building out the Climate Action Plan strategy which calls for "[halting] tree canopy loss due to development." Recommendations for each section include:

- **Off-Street Parking Areas:**
    - Supplement existing requirements with language around even shade distribution across the pavement area (see Township of Radnor code § 255-75), tree size requirements (i.e. percentage overstory trees, size at time of planting; see City of Atlanta Tree Protection Ordinance), and tree diversity requirements.

- **Street Trees:**
    - Add language around coordinating with stormwater management and mobility improvements (see Township of Radnor code § 255-75)

- **Tree Protection and Replacement:**
    - Reduce the standard for trees that must be protected from a diameter of 12 inches to a diameter of 6 inches.
    - Add a Heritage Tree designation for trees with a diameter of 30 inches or more and make requirements for removal and replacement of these trees more stringent.
    - Expand tree replacement requirements to specify tree type (i.e. overstory) and size at the time of planting (see City of Austin code § 25-2-1033).
    - Add language around tree species diversity and tree maintenance requirements for replacement trees (see Seattle Municipal Code 25.11.090).
- **Tree Density:**
    - Add a section outlining tree density requirements for new development (see City of Portland, Oregon code 11.50.050)

BOX 4

PILOT PLANTING PROJECTS IN HAZELWOOD AND BELTZHOOVER



The Action Fund project also involved designing and implementing pilot urban forestry projects to model how strong partnerships and data could be leveraged to get trees in the ground. City data and First Street Foundation climate risk data were used to identify neighborhoods that had low to medium tree canopy levels, high tree opportunity levels, and high levels of heat and flood risk. Hazelwood and Beltzhoover met these criteria and were selected as the locations for pilot projects.

Funded through Action Fund subgrants, Tree Pittsburgh worked closely with Resilient Cities Catalyst and the City of Pittsburgh Division of Forestry, Department of City Planning, and Department of Innovation and Performance along with community partners including the Western Pennsylvania Conservancy, UrbanKind Institute, Hazelwood Initiative, and FroGang Foundation to plant trees in the right of way in Beltzhoover and Hazelwood in Fall 2023 and Spring 2024.

Through these pilots, the team not only planted trees but also conducted education and outreach about neighborhood-specific climate risks and the potential of investments in the urban canopy to help build resilience of the local community to those climate risks and other challenges.

Standardizing Best Practices

The Department of City Planning is leading the development of a Standard Operating Procedure that will institutionalize data-driven urban forestry in Pittsburgh. It creates streamlined guidance on best practices, identifies key city and non-profit stakeholders, and outlines the process for moving from data analysis to tree planting. The SOP integrates multiple data streams to guide decision-making, including the climate risk data from First Street Foundation and the tree canopy data from Google and the Street Tree Inventory. By standardizing how the data is used, the City can ensure that future urban forestry investments consistently consider where climate resilience benefits are most needed. The procedure also formalizes coordination between city departments and nonprofit partners that has strengthened in recent years.

The SOP will help concretize the longstanding desire of the Department of City Planning to initiate more climate justice-driven urban forestry investment and will increase the effectiveness of any trees planted in Pittsburgh. By creating clear protocols for using data to guide decisions, outlining roles for both city staff and community partners, and encouraging formal agreements like MOUs, the SOP helps ensure that Pittsburgh's urban forest will grow in ways that maximize benefits for communities facing the greatest climate risks.



Conclusion

As Pittsburgh confronts increasing climate risks and seeks to create more equitable, resilient neighborhoods through the Pittsburgh 2050 effort, the urban forest stands out as a powerful, underutilized element of the city's critical infrastructure. By committing to planting 100,000 trees across the city over the next decade, Pittsburgh can address multiple pressing challenges simultaneously in an approach that coheres with the city's climate action goals and its vision for a just transition.

Success will require action on multiple fronts: increased dedicated funding for both planting and maintenance, expanded staffing in the Forestry Division, strengthened partnerships with nonprofit organizations, and updated municipal codes and standard operating procedures. The path forward is clear. By recognizing trees as essential infrastructure rather than optional amenities, investing in their growth and care at levels commensurate with their value, and distributing tree resources equitably across the city, Pittsburgh can create a legacy of resilience, health, and sustainability that will benefit residents today and for many decades into the future.