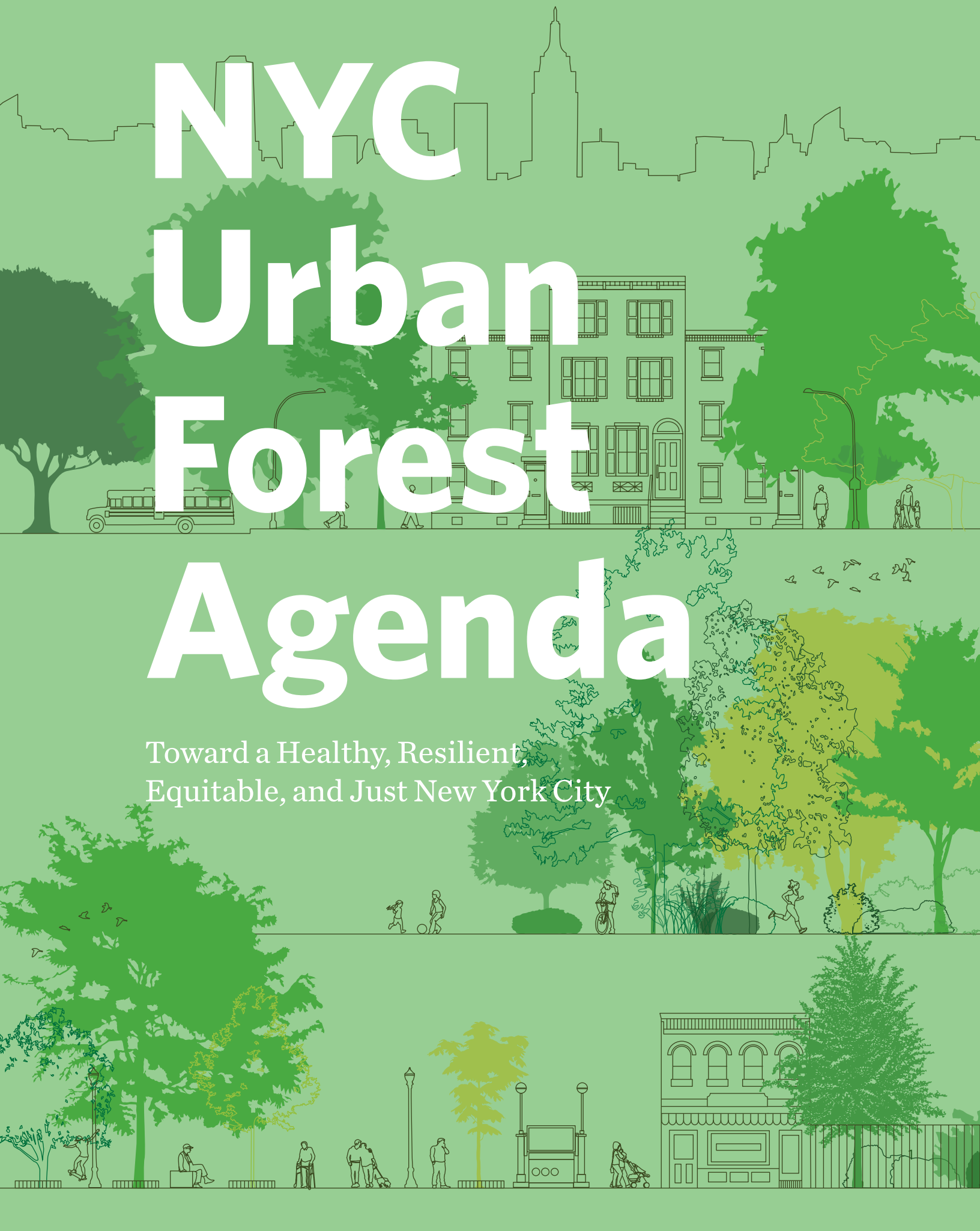
# NYC Urban Forest Agenda

Toward a Healthy, Resilient, Equitable, and Just New York City



## ENDORSERS OF THE *NYC URBAN FOREST AGENDA*

The *NYC Urban Forest Agenda: Toward A Healthy, Resilient, Equitable, and Just New York City* is a strategic roadmap that provides detailed recommendations to meaningfully protect, maintain, expand, research, and promote the New York City urban forest to benefit all New Yorkers. The following organizations have endorsed the *NYC Urban Forest Agenda*. Endorsement means organizations support the *Agenda*'s Vision, Strategies, and Actions and commit to work in partnership with the other organizations toward its implementation.

Brooklyn Botanic Garden

conEdison

Coney Island Beautification Project Inc

DAVEY Resource Group

DESIGN TRUST FOR PUBLIC SPACE

EL PUENTE GREEN LIGHT DISTRICT

Gowanus Canal CONSERVANCY

GREEN CITY FORCE

HUDSQUARE Hudson Square Business Improvement District

Jackson Heights Beautification Group

LOVE YOUR STREET DAY

National Wildlife Federation

Natural Areas Conservancy

New York Cares THE WAY TO VOLUNTEER

New York City Environmental Justice Alliance

New York City Housing Authority

NYC Soil & Water Conservation District

NYLCV New York League of Conservation Voters

New York State Department of Environmental Conservation

New Yorkers for Parks

REBNY Real Estate Board of New York

Snug Harbor Cultural Center & Botanical Garden

STARR WHITEHOUSE Landscape Architects and Planners PLLC

The Nature Conservancy

The Reinmann Lab, Advanced Science Research Center at the Graduate Center, CUNY

The Sustainable Water Resource Engineering Lab at Drexel University

THE TRUST FOR GOVERNORS ISLAND

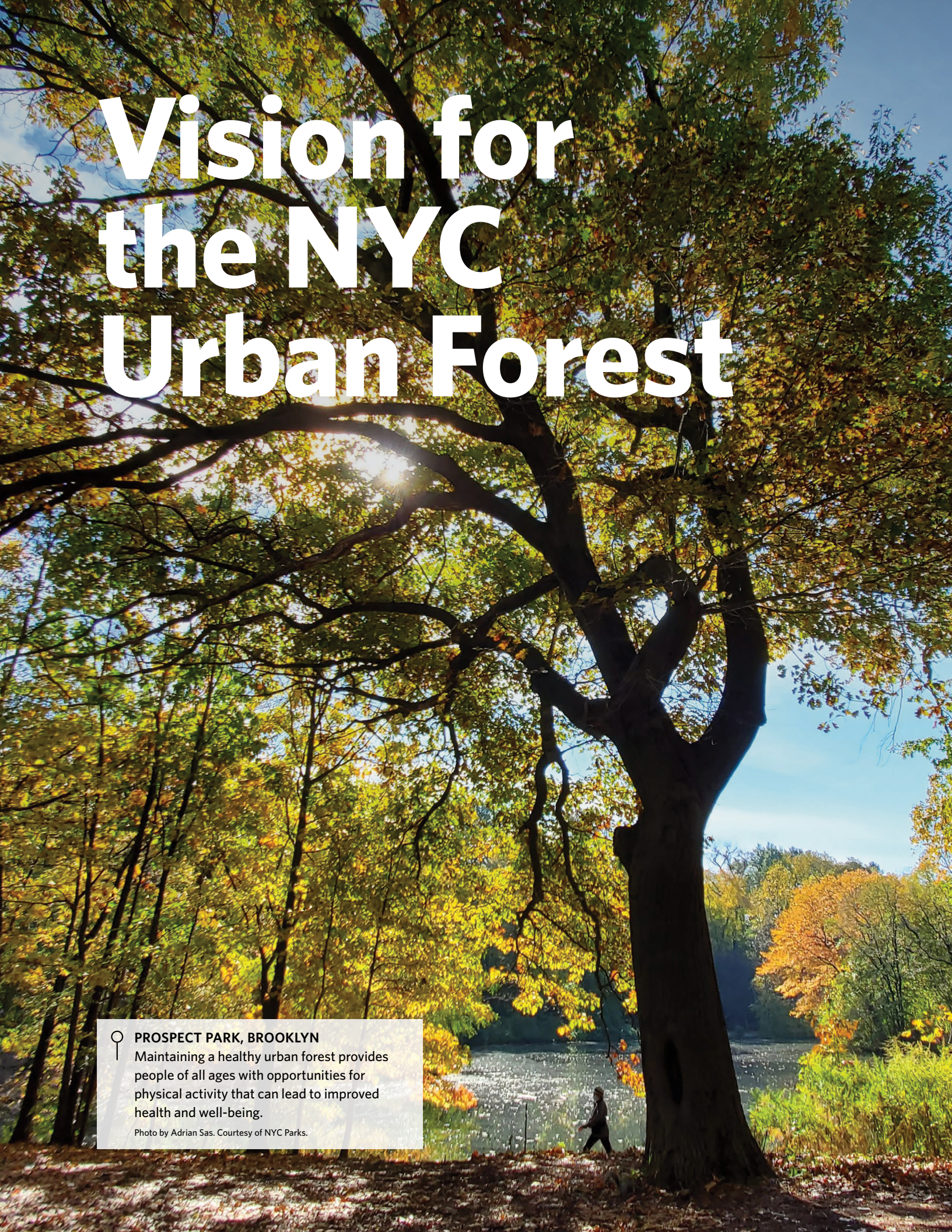
Trees New York plant preserve protect

TRI LOX

The New School URBAN SYSTEMS LAB

The *NYC Urban Forest Agenda* was developed in a highly collaborative process by the NYC Urban Forest Task Force, which was convened and facilitated by The Nature Conservancy. The Task Force will transition into the Forest for All NYC coalition to carry out the *Agenda*. The Nature Conservancy expresses significant gratitude to the nearly 70 individual members for their contributions to this coalition and the *Agenda*, and to our generous funders who made this work possible: The Leona M. and Harry B. Helmsley Charitable Trust, New York State Department of Environmental Conservation/Land Trust Alliance, The JPB Foundation, and Con Edison.

# Vision for the NYC Urban Forest



**PROSPECT PARK, BROOKLYN**
Maintaining a healthy urban forest provides people of all ages with opportunities for physical activity that can lead to improved health and well-being.

Photo by Adrian Sas. Courtesy of NYC Parks.

Forest for All NYC envisions a healthy, biodiverse, robust, accessible, well-understood, and resilient urban forest that justly and equitably delivers its multiple benefits to all residents of New York City and helps the city adapt to and mitigate climate change. Our diverse and inclusive coalition is committed to working together to advance effective and lasting policies, plans, practices, research, and investments.

Collectively, these actions will help to protect, maintain, use, monitor, understand, promote, and expand the New York City urban forest and ensure that its benefits accrue throughout all stages of the life cycle of NYC's trees. It will increase the health and well-being of all people in NYC, while demonstrating to the world how to use nature-based solutions to provide multiple social and environmental benefits.

**JAMAICA BAY WILDLIFE REFUGE, QUEENS**
Starting in 2018, over two years, The Nature Conservancy, in collaboration with the National Park Service and the Jamaica Bay-Rockaway Parks Conservancy, planted more than 28,000 trees and shrubs with more than 1,000 volunteers at Jamaica Bay Wildlife Refuge.

Photo by Devan King.

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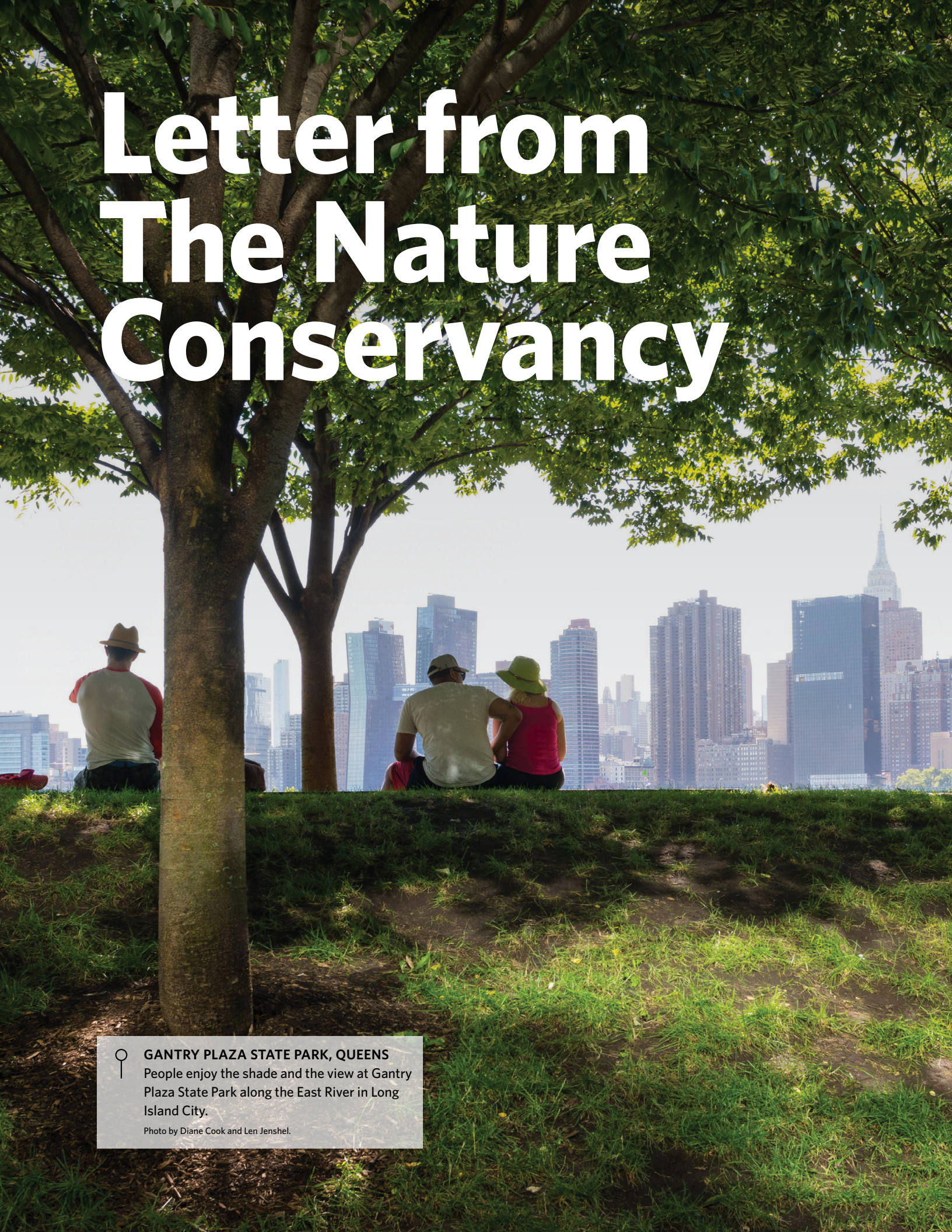
# Letter from The Nature Conservancy



**GANTRY PLAZA STATE PARK, QUEENS**
People enjoy the shade and the view at Gantry Plaza State Park along the East River in Long Island City.

Photo by Diane Cook and Len Jenshel.

Dear Reader,

As a global conservationist, forester, and proud New Yorker, I'm fascinated and inspired by New York City's urban forest, from its humblest street tree to its grandest old growth. The urban forest brings so many benefits to our city. But we need to do our part to sustain its health—by caring for the trees we have, and by planting new ones across our city's landscape.

Today, we urgently need a climate-resilient future, healthy and accessible outdoor spaces, and a green and just post-COVID recovery. Our urban forest can play a pivotal role in helping us achieve all of these. A thriving and healthy urban forest will help our city adapt to climate change, foster greater social equity and racial justice, and aid in the city's economic recovery.

In New York City, the well-being of its 8+ million people and 7+ million trees are intrinsically linked, and yet the urban forest lacks protection. The city has no long-term vision for its care and has not made the financial investment to keep it healthy. Despite the many social and ecological benefits that trees bring, urban forests are declining nationwide and the urban forest in New York City is at risk of following this trend.

The Nature Conservancy recognized a tremendous need to invest in the city's urban forest and an opportunity to elevate the incredible leadership of its many caretakers. We are proud to have convened representatives from nearly 50 organizations to form a coalition for the urban forest. Together we dreamed of how the urban forest could help create a more sustainable, resilient, equitable, and just city. I am inspired by how the Task Force turned that dream into tangible, ambitious actions that form the *NYC Urban Forest Agenda*. Through planning, stewardship, research, and policy, the *Agenda's* actions will enhance the urban forest and increase investment in trees across all five boroughs.

The Nature Conservancy is honored to be a member of the growing Forest for All NYC coalition and committed to bringing the *Agenda* to life. Working together, we can achieve far more than we could by working separately. We invite you to join us.

With gratitude,

Bill Ulfelder
Executive Director
*The Nature Conservancy in New York*

# Executive Summary

**SOUNDVIEW PARK, BRONX**
As New York City sees more intense heat waves and frequent storms due to climate change, caring for its urban forest will help fight those effects, benefiting both people and nature.

Photo by Daniel Avila. Courtesy of NYC Parks.

Trees are essential to New York City. They help improve the livability of the city by cleaning the air of pollutants, reducing the impacts of climate change, cooling city streets and buildings, absorbing stormwater, serving as habitats for wildlife, adding beauty, and promoting human health and well-being. Unfortunately, the majority of trees on public and private lands are not protected from being removed. There is no sufficient budget for their long-term care, and no coordinated vision or plan for their management. Without these policies in place, our urban forest and its many benefits are at risk.

To address these challenges, The Nature Conservancy, alongside many partners, launched the NYC Urban Forest Task Force ("UFTF" or "the Task Force"), a coalition of nearly 50 member organizations and nearly 70 participants, to collaboratively develop this *NYC Urban Forest Agenda* ("UFA" or "the *Agenda*"). The *NYC Urban Forest Agenda* is a strategic, concrete, and broadly endorsed roadmap that provides detailed recommendations to meaningfully protect, maintain, expand, research, and promote the New York City urban forest to benefit all New Yorkers in a way that is just and equitable. The NYC Urban Forest Task Force that created this UFA will transition into the Forest for All NYC coalition to help carry out the agenda, along with many new supporters.

The heart of the *Agenda* is an organized call to action for NYC's forest and contains 12 actions that are collectively designed to:

**Improve human health and well-being;**

**Enhance the health and climate resilience of the forest and the communities it serves;**

**Increase the equity of benefits of the urban forest; and**

**Inspire increased connection to and investment in the urban forest.**

The *Agenda* provides a shared vision to inform strategic planning, stewardship and management, investment, learning, research, and policy, as well as to inspire related local action for NYC's trees. The actions in the UFA reflect the diverse perspectives of the UFTF members who collectively developed it and are intended to be broadly relevant and durable over time. The actions address the most pressing needs that the UFTF identified, including the need to plan for the future of the NYC urban forest, invest in the long-term care of trees and the people who take care of them, manage trees throughout their life cycles, and continue to learn about and connect with the urban forest.

The *Agenda* grows out of several pressing issues New York City faces—the growing impacts of climate change, the need to maintain long-term sustainability of the city and livability for its residents, an imperative for greater social equity and racial justice—and the understanding that a thriving and expansive urban forest has an important role in ameliorating each of these issues. Our near-term focus is on five priority actions that underpin the overall success of the UFA and Forest for All NYC, and ultimately, the health of the NYC urban forest and communities, including: pursuing ambitious citywide urban forest goals; developing a master plan for the NYC urban forest; building a coalition and movement for the urban forest; investing in urban forest career pathways; and increasing investment in the urban forest and ensuring its equitable distribution.

The extent, distribution, and health of the urban forest are crucial to New York City's ability to adapt to climate change and our residents' health and well-being. The forest requires a coordinated and dedicated movement for its long-term care and survival. To advance this vision, we need everyone's participation and invite you to get involved in caring for the NYC urban forest and advancing the *NYC Urban Forest Agenda.* To learn more please visit ForestforAll.nyc.

*"The* NYC Urban Forest Agenda *offers a collaborative vision and set of targeted actions for expanding and supporting New York City's urban forest as a resilient, equitable resource for all New Yorkers. This work aligns with the USDA Forest Service's mission of 'caring for the land and serving people' and leverages the Forest Service Urban Field Station network's expertise in research on environmental stewardship and forest health."*

**Lindsay Campbell**
Research Social Scientist, U.S. Department of Agriculture Forest Service, NYC Urban Field Station

**THE EVERGREENS CEMETERY, BROOKLYN**
The nearly 60 cemeteries in NYC provide urban green space and trees that support biodiversity, recreation, and restoration.
Photo by The Evergreens Cemetery.

# Introduction

**FOREST PARK, QUEENS**
Park visitors participate in a forest bathing event led by the Natural Areas Conservancy.
Photo by Natural Areas Conservancy.

The New York City urban forest grows everywhere across our city. It includes the street trees found on many city blocks that cool residents on sweltering summer days. It includes the towering trees providing shade across the five boroughs' many parks. It includes the dense patches of trees in the forested natural areas that create opportunities for those of us in the city to rejuvenate locally in nature. And it includes the many people and organizations that are working daily to keep the forest strong.

A healthy urban forest is especially important in NYC, a metropolis known for its fast pace of life, diverse neighborhoods, and dense population. And yet, the urban forest is in many ways invisible to New Yorkers. People often take trees for granted, along with the environmental and social benefits they provide to the city. While trees are plentiful in some neighborhoods, they are scant in others—all too often the places where the city's most marginalized residents live and work. The NYC urban forest needs thoughtful and long-term management in order to thrive. The distribution of the city's trees needs to be more equitable, and access to them needs to be improved so that all New Yorkers will benefit from these resources equally. Although some recent policy initiatives have sought to expand and invest in the urban forest, notably the MillionTreesNYC initiative of 2007 and Cool Neighborhoods NYC initiative of 2017, the city has no overarching plan, vision, or goals for its urban forest.

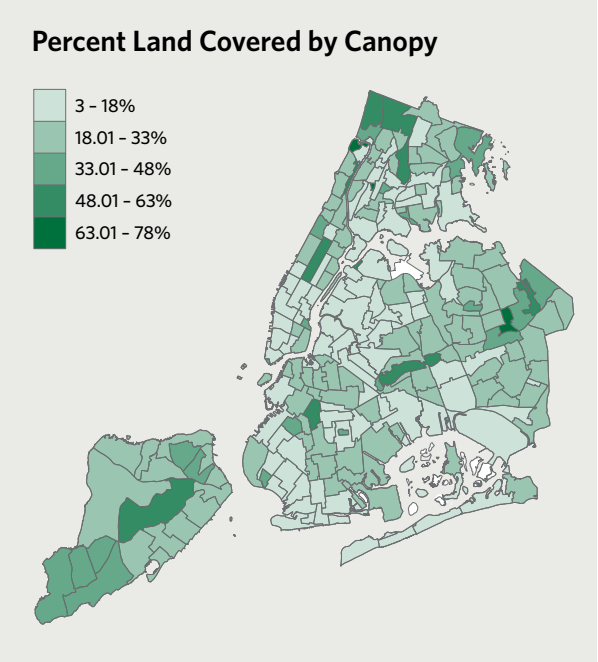
The *NYC Urban Forest Agenda* serves as a starting point for policymakers, advocacy groups, neighborhood leaders, community health practitioners, urban forestry practitioners, and many others committed to guiding NYC toward a unified vision to keep our urban forest thriving and ensure equitable access to its resources into the future.

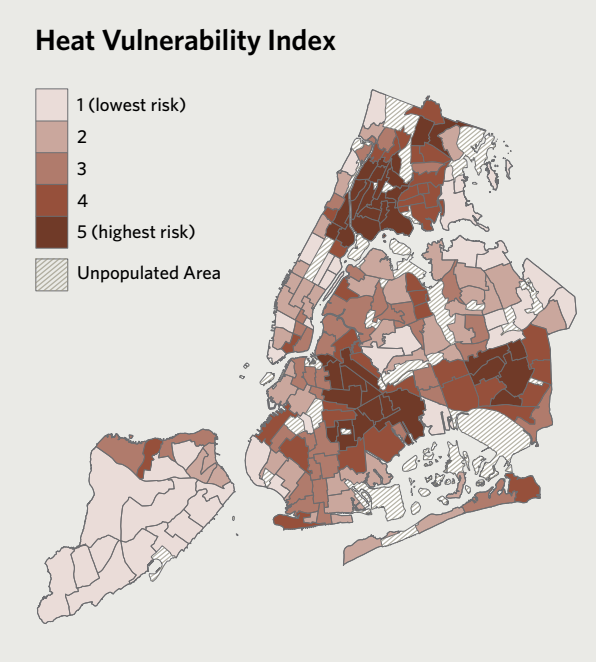
## Why This Agenda? Why Now?

Like many cities across the United States, NYC faces major challenges, including the lasting impacts of COVID-19, an overdue reckoning with systemic racism, and increasing climate change impacts—including heat waves, more extreme rain events, and flooding. These challenges affect the health and well-being of all, particularly frontline communities of color. Trees can help NYC address these societal challenges by providing respite during stressful times, helping to redress historical inequities in access to nature and its benefits, and mitigating the effects of climate change. The NYC urban forest is critical to the health and well-being of our communities, but it faces several key challenges that require a coordinated and dedicated movement to advocate for change.

## Trees and their benefits are not equitably distributed across the city. We need to be proactive in ensuring that all New Yorkers benefit from the urban forest.

The latest canopy cover data of NYC from 2017 showed that there was generally less canopy in areas with lower income households and higher proportions of people of color, which has serious implications for public health and quality of life. Unsurprisingly, communities with less tree cover are also often the most heat vulnerable. As heat waves are projected to increase in frequency, intensity, and duration in NYC due to climate change, these frontline communities are experiencing the most severe impacts. These equity concerns have been further amplified during the COVID-19 pandemic, as city residents have increasingly sought out green and open spaces for physical and mental health, but these spaces are not easily accessible, nor are they of consistently high quality across all communities. We need to be proactive in ensuring that the benefits of the urban forest improve the lives of everyone, particularly those in environmental justice and frontline communities.




The Heat Vulnerability Index (HVI) uses socioeconomic and environmental indicators to estimate the risk of heat-related illness or death within communities across NYC. Many of the most heat-vulnerable communities have relatively low tree canopy.

Data Sources: Percentage of Canopy in 2017 derived from Tree Canopy Change (2010-2017) data from NYC Department of Information Technology and Telecommunications; 2018 Heat Vulnerability Index from NYC Department of Health and Mental Hygiene.

**Trees and Urban Heat**

Trees and other plants lower surface and air temperatures by providing shade and through evapotranspiration, which help to reduce the risk of heat-related illness. On a hot summer day, shaded areas may be anywhere between 20–45° F cooler than unshaded areas.[1] The hottest areas of the city are generally those with the least tree canopy cover and green, open spaces. Often, the neighborhoods most vulnerable to high heat are also communities with low income or communities of color. It is vital to ensure the distribution of trees and their benefits are equitable and reach everyone in the city, especially the most vulnerable communities.

**Trees face numerous environmental threats, from the accelerating impacts of climate change to invasive pests and pathogens and human-caused damage. Keeping our urban forest healthy through coordinated research, monitoring, and regular maintenance is essential if we want it to thrive and protect New Yorkers.**

NYC's trees face extreme weather-related stressors like droughts, heat waves, storms, hurricanes, and blizzards that have the potential to impair their long-term survival. These weather events are increasing in frequency and severity due to climate change, and they are projected to worsen in the decades to come. In 2012, the strong wind and rain of Superstorm Sandy uprooted more than 20,000 street trees, and the accompanying storm surge of saltwater is estimated to have negatively impacted the health of approximately 48,000 street trees.[2] More recently, in August 2020, NYC experienced its third-worst storm in more than a quarter century—Tropical Storm Isaias destroyed more than 3,000 street and park trees and damaged an additional 8,000. Trees are also susceptible to a myriad of invasive pests and pathogens, and the city harbors at least 31 exotic insects and tree diseases that could impact or are already impacting its urban forest.[3] Trees also experience human-caused damage from vandalism, soil compaction, and impacts from cars and trucks. We need to keep our urban forest healthy through a range of measures, from doing coordinated research and monitoring to setting widespread management standards. This work is essential to the long-term vitality of the urban forest and will help NYC adapt to climate change.

**SAUGERTIES, NEW YORK**
Ash trees across NYC are at risk of infestation from the emerald ash borer, an invasive wood-boring beetle that feeds on and eventually kills the tree.

Photo by Kenneth R. Law, USDA APHIS PPQ, Bugwood.org.

**BEDFORD PLAYGROUND, BROOKLYN**
Trees face a number of risks from weather-related stressors. A Callery pear tree (*Pyrus calleryana*) shows damage and tree limb breakage from a wind storm.

Photo by Matthew López-Jensen.

## Most trees are not protected from being cut down, whether they are on public or private property. We need to conserve and protect trees in all segments of the urban forest.

There are almost no laws protecting trees on public or private property in NYC. While the New York City Department of Parks and Recreation ("NYC Parks") is required to replace street and park trees that were removed under its jurisdiction, the overwhelming majority of trees on public property are not legally protected. Private lands account for an estimated 35% of NYC's total 42,635 acres of tree canopy and nearly all of it is unprotected. The only trees on private property that have some level of protection from being cut down are those in a small number of areas in the Bronx, Queens, and Staten Island that have special zoning requirements for tree planting, replacement, and protection.[4, 5, 6] These few existing requirements are insufficient to conserve, protect, and expand the NYC urban forest or to maximize its benefits. We must strive to provide conservation measures and protections for all segments of the urban forest—on both public and private property—in order to achieve a thriving, sustainable urban forest.

**MANHATTAN**
After dead or damaged trees are removed, the benefits and services of that tree are lost until a new one is planted in its place and reaches maturity.

Photo by Matthew López-Jensen.

**BRONX**
Without proper protections, trees are at risk of being damaged or cut down.

Photo by Matthew López-Jensen.

**There is no coordinated plan and no committed vision to care for and expand the urban forest, nor is sufficient funding available. We need a lasting and unifying vision and roadmap to ensure the longevity of our urban forest.**

NYC lacks a coordinated, long-term citywide plan (encompassing both public and private land) to care for its urban forest. Public funding dedicated to trees is insufficient and heavily reliant on temporal government initiatives, such as MillionTreesNYC and Cool Neighborhoods NYC. There are complicated, piecemeal, and inadequate policies that dictate how and where trees are located, regulated, and managed in NYC, alongside a constellation of different landowners bearing responsibility (or not) for trees. We need a unifying, thoughtful, ambitious, and lasting vision and roadmap that ensures the urban forest's longevity and protects our investments in it to support its myriad benefits for New Yorkers.

**SOUNDVIEW, BRONX**
Before (left) and after (right) a block tree planting on Taylor Avenue in 2013 as part of a MillionTreesNYC event.
Photos by NYC Parks.

## In Conclusion

This *NYC Urban Forest Agenda* recognizes and seeks to address these key challenges facing the urban forest; leverages this pivotal moment to build a healthier, more climate-resilient city; and helps NYC become a global leader in urban forestry while centering equity and justice to create a healthier, more just city.

# What is the New York City Urban Forest?

**BROOKLYN**
Tree canopies provide ecological, economic, and aesthetic benefits to the neighborhoods they shade.

Photo by PM10. Courtesy of iStock.

The NYC urban forest is a fascinating and complex social-ecological system composed of all of the trees in NYC and the physical and social infrastructure that support them. It includes approximately 7+ million trees on public and private property, covering a variety of forest types from street trees to natural forest; the soil; and the forest understory. The social infrastructure referenced in our definition includes the people—thousands of paid and volunteer tree stewards, researchers, advocates, and other practitioners who care for the trees—and the behaviors, policies, programs, budgets, and investments that relate to NYC's trees.

This definition is adapted from the United States Department of Agriculture ("USDA") Forest Service, which states: "Urban forests are composed of all the trees within our urban lands. The definition conceptually extends to include the various ecosystem components that accompany these trees (e.g., soils or understory flora)... Urban forests can contain forested stands, like in rural areas, but they also contain trees found along streets, in residential lots, in parks, and in other land uses. The forests are a mix of planted and naturally regenerated trees."[7]

The concept of the urban forest as a social-ecological system allows us to think holistically about trees and understand them as an asset so that they may be better maintained, protected, and managed.

Key elements of the urban forest include:

**Trees**

**Biodiversity**

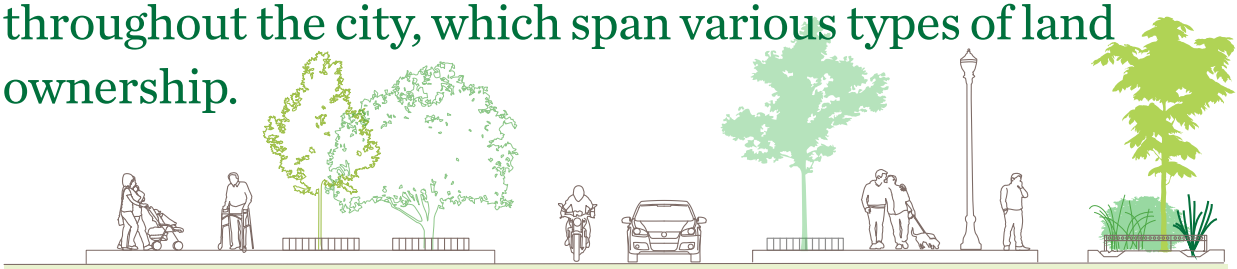
**Soil, Roots, and Understory**

**Stewards**

**Policy, Funding, and Investment**

# WHERE TREES ARE FOUND

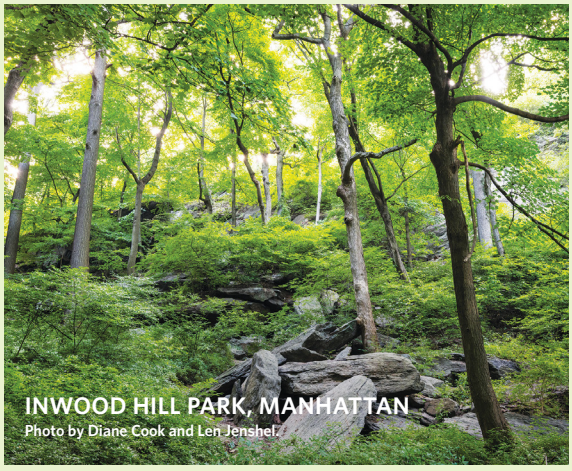
## There are four major areas where trees are found throughout the city, which span various types of land ownership.



COLUMBUS STREET, MANHATTAN
Photo by Kevin Arnold.

### PUBLIC RIGHTS OF WAY

Trees that are planted in public rights of way are found along streets, sidewalks, parkways, highways, and medians of surface roads. One specific set of these trees, street trees, are a key component of the urban forest. As of the most recent 2015 street tree census, there were 652,088 living street trees in NYC,† which comprise an estimated 25% of the city's tree canopy.‡



INWOOD HILL PARK, MANHATTAN
Photo by Diane Cook and Len Jenshel.

### FORESTED NATURAL AREAS

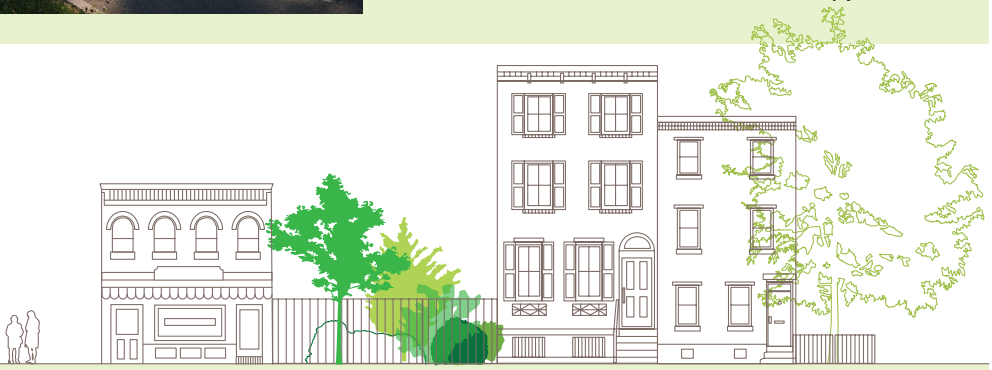
Forested natural areas are a subset of the urban forest and are distinct from other tree types, in terms of biodiversity, size, composition, and management. They are complex ecosystems with unique soils, microorganisms, and myriad species of flora and fauna, in addition to the humans who live near, visit, and manage these spaces.[8] Forested natural areas comprise approximately 28% of the total tree canopy.

† Based on analysis by The Nature Conservancy of data from the 2015–2016 NYC Street Tree Census.
‡ All canopy percentages on this page are based on analyses presented by The Nature Conservancy in a forthcoming report, *The State of the Urban Forest in New York City*.

QUEENSBRIDGE PARK, QUEENS
Photo by Diane Cook and Len Jenshel.

## LANDSCAPED AREAS

Trees in landscaped areas are typically actively planted and managed. They can be found at facilities and institutions, including schools and universities, hospitals and medical campuses, places of worship, cemeteries, NYC Housing Authority properties, and in actively programmed areas of parks. Trees in landscaped areas can exist in parks of various jurisdictions, and a recent inventory indicated that NYC Parks had 154,982 living trees in landscaped areas alone, comprising an estimated 10% of the total tree canopy.†



BAY RIDGE, BROOKLYN
Photo by Oleg Albinsky.

## PRIVATE HOMES AND BUSINESSES

Much of the city's tree canopy can be found on the properties of homes and businesses, including one- to three-family homes with yards, multi-family properties, and commercial businesses (industrial, manufacturing, etc.) Trees on all private properties, including homes and businesses, make up approximately 35% of NYC's tree canopy.

† Based on data from the 2017-2018 Parks Tree Inventory provided by NYC Parks.

# OTHER ELEMENTS OF THE NYC URBAN FOREST

## The urban forest includes not just trees, but other elements that help them thrive.

MOUNT LORETTO UNIQUE AREA, STATEN ISLAND
Photo by Michael Treglia.

### BIODIVERSITY

In addition to providing benefits to people, the urban forest supports many species of flora and fauna and, therefore, helps maintain biodiversity in NYC. Trees provide food and habitat to myriad animal species, including insects, birds, snakes, amphibians, and invertebrates.

JAMAICA BAY WILDLIFE REFUGE, QUEENS
Photo by Diane Cook and Len Jenshel.

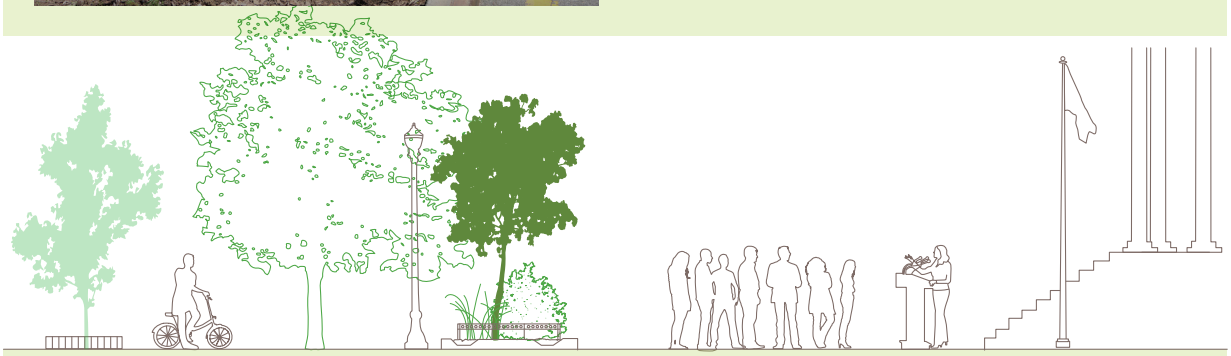
### SOIL, ROOTS, AND UNDERSTORY

Trees across their landscape soak up nutrients from the soil through their roots, with support from microorganisms and fungi. Soil stores water, filters pollutants, and cycles nutrients, while roots help trees acquire resources and serve as an anchor. Understory is the vegetation growing between the forest floor and forest canopy, which includes grasses, forbs, ferns, mosses, shrubs, and young trees, and makes up the largest percentage of plant diversity in a given forest ecosystem.[9]

HUNTS POINT, BRONX
Photo by Noemi Gonzalo-Bilbao Fernandez.

## STEWARDSHIP

Urban forest stewards are those who take care of the urban forest.[10] This includes conservation (e.g., protecting green spaces and trees), management (e.g., planting, pruning, weeding, watering), monitoring (e.g., collecting tree health data), education (e.g., sharing the importance and benefits of trees to cities, preparing people for urban forestry careers), advocacy (e.g., supporting legislation and funding for trees), and transformation (e.g., repurposing fallen trees into wood products).



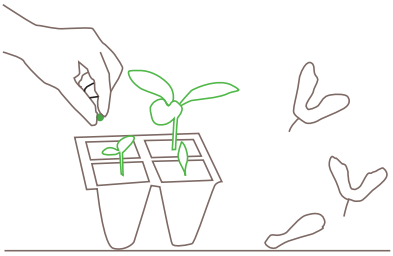
GREENPOINT, BROOKLYN
Photo by Trees New York.

## POLICY, FUNDING, AND INVESTMENT

Policy, funding, and investment are crucial to ensuring that the NYC urban forest provides benefits to all. Trees are protected and managed through various policies, including laws, regulations, and strategic plans. Funding comes from public sources, through the City budget and state and federal grants, and from private sources, through corporations, charities, foundations, and crowdfunding. The public plays an important role in advocating for policy and funding to support the urban forest and those who maintain it.

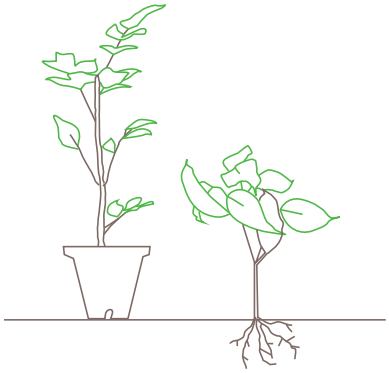
# LIFE CYCLE OF A TREE IN NYC

## The cycle of tree planting, aging, and removal is central to urban forest management.



### 1. SEED

Many trees start from a small seed. In natural areas, seeds can often be dispersed by wind, water, or animals. In other areas of the city, trees grow from seedlings that are started from seed by nurseries. These trees are grown in containers and then transplanted into locations along streets, in landscaped parks, in backyards, and in natural areas for forest restoration efforts.



### 2. SEEDLING

After seeds are planted, either by natural dispersal or at nurseries, the sprout persistently grows and begins to develop woody characteristics. At nurseries, people water and fertilize tree seedlings—and for some species, transplant them to gradually larger pots—until they reach the size at which they are ready for planting. While seedlings are not mature enough to plant in all locations, like landscaped parks or in street tree beds, staff and volunteers often plant seedlings during planting efforts in forested natural areas.[11] The seedling stage is when trees are most at risk from diseases and damage like deer grazing.[12] Private property owners may purchase seedlings from nurseries for planting.

### 3. YOUNG TREE

A sapling is a young tree that typically has a trunk between 1 and 4 inches wide, measured at 4.5 feet from the ground.[13] The time of the sapling stage varies by tree species. At nurseries, the staff care for young trees until they are ready to be planted. City agencies, local gardens and conservancies, stewardship organizations, and other private property owners purchase containerized young trees from nurseries to plant at a variety of landscapes across the city.

## 4. MATURE TREE

A mature tree produces fruits or flowers and is at its most productive stage of life. Generally, large, long-lived trees provide the greatest ecosystem services for people and nature.[14] To ensure all trees in the city reach full maturity and continue to thrive, they require regular maintenance and health monitoring work. This work is not always carried out, depending on the landowner, and is often under-resourced. Public agencies and local park conservancies prune landscaped park trees if a structural or health issue is detected. Local stewardship groups and volunteers also help take care of trees throughout their life cycle in public spaces, such as cultivating, mulching, and watering street tree beds. Individual trees in forested natural areas typically require less active human intervention because they are influenced by natural processes.

## 5. DECLINING TREES AND SNAGS

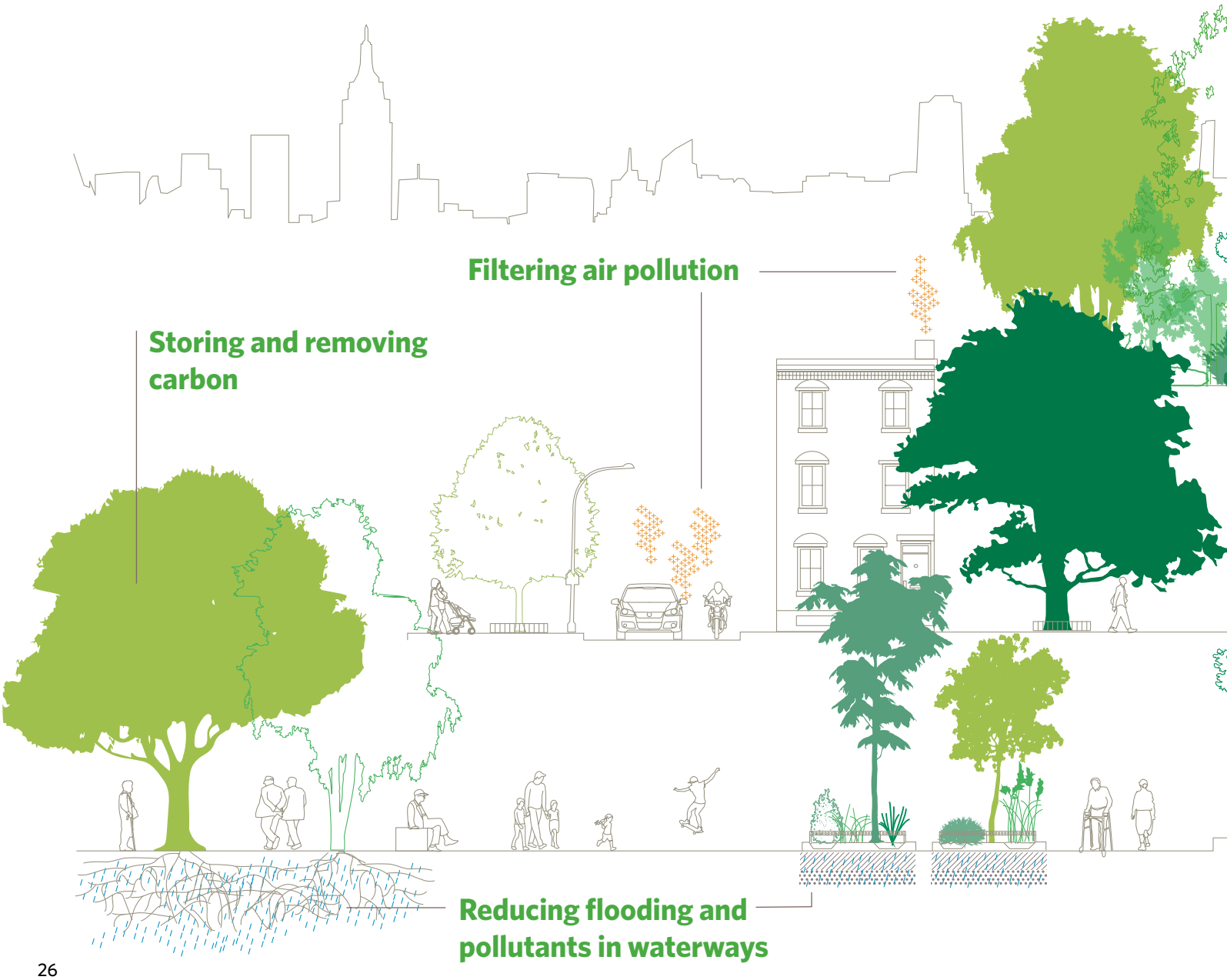
As trees age to the end of their lives, they become more susceptible to the impacts of insects or pathogens, major weather events, and other influences. Tree care professionals may need to chemically treat, structurally prune, or even remove trees if they pose a risk to people or property. In natural areas, snags (standing dead trees) are useful to sustaining biodiversity, serving as home to insects and fungi, and providing shelter for birds and other small mammals. As trees decompose, they gradually return nutrients to the soil to sustain the growth of other trees and vegetation. Planting trees in areas where existing trees are beginning to decline (successional planting) is a helpful way to ensure the continuity of tree benefits for generations to come.

## 6. END USE

Most trees removed in NYC are either chipped and spread on park landscapes or sent directly to a landfill, and some trees are made into compost. While it is not yet common in NYC, there is a growing movement to reuse urban wood in cities like Baltimore, MD,[15] where removed trees are taken to a local mill and transformed into lumber for products. Urban wood reuse reduces carbon emissions by keeping the carbon that was sequestered by the trees stored in wood products rather than releasing it, and by reducing long-haul transport of removed trees to landfills. This wood material is maintained in the local ecosystem, supporting local economic activity and jobs.

# BENEFITS AND SERVICES OF NYC'S TREES

Trees are essential infrastructure in NYC and provide abundant services to New Yorkers. They clean the air by capturing and absorbing harmful pollutants (like particulate matter, ground-level ozone, dust, and smoke). Trees help the city mitigate climate change by absorbing and sequestering carbon dioxide and reducing energy use in buildings (thus reducing the amount of associated carbon emissions). They help NYC adapt to climate change and ameliorate the urban heat island effect by providing shade and cooling that offer relief from rising temperatures and heat waves. And trees, especially those with enhanced tree beds (also called bioswales or rain gardens), absorb stormwater during rain events, which helps to reduce street flooding incidents. Trees also help to reduce the amount of water entering the sewer system that could cause a combined sewer overflow event, thus improving the water quality of local waterways.



Trees also provide key social benefits across NYC. They are a valuable tool for improving public health in cities because they improve air quality and help to reduce respiratory illnesses, and they provide cooling and shade on hot days, which helps to reduce heat-related illnesses. They can also improve the mental health and well-being of people by reducing stress and promoting healing and contemplation. Trees also hold deep cultural, spiritual, and artistic value. Urban trees, and their care, can build cohesive communities by fostering stronger connections between neighbors and establishing people's sense of place, resulting in more resilient communities.

# FACTS ABOUT THE URBAN FOREST IN NYC

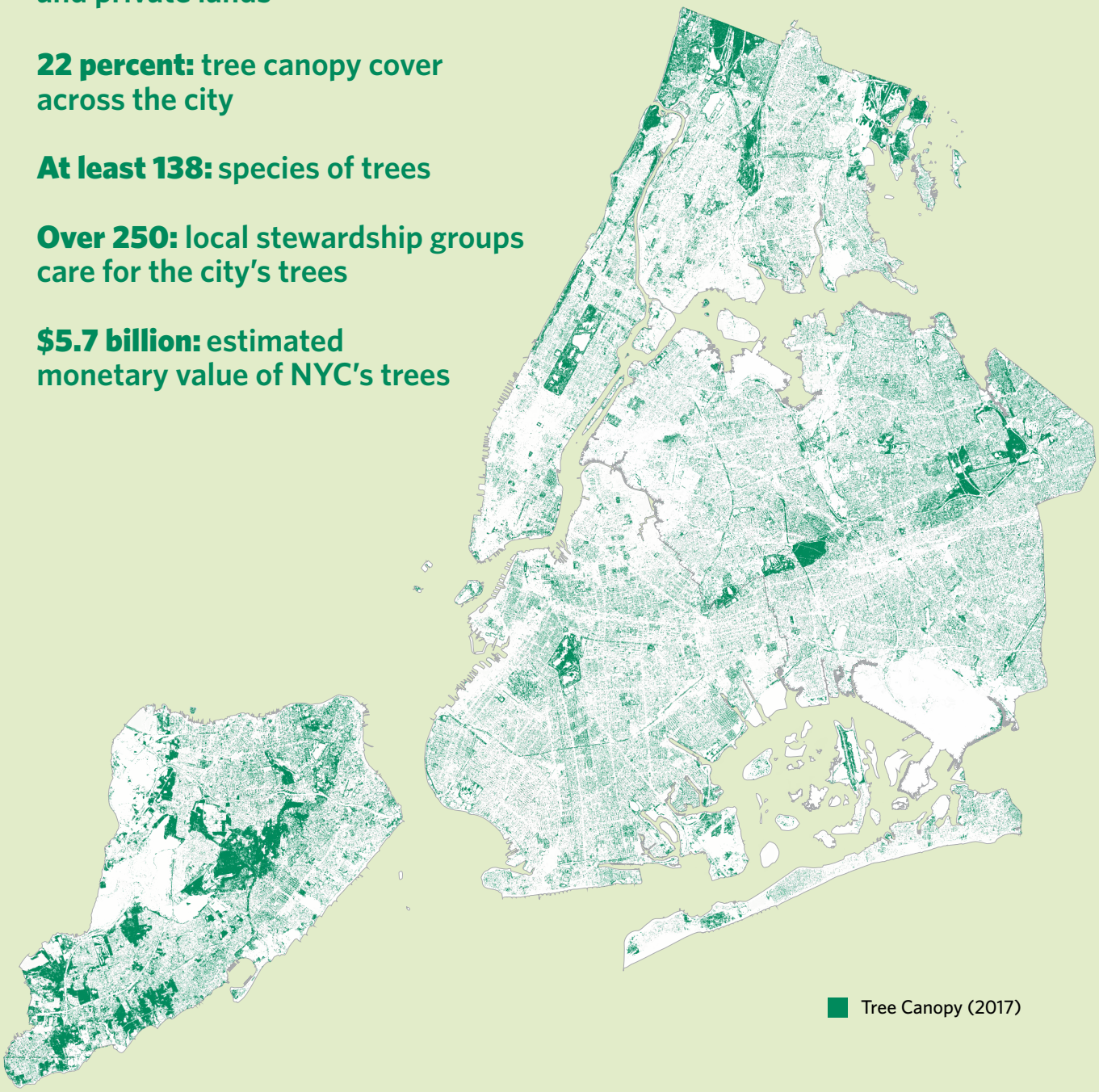
**Over 7 million:** trees on public and private lands

**22 percent:** tree canopy cover across the city

**At least 138:** species of trees

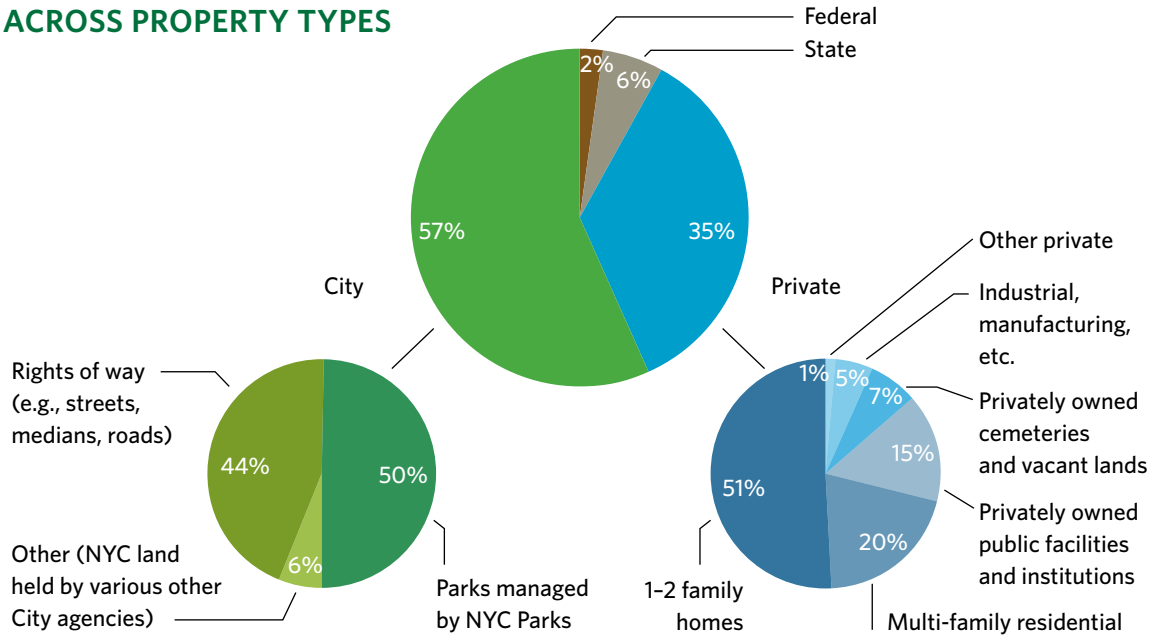
**Over 250:** local stewardship groups care for the city's trees

**$5.7 billion:** estimated monetary value of NYC's trees

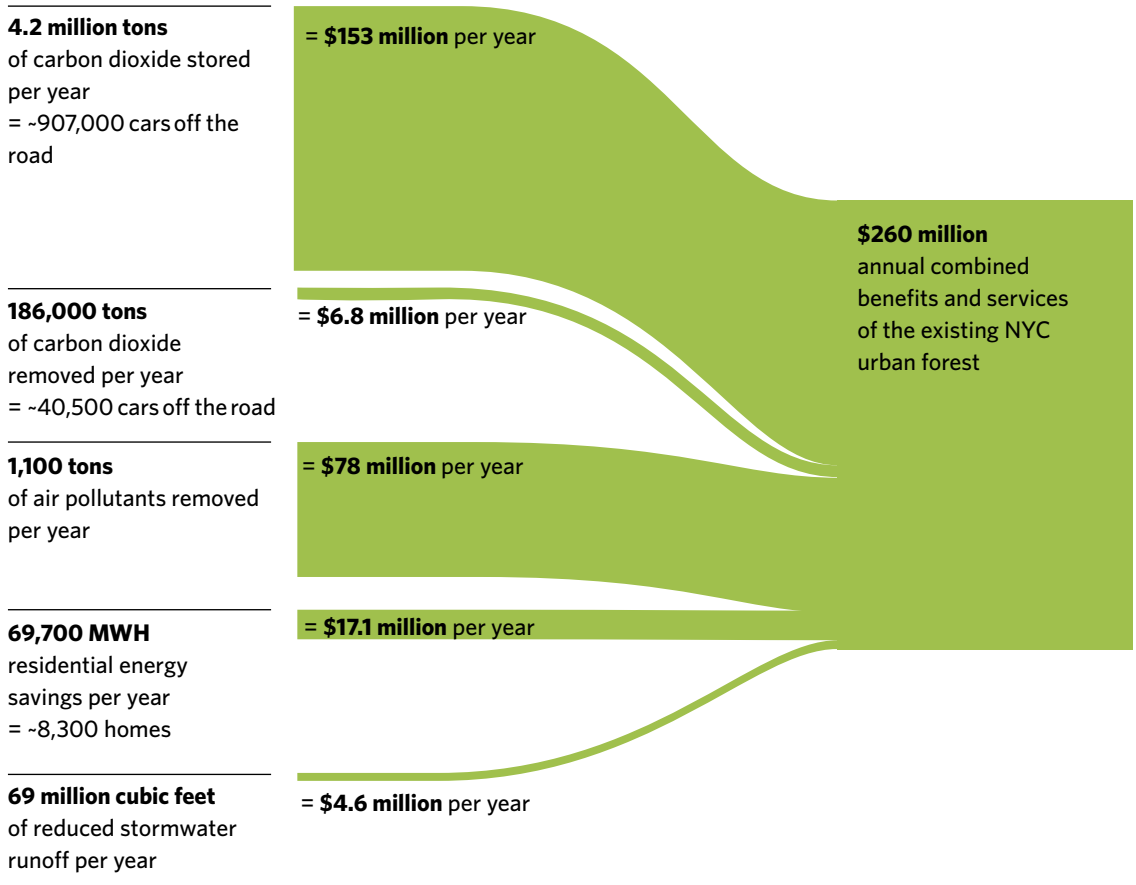



SOURCES: Nowak, D. J., Bodine, A. R., Hoehn, R. E., Ellis, A., Hirabayashi, S., Coville, R., Auyeung, D. S. N., Sonti, N. F., Hallett, R. A., & Johnson, M. L. (2018). The Urban Forest of New York City (Resource Bulletin NRS-117; pp. 1–82). USDA Forest Service, Northern Research Station.
NYC Department of Information Technology and Telecommunications. (2018). Tree Canopy Change (2010-2017). NYC OpenData. https://data.cityofnewyork.us/Environment/Tree-Canopy-Change-2010-2017-/by9k-vhck.
USDA Forest Service. (2017). *Stewardship Mapping and Assessment Project (STEW-MAP)* [computer file]. New York City.

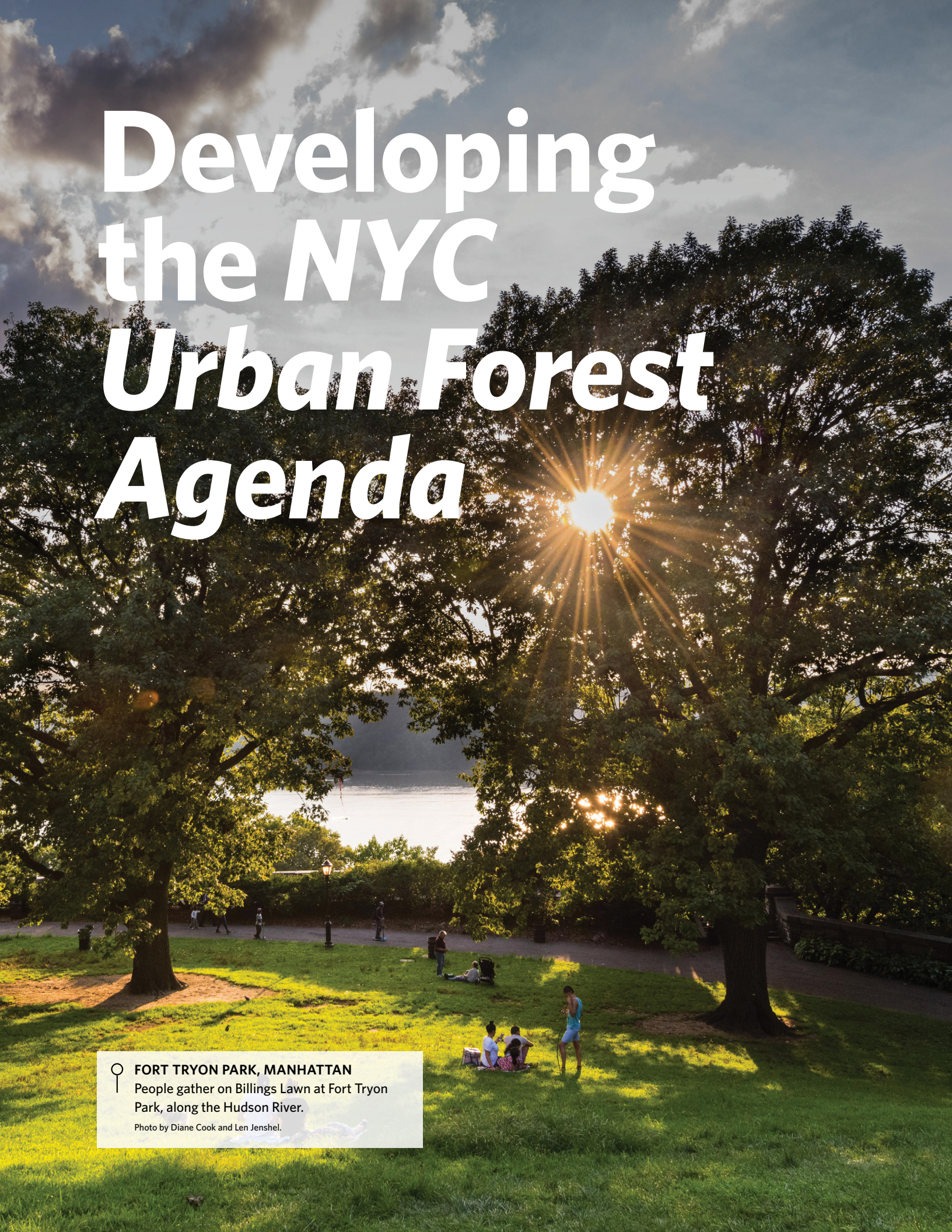
## DISTRIBUTION OF NYC CANOPY ACROSS PROPERTY TYPES




## BENEFITS AND SERVICES OF NYC'S TREES



# Developing the *NYC Urban Forest Agenda*



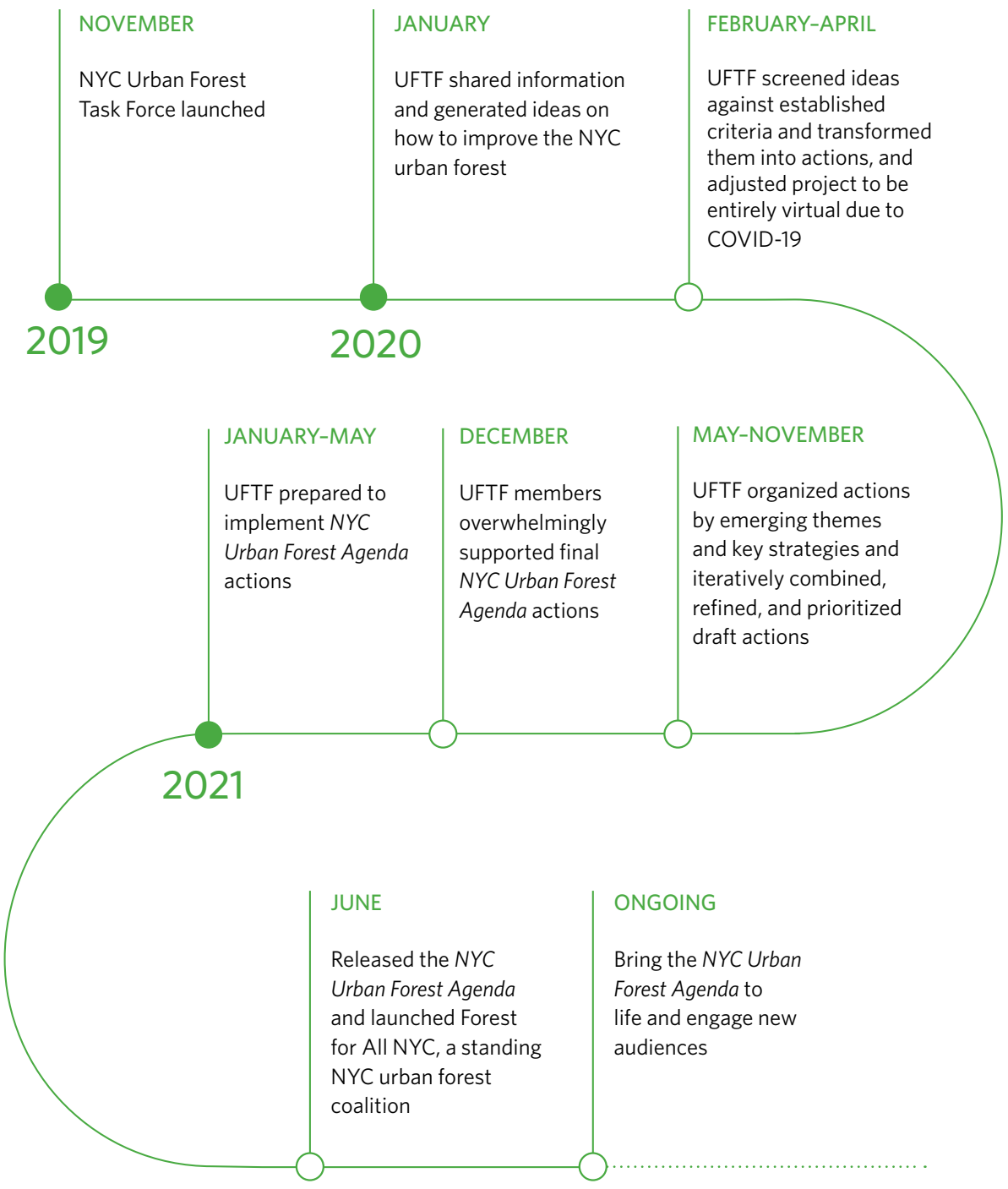
**FORT TRYON PARK, MANHATTAN**
People gather on Billings Lawn at Fort Tryon Park, along the Hudson River.
Photo by Diane Cook and Len Jenshel.

The Nature Conservancy in New York launched Future Forest NYC in summer 2019—an initiative with the intent to galvanize a clear, coordinated, committed, and broad-based voice for protecting, maintaining and expanding the city's urban forest and ensuring that its benefits are shared equitably among all New Yorkers. As part of this effort, The Nature Conservancy convened the NYC Urban Forest Task Force starting in the fall, in an effort to elevate, build on, and link the many initiatives, assets, and efforts related to the NYC urban forest. Many members of the Task Force that created the *NYC Urban Forest Agenda* are joining together as Forest for All NYC to carry out this vision alongside more supporters.

The process of developing the *NYC Urban Forest Agenda* was designed to draw on the collective expertise and perspectives of all those involved. The process began in the pre-COVID-19 world with in-person meetings around tables and groups brainstorming with flip charts. In March 2020, when COVID-19 swept across the city, the Task Force quickly committed to stay the course and keep this project going, reinventing its process with more urgency and new priorities. The UFTF recognized the importance of trees and equitable access to well-maintained open spaces in the COVID-19 era and the urgency of combating climate change.

The entire project was reimagined and adjusted to a virtual format. Meetings in The Nature Conservancy's conference room were replaced by Zoom meetings. Casual conversations were swapped out for deep virtual "check-ins." Flip charts and markers morphed into digital collaborative technologies. Remarkably, Task Force members remained deeply engaged, committing hours to shaping the contents of the *NYC Urban Forest Agenda* through online discussions, surveys, and phone conversations. As this group moves forward to carry out the *Agenda*, the UFTF, along with many new supporters, will transition into the Forest for All NYC coalition.

# KEY STEPS IN CREATING THE *NYC URBAN FOREST AGENDA*



## CORE PRINCIPLES AND APPROACHES

Based on The Nature Conservancy's earliest discussions with the city agencies and nonprofits that were most active on urban forest issues and eager to engage in a coordinated initiative, and in consultation with the nonprofit consultant Consensus Building Institute, The Nature Conservancy designed the effort around several core principles and approaches:

**Focused, yet balanced, leadership to guide development of the UFTF and *Agenda*, work through challenges, and propel progress.** The Nature Conservancy in New York formed an 11-organization Steering Committee that collectively spans the breadth of views and programs that sustain the city's urban forest. This committee met every six to eight weeks for 18 months to shape the effort, track progress, and provide guidance in developing an urban forest agenda. Their leadership and vision were essential to guiding the process and eventually adopting a consensus-supported agenda for the NYC urban forest.

**Broad participation to ensure that the effort was informed by needed expertise and a diversity of perspectives.** Collectively, the effort brought together nearly 50 different organizations committed to the urban forest, from community-based stewardship organizations and environmental justice–focused groups to federal, state, and city government agencies and real-estate interests. The Steering Committee was instrumental in identifying and recruiting potential Task Force members.

**Targeted Working Groups to shape and focus urban forest actions.** Task Force members were invited to join Working Groups established around four main themes: funding/investments, policy, and advocacy; research, monitoring, and evaluation; building an urban forest movement; and tree management. The groups met over an 11-month period to generate, refine, provide guidance and expertise on, and eventually prioritize recommendations for strengthening the city's urban forest. Working Groups served as the backbone of the initiative.

**Facilitated discussions to ensure that all voices were heard and considered.** Some groups on the UFTF had a long history of working together. Others were meeting each other for the first time. Professionally facilitated discussions during the Steering Committee and Working Group meetings helped create an atmosphere that encouraged candor, balanced participation, and a commitment to finding common ground.

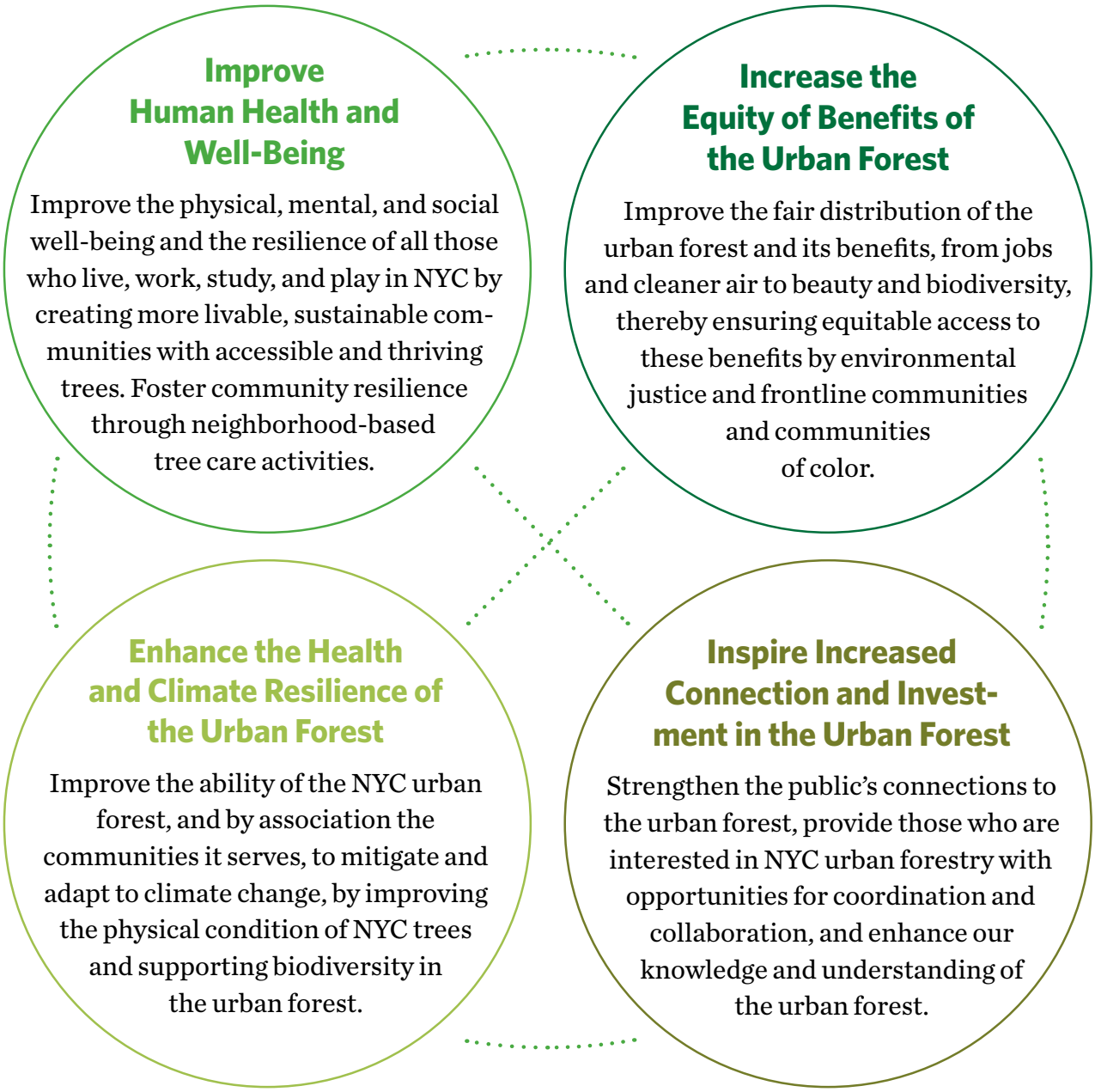
**Expert opinions and credible data to foster well-informed discussions.** Accurate data and a clear articulation of the urban forest's needs, challenges, and opportunities by diverse experts informed the Task Force's creation of a thoughtful and forward-looking action agenda. UFTF members provided data and expert opinions on the state of the city's urban forest in their Working Groups to ensure that participants had a realistic understanding of its current characteristics—from overall canopy coverage trends to the urban forest's distribution throughout the city's different neighborhoods and property types.

**A commitment to consensus.** Participants recognized from the outset that a shared action agenda will only be effective if stakeholders are truly involved and committed to action. The initiative kept that principle front and center at all times, first engaging Task Force members in brainstorming sessions to get all ideas on the table, then using a series of conversations and polling to hone in on the most compelling and highest priority topics and gauge the degree of support for the emerging *NYC Urban Forest Agenda*.

**BRONX**
Trees New York partners with a co-op tenant association to plant trees to shade playgrounds, parking lots, and walkways.
Photo by Trees New York.

## SETTING PRIORITIES

The UFTF sought to craft an agenda that is aspirational yet realistic. Given the many needs of the urban forest, the Task Force brainstormed what the collective set of actions of the *Agenda* should achieve. As a result, these overarching and interconnected criteria were used to shape and prioritize among many potential candidate actions:



# VOICES FROM FOREST FOR ALL NYC

*"The Natural Areas Conservancy has made a significant investment in research, management and advocacy for NYC's forested natural areas. The Forest for All NYC coalition provides us with the opportunity to collaborate."*

**Sarah Charlop-Powers**
Executive Director and Co-Founder, Natural Areas Conservancy

*"All of us at Trees New York are committed to meeting the* NYC Urban Forest Agenda *goals. Trees are essential to the health and vitality of our great city, and the goals outlined in the* Agenda *will ensure a healthy and robust urban forest that benefits all New Yorkers."*

**Nelson Villarrubia**
Executive Director, Trees New York

*"We believe in a greener NYC and want to contribute our own expertise to that effort. Seeing our work as part of the larger agenda and connecting wood reuse with the rest of the tree's life cycle creates a more expansive vision of how we can support our urban forest. Working with this coalition has given us new insight and fostered new collaborations that have been essential in developing our urban wood salvage work."*

**Alexander Bender**
Founding Partner, Tri-Lox

*"The urban forest is critical living infrastructure that helps us adapt to climate change and creates a more livable and sustainable New York City for all. The Nature Conservancy is proud to uplift the* NYC Urban Forest Agenda *to foster healthy, just communities where people and nature can thrive together."*

**Emily Nobel Maxwell**
Director, New York Division Cities, The Nature Conservancy

*"NYC Parks is proud of the work we do to protect and expand the urban forest. We are grateful that the NYC Urban Forest Task Force shares our commitment to this critical resource and has pledged to make the urban forest a more vital part of our future. We look forward to working with the Forest for All NYC coalition to bring the enormous benefits that trees and forests provide to all New Yorkers."*

**Liam Kavanagh**
First Deputy Commissioner, NYC Department of Parks and Recreation

*"It was a rewarding experience for me to join with such a diverse group of New Yorkers to create this holistic, landmark plan for issues concerning NYC's trees. The* NYC Urban Forest Agenda *aligns with the West 80s Neighborhood Association's 'Love Your Street Tree Day' mission by strengthening the community's connection to urban trees, while educating about their importance to our well-being and the environment."*

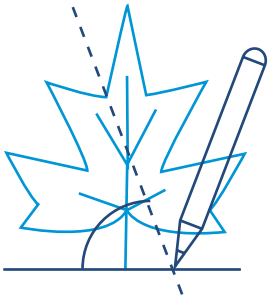
**Melissa Elstein**
Co-Founder, Love Your Street Tree Day

**BROOKLYN**
Investment in our urban forest means investment in our communities. Trees enhance the strength of social ties between neighbors and can help residents thrive in every neighborhood of our city.

Photo by Alex Potemkin.

## *NYC URBAN FOREST AGENDA* ACTIONS

In order to achieve our vision, the *NYC Urban Forest Agenda* is made up of 12 actions organized into four interconnected strategies.

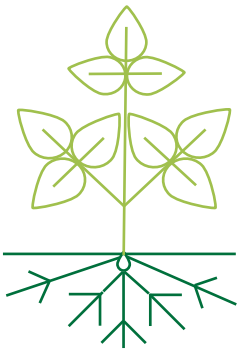


# Plan

Plan for the future of the NYC urban forest by adopting a coordinated, long-term vision for the protection and care of the urban forest and equitable distribution of its benefits.

**ACTIONS:**

- **1.1** Achieve 30% Canopy Cover by 2035
- **1.2** Support Development of Community-Scale Urban Forest Plans and Goals
- **1.3** Establish a Master Plan for the Urban Forest



# Invest

Invest in the people, essential social infrastructure, and reliable funding sources that are critical to the long-term care and protection of the urban forest.

**ACTIONS:**

- **2.1** Grow and Sustain the Forest for All NYC Coalition
- **2.2** Cultivate Urban Forest Careers
- **2.3** Increase and Equitably Distribute Funding for Urban Forestry Projects

# Manage

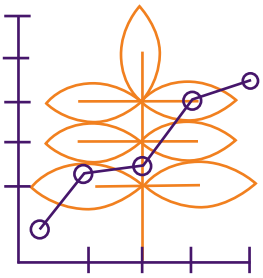
Manage our urban forest through its life cycle on public and private lands to increase its growth and resilience.

**ACTIONS:**

**3.1** Strengthen Tree Regulations and Establish Incentive Programs

**3.2** Set Tree Planting and Management Standards

**3.3** Develop Conditions to Transform Wood Waste into a Sustainable Local Resource



# Learn

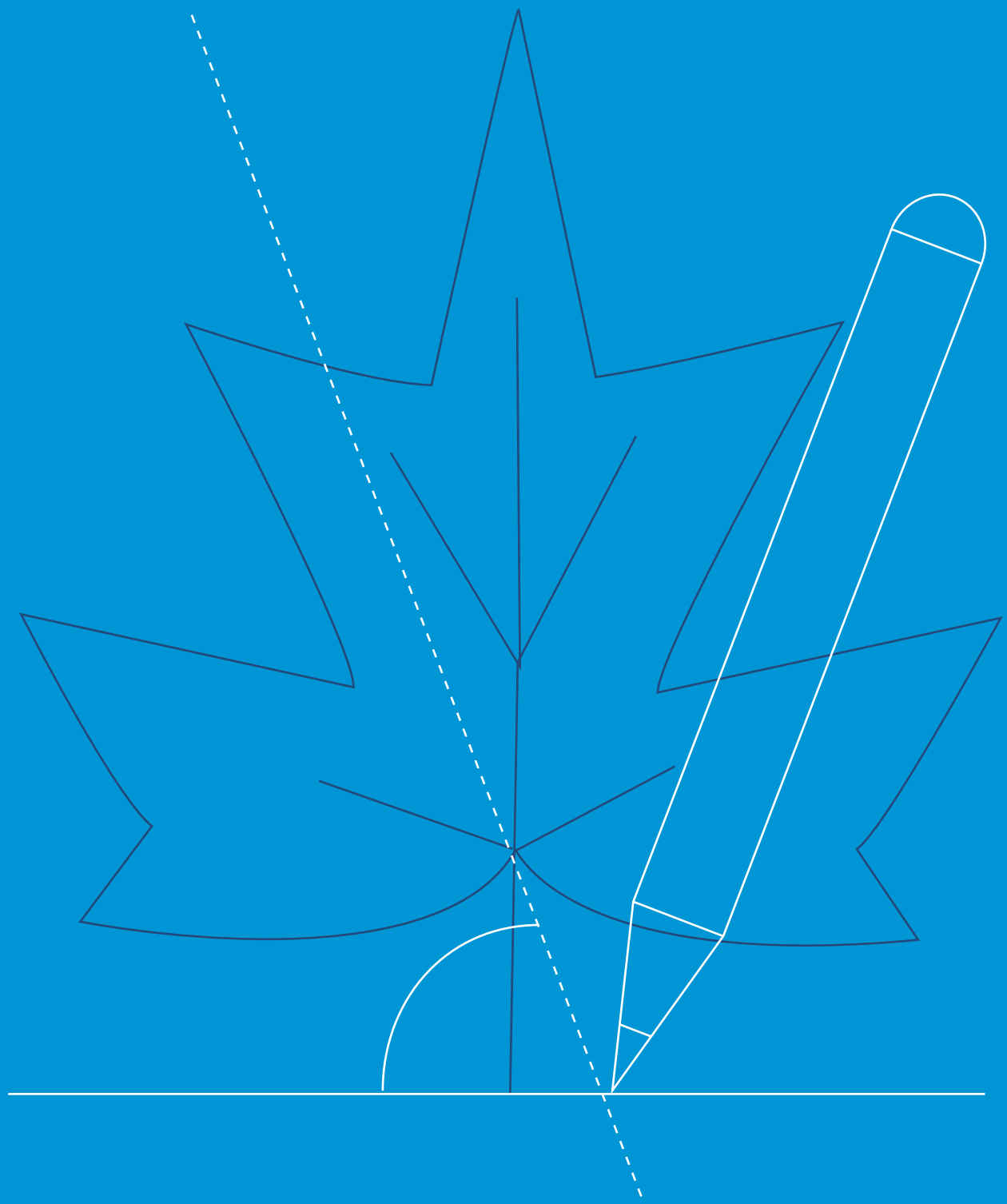
Learn more about the NYC urban forest through research and monitoring, develop better practices related to forest management, and deepen the public's connection to the forest.

**ACTIONS:**

**4.1** Create an Urban Forestry Research and Monitoring Agenda

**4.2** Establish Citywide Educational and Tree Stewardship Events

**4.3** Monitor Urban Forest Environment and Health



STRATEGY 1

# Plan

**Plan for the future of the NYC urban forest by adopting a coordinated, long-term vision for the protection and care of the urban forest and equitable distribution of its benefits.**

ACTION 1.1

**Achieve 30% Canopy Cover by 2035**

ACTION 1.2

**Support Development of Community-Scale Urban Forest Plans and Goals**

ACTION 1.3

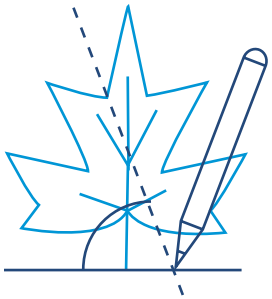
**Establish a Master Plan for the Urban Forest**

**KISSENA PARK, QUEENS**
Nancy Sonti (USDA Forest Service) uses a chlorophyll fluorescence meter to measure the health of a basswood (*Tilia americana*) planted as part of the New York City Afforestation Project.

Photo by Rich Hallett.

ACTION 1.1

# Achieve 30% Canopy Cover by 2035



Promote and foster support for a new citywide goal of achieving at least 30% tree canopy cover by 2035. Encourage the City of New York and other key stakeholders to adopt this goal and immediately launch action. Collaboratively establish targets for urban forest health, protection, management, restoration, and planting for all parts of the resource, including street trees and those in parks (landscaped parkland and forested natural areas), and all other property, both public and private. Strategies to achieve the overall goal and associated targets include the following:

1. **Preserve existing canopy across private and public lands, including limiting removal to prevent loss (except as appropriate for good management practice);**

2. **Improve forest health and increase tree canopy through management and restoration; and**

3. **Plant new trees, and replace lost and removed trees, with a specific focus on areas with high, unutilized potential for canopy including private property, and areas with greatest potential to benefit from new canopy, such as the most heat-vulnerable parts of NYC.**

## WHY:

A shared goal is an opportunity to establish direction for policy and public funding and for the city's many urban forest stewards and enthusiasts to collectively attract and to invest vital resources. While some major U.S. cities have overall urban forest goals, there are no citywide goals for the urban forest in NYC. In 2017, the city had approximately 22% tree canopy cover, and new analysis reveals a potential for approximately 40%. To reach 30% tree canopy cover would effectively mean increasing our relative tree canopy by nearly 36%, which is ambitious given the 8% relative increase between 2010–2017 and important in the face of growing climate impacts. The majority of canopy gains from 2010–2017 were due to growth of existing trees' canopy and natural regeneration, so having targets for both new plantings and for protection and management of the existing forest is crucial. Some of the greatest potential for new tree canopy is on private property, and thus a goal that is inclusive of all lands is vital.†

## IMPACT:

Tangible, specific, and measurable goals and targets that transcend government administrations can also help NYC realize the many benefits associated with a healthy and extensive urban forest and cope with the myriad effects of climate change that threaten our city, including: increased flooding, rising temperatures, increased energy use, and the compounded threats to flora and fauna native to our region. Further, given the inequities in our urban forest, if implemented with an equity-centered lens, a healthier, more extensive overall urban forest can help advance distributional equity of both trees and their benefits. Achieving this goal will contribute toward broader local, state, national, and global land protection goals as well. Last, this unifying goal will serve as a common motivator and organizing principle for Forest for All NYC members and help to attract public and private investment in this effort.

*"Nature is crucial for emotional well-being of humans. And for urban dwellers like me, trees are the most readily available nature. It would not be an exaggeration to say that the honeysuckle locust outside the window of my apartment made the shut-down from the pandemic tolerable. As the world was grieving and living in fear, the honeysuckle locust was sprouting new leaves, reminding me of the resilience of nature and of life."*

**Shino Tanikawa**
Executive Director, NYC Soil & Water Conservation District

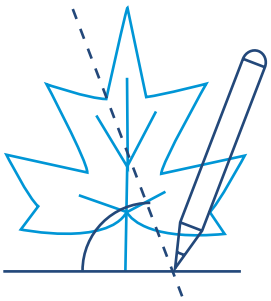
† All numbers in this paragraph are based on forthcoming analyses led by The Nature Conservancy, with information and guidance from Natural Areas Conservancy and USDA Forest Service Research and Development.


**GOWANUS, BROOKLYN**
Chris Robinson (volunteer with the Gowanus Tree Network) and Natasia Sidarta (Gowanus Canal Conservancy) add plantings to a tree bed on 9th Street in Gowanus, Brooklyn.

Photo by Jeremy Amar. Courtesy of Gowanus Canal Conservancy.

ACTION 1.2

# Support Development of Community-Scale Urban Forest Plans and Goals



In direct collaboration with Community Districts and community members, integrate community forestry into local planning processes and establish urban forest extent and quality goals for each of the 59 Community Districts and five boroughs. The goals should reflect local geography, the need for vegetative cover, development styles, community needs and concerns, and the degree to which large trees can be planted and survive. Target goals may relate to long-term tree maintenance and health monitoring, new tree planting or replacement, and other local needs. Progress toward these goals should be monitored on a regular basis.

## WHY:

The urban forest and its social and environmental benefits are not equitably distributed across the city. Similarly, boroughs and neighborhoods do not all receive the same level of attention, support, and benefits from investments in environmental programs. People who lead and care about the urban forest from neighborhood to citywide scales do not have a scale against which to measure progress in growing, protecting, and managing the urban forest. In addition, environmental justice communities often face the most severe environmental insults and are frequently the last to benefit from innovative programs.

## IMPACT:

Borough and Community District urban forest goals can support a community forestry approach, where trees are integrated into a broad array of community-level priorities, while also helping to provide the means for achieving the citywide goals. Setting these goals at a local level will mean that they better reflect the unique characteristics and needs of each community and help to identify the areas of highest and lowest potential for tree planting and canopy growth so that the city can still reach its overall targets. The regular progress tracking and publication of this information will enable elected officials, the media, and the general public to weigh in and press for changes or additional investment if progress is lagging. Having additional information will help passionate and knowledgeable residents, local organizations, and activists focus their attention on their community's needs. Establishing regular monitoring of these goals will help ensure that the benefits of the urban forest reach all of the city's neighborhoods.

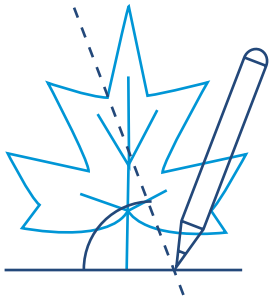
> *"The Real Estate Board of New York is proud to be part of crafting the* NYC Urban Forest Agenda. *We all have a responsibility to support the urban forest, a vital component of New York City's streets, parks, and private and public spaces."*
>
> **Zachary Steinberg**
> Vice President of Policy, Real Estate Board of New York

**HUNTER'S POINT SOUTH PARK, QUEENS**
This waterfront park is designed for storm resiliency, featuring plantings and wetlands to soften the shoreline, and gabions (wire cages filled with broken stone) to retain and prevent stormwater from entering the sewer system.

Photo by Diane Cook and Len Jenshel.

ACTION 1.3

# Establish a Master Plan for the Urban Forest



Support development of a Master Plan to protect, care for, and expand the NYC urban forest on public and private land, ensuring its equitable and sustainable future. The Plan should be developed with the City of New York and a diverse coalition of stakeholders; informed by the aspirational goals; anchored by assessments of the existing and potential urban forest canopy; and formulated with a focus on improving human health and well-being, the city's ability to adapt to climate change, environmental justice, and equity. This Master Plan ultimately should be legislated and codified by the City of New York.

WHY:

NYC does not have a long-term plan for its urban forest (on either public or private land). Furthermore, planning and caring for trees have often been studied in isolation. However, trees are part of a larger urban ecosystem intersecting with social, economic, environmental, health, and spatial conditions of surrounding communities. The lack of a citywide, cross-sector approach to long-term planning and stewarding the city's urban forest has led to lost opportunities for strengthening this resource, and disparate investment in and participation by environmental justice and climate-vulnerable neighborhoods.

## IMPACT:

The Master Plan will allow all partners to work toward a shared vision and goals. It will help diverse actors understand and identify the areas of highest need for action and the appropriate solutions to yield the most protection and expansion of the urban forest, and more equitably distribute the benefits of trees to residents. Further, it will help facilitate a consistent approach over a long period of time, spanning government administrations.

The Master Plan will also serve as an advocacy and educational tool to facilitate public engagement and to guide inter-agency and public–private collaboration. This action will help integrate trees into other key NYC plans (e.g., Streets Master Plan,[16] Comprehensive Waterfront Plan,[17] Climate Resiliency Design Guidelines,[18] and the pending Environmental Justice Plan). A Master Plan will increase visibility, help galvanize public interest and engagement, and allocate more funding toward needed urban forestry projects, particularly to environmental justice and climate-vulnerable neighborhoods.

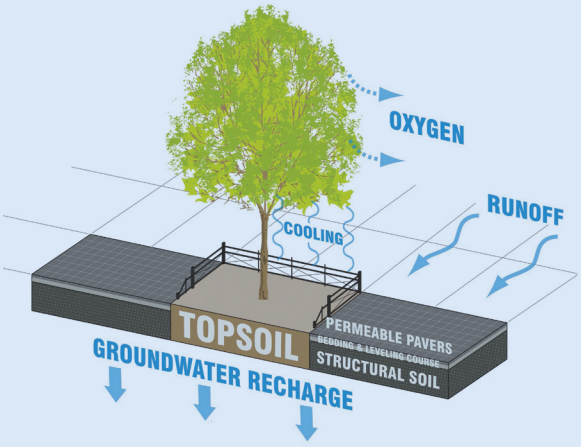
**TRAVIS–CHELSEA, STATEN ISLAND**
American holly (*Ilex opaca*) seedlings are shown growing at the Greenbelt Native Plant Center, a 13-acre greenhouse, nursery, and seed bank facility of NYC Parks that provides native plants and seeds.
Photo by NYC Parks.

STORIES SPROUTING FROM THE GROUND

# A Novel P3 for Trees

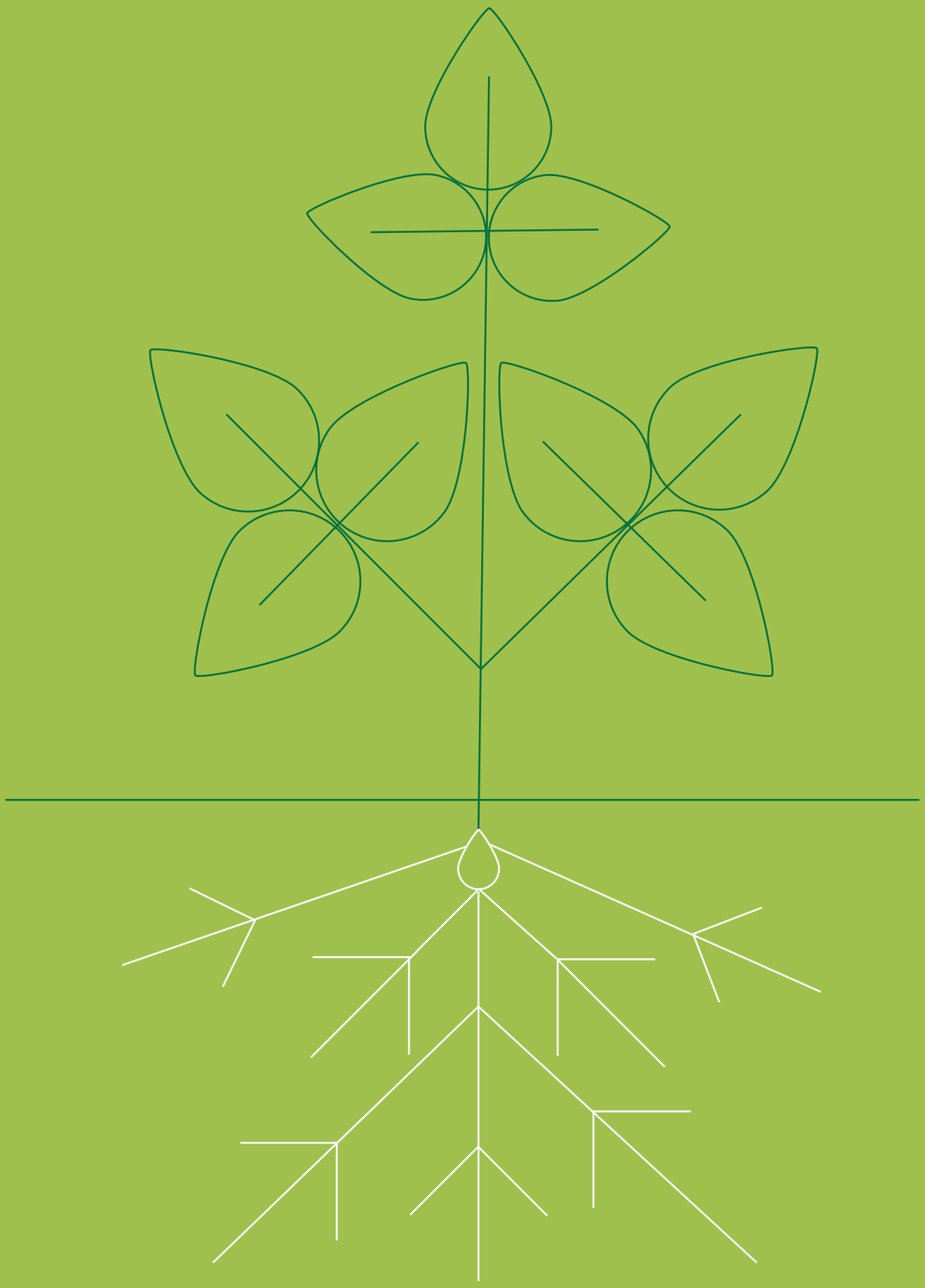
**Emily Goldstein**
Planning Associate, Hudson Square Business Improvement District

Since 2013, we have partnered with the New York City Department of Parks and Recreation and the New York Tree Trust to plant and retrofit over 350 street trees throughout the Hudson Square neighborhood of Lower Manhattan. In order to create a unified, neighborhood-wide approach to expanding and maintaining NYC's urban canopy, we developed a custom design called the Hudson Square Standard. This design includes expanded tree pits and distinctive tree guards, adjacent permeable paving, and structural soil. The project reimagines the potential for urban sidewalks and tree planting by creating continuous tree beds connected through structural soil and permeable pavers for maximal stormwater capture and tree growth. The program is the first to use this type of public–private partnership (P3) to fund the planting and retrofitting of NYC's street trees. The program has won numerous awards and accolades, including the Municipal Art Society's MASterworks Best New Urban Amenity Award in 2015 and the Standard's inclusion as the preferred tree treatment in the Design Trust for Public Space's 2015 design guidelines for affordable housing.




**LOWER MANHATTAN**
Before (left) and after (right) the Hudson Square Standard was implemented along Varick Street (between Spring Street and Dominick Street).

Photos courtesy of Hudson Square Business Improvement District.
Rendering by Matthews Nielsen Landscape Architects.



STRATEGY 2

# Invest

**Invest in the people, essential social infrastructure, and reliable funding sources that are critical to the long-term care and protection of the urban forest.**

ACTION 2.1

**Grow and Sustain the Forest for All NYC Coalition**

ACTION 2.2

**Cultivate Urban Forest Careers**

ACTION 2.3

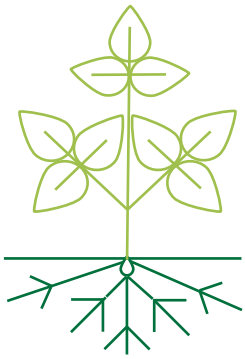
**Increase and Equitably Distribute Funding for Urban Forestry Projects**

**FOREST PARK, QUEENS**
Volunteers planted climate-adapted trees during an urban community forestry event led by the Natural Areas Conservancy and Forest Park Trust in 2019.

Photo by Natural Areas Conservancy.

ACTION 2.1

# Grow and Sustain the Forest for All NYC Coalition



Grow the Forest for All NYC coalition into a standing, enduring body to drive and support the implementation of the *NYC Urban Forest Agenda*, adapt the UFA over time, and strengthen knowledge exchange, coordination, and collaboration among the city's urban forest researchers, managers, and advocates.

**WHY:**

A multi-sector, organized coalition focused on the care of the NYC urban forest is essential if the issue is to gain traction in a city with many competing high-priority issues. The lack of coordination, knowledge exchange, and collaboration among public, private, and nonprofit entities and community members makes it difficult to garner and focus the attention and resources needed to foster a healthy urban forest across the five boroughs. Now that the *NYC Urban Forest Agenda* has been completed, we need a continued and expanded standing coalition, Forest for All NYC, to continue coordinating on important issues, sharing information, and driving the implementation of the *Agenda* in a timely manner.

## IMPACT:

Forest for All NYC will be a standing, diverse coalition composed of policymakers, researchers, advocates, stewards, private property owners, and other groups interested in urban forestry. It will provide a reliable and ongoing forum for interested stakeholders to propel progress on the *NYC Urban Forest Agenda*, identify and pursue needed resources to implement UFA actions, press for new and evolving priority actions in the future, grow this coalition, and find ways to increase their individual and collective effectiveness. Forest for All NYC will offer a much-needed sense of ownership to participating groups and reinforce members' sense of mutual commitment. A stronger, more connected urban forestry community will also lead to more rapid socialization and application of best practices, as well as surfacing of challenges for which to innovate solutions. It will support knowledge-sharing, enable exchange of best practices, build trust, and ultimately, we hope, lead to co-producing new solutions together.

**VAN CORTLANDT PARK, BRONX**
The Natural Areas Conservancy's Deputy Director of Conservation Science, Clara Pregitzer, collects data on vegetation.
Photo by Natural Areas Conservancy.

STORIES SPROUTING FROM THE GROUND

# Creating Climate-Resilient Schools

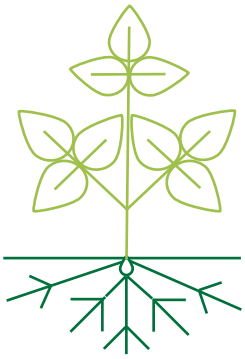
**Sarah Ward**
Program Manager, Schoolyard and Community Habitats, National Wildlife Federation

In the school year spanning 2019 to 2020, we partnered with Trees New York to help students take action to create more climate-resilient schools and communities by planting trees on their school grounds. The project was part of the National Wildlife Federation's Resilient Schools Consortium, which educates youth in NYC schools about climate change science and climate impacts, as well as natural and built solutions that increase climate resiliency. Students learned that trees provide shade and cool city neighborhoods that are particularly vulnerable to the urban heat island effect. They also learned about tree stewardship techniques needed to keep young tree seedlings healthy, especially during the hot summer months.

**CONEY ISLAND, BROOKLYN**
Students at Rachel Carson High School for Coastal Studies learn how to plant trees with Trees New York.
Photo by National Wildlife Federation.

ACTION 2.2

# Cultivate Urban Forest Careers



Expand urban forestry career and leadership opportunities to advance equity and a Just Transition (see next page), with this effort targeted to communities that are underemployed and to those who live in areas most vulnerable to climate change effects (e.g., frontline communities).

**Key initiatives of the action:**

**Job Training**

- Work with a public, higher-education institution in New York City to create degree and certificate programs in preparation for a range of urban forestry careers in the public and private sector.
- Establish consistent standards for all urban forestry training programs.

**Bridging to Jobs**

- Develop an urban forestry employment program that is connected to broader economic development and recovery activities in New York City.

**Job Retention and Growth into Career**

- Advocate for a living wage for entry-level urban forestry jobs.
- Advocate for year-round, permanent public-sector forestry jobs.

**Just Transition**

The Climate Justice Alliance developed this concept and defines it as: *"a vision-led, unifying and place-based set of principles, processes, and practices that build economic and political power to shift from an extractive economy to a regenerative economy. This means approaching production and consumption cycles holistically and waste-free. The transition itself must be just and equitable, redressing past harms and creating new relationships of power for the future through reparations. If the process of transition is not just, the outcome will never be. Just Transition describes both where we are going and how we get there."*[19]

## WHY:

Pathways to careers in urban forestry in NYC are hamstrung by insufficient funding for jobs, access to training, and information distribution. Limited availability of urban forestry training is particularly challenging and problematic. For example, there are no forestry degree programs at any of the City University of New York institutions. In fact, only one higher education institution offers credentials related to this subject (the Bronx Community College offers an Associate in Applied Science degree in Ornamental Horticulture). Non-degree training programs also lack standard requirements, which contributes to inconsistencies in practices and quality of tree care. The city also lacks a clearinghouse for career development programs and other leadership opportunities related to trees, making it difficult to measure the success or shortcomings of this critical industry. Entry-level urban forestry jobs tend to be seasonal and tend to have low wages, which make these jobs unattractive as long-term career prospects, especially as living costs in NYC are so high, which leads to high turnover.

## IMPACT:

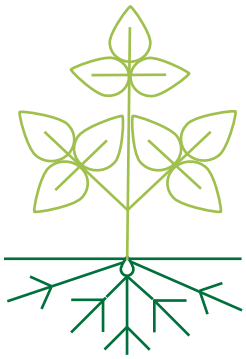
This action will help strengthen urban forestry career pathways and make them more attractive to more diverse local candidates. It will increase visibility, access, and funding for urban forestry careers, and secure better compensation for urban forestry workers, which will help to keep qualified workers in NYC and help make these jobs attractive to more and diverse candidates. Especially in the wake of the COVID-19 economic crisis, it is critical to assess the current scope of workforce development programs and opportunities related to trees and to identify ways to expand opportunities, including their connection to economic development and recovery activities. This action will also help grow a strong and diverse urban forest workforce and ensure that tree care professionals have access to acquire technical qualifications and to career development opportunities at all levels of their careers. Finally, this action will help standardize the quality of services that tree care professionals are delivering and ensure that they follow best practices.

**HUNTS POINT, BRONX**
Volunteers organized by Sustainable South Bronx and The Nature Conservancy provided beautification work along the Hunts Point Greenway in 2019.

Photo by Noemi Gonzalo-Bilbao Fernandez.

ACTION 2.3

# Increase and Equitably Distribute Funding for Urban Forestry Projects



Secure and increase available funding for urban forestry projects to support tree planting, care, and maintenance, particularly in environmental justice and climate-vulnerable neighborhoods. In the first year, this action will focus on launching a campaign to achieve a dedicated city budget commitment for urban forestry efforts and developing a grassroots advocacy training program to deepen local organizations' capacity to request funding. Later efforts will focus on raising and redistributing funding for small, local, or community-based stewardship groups.

**Key initiatives of the action:**

- Develop a coordinated messaging and advocacy campaign to increase private investments and secure a multi-year dedicated City budget commitment for tree planting and maintenance projects, including community-led stewardship projects, with an emphasis on funds distribution rooted in diversity, equity, inclusion, and justice.

- Develop an advocacy training program to deepen and leverage the skills of nonprofits and community-based organizations to effectively lobby for and request public and private funding for urban forestry projects.

- Establish dedicated funding for systematic and regular forest monitoring via periodic institutionalized assessments and ensure that tree-related data are available to the public via open data.

## WHY:

Public funding for tree planting and maintenance in NYC is insufficient, highly variable, and largely dependent on short-term government initiatives that change with each mayoral administration. Further, in FY21, the City reduced its overall budget by approximately $9 billion compared with the previous year due to the ongoing economic impacts of COVID-19.[20] City funding for tree care in NYC was drastically cut by more than $22 million (a 90% cut).† Prior to the budget cut, there was already insufficient public funding for urban forest projects, which jeopardizes the long-term survival of the city's trees and their associated ecological and social benefits. Furthermore, there is no mandate, nor is there City funding, to conduct citywide monitoring of the City's trees, canopy, or ecosystems and their relationship to nearby social dynamics. These data are key to informing holistic management of the NYC urban forest and needed to track change over time to understand the system's trajectory.

Many smaller community groups, particularly in underserved and minority neighborhoods, also have a difficult time securing public and private funding to start or continue tree stewardship activities for various reasons (such as, limited and unequal access to lobbying/advocacy training and information, limited grants geared for smaller community groups, and unequal access to information and grant writing skills/professionals). The ongoing economic impacts of COVID-19 have further reduced available funding for these groups, jeopardizing the long-term care of NYC's trees.

† For City budget numbers as a whole, we leveraged publicly available data from the NYC Office of Management and Budget and for NYC Parks forestry figures, we leveraged data shared for purposes of this report.

IMPACT:

A successful campaign will reinstate funding for the city's urban forest and secure it for the long term. In addition, it will serve as an educational opportunity on the importance of trees and tree management, help highlight the correlation between the economy and the environment, and provide a means to address equity and environmental justice through more targeted funding to frontline communities. Securing long-term, dedicated funding for urban forestry projects in these neighborhoods will enable more tree planting and stewardship activities and increase people's access to trees' benefits in these essential neighborhoods for years to come. Funded, regular assessments to monitor changes in the urban forest will enable best practices and adaptive management, appropriate stewardship, and informed policy to maintain and protect the urban forest. The assessments will also improve our understanding of the urban forest over a long period of time.

Training and support for nonprofits and community-based organizations will help to elevate frontline communities' advocacy for more tree-related funding in their neighborhoods. Engaging with these communities will also help to build a broader, more diverse coalition to advocate for the urban forest. Sharing resources on an equitable basis, through redistribution of public and private funds, will grow the capacity of tree stewardship more equitably throughout the city and result in a strong community-led foundation upon which to build an urban forestry movement.

> *"To build a more resilient city, New York City must prioritize nature-based solutions that address disproportionate heat vulnerability and air quality issues, while providing greater access to green spaces. Growing and maintaining our urban forest is an integral piece of environmental justice, and the* NYC Urban Forest Agenda *provides a pathway forward."*
>
> **Annel Hernandez**
> Associate Director, New York City Environmental Justice Alliance

STRATEGY 3

# Manage

**Manage our urban forest through its life cycle on public and private lands to increase its growth and resilience.**

ACTION 3.1

**Strengthen Tree Regulations and Establish Incentive Programs**

ACTION 3.2

**Set Tree Planting and Management Standards**

ACTION 3.3

**Develop Conditions to Transform Wood Waste into a Sustainable Local Resource**

**FRESHKILLS PARK, STATEN ISLAND**
Tree stewards measure the height of newly planted trees in the 2,200-acre Freshkills Park, which is being transformed from a former landfill to one of the largest public parks in New York City.

Photo by Rich Hallett.

ACTION 3.1

# Strengthen Tree Regulations and Establish Incentive Programs

Strengthen regulatory framework and establish incentives to protect trees from being willfully removed or damaged and to expand the NYC urban forest. This action includes several efforts with an initial focus on protecting, maintaining, assessing, and expanding trees on public lands throughout the city; later efforts center on achieving similar goals on private property.

**Key initiatives of the action:**

**Urban Forest on Public Property**

- Encourage canopy expansion through tree protection and enhanced tree replacement requirements on more City-owned properties.
- Include a tree and/or canopy impact analysis during development projects.

**Urban Forest on Private Property**

- Advance incentives to encourage private property owners to protect and increase trees and canopy.
- Advance policy to protect, maintain, and plant new or replacement trees on private property.

## WHY:

Protecting and maintaining the city's existing trees is an important step to expanding the urban forest. Larger, more established trees provide many times the benefits of small or newly planted trees; thus, canopy expansion through growth of existing canopy is worth more and costs less than planting new trees. There are almost no laws that protect trees from removal on public or private property. This means that trees are subject to removal due to development pressures, nuisance objections, fear of maintenance costs, or other concerns that may best be remedied through incentives, education, or improved regulations. When trees are removed, the only ones that are required to be replaced are those under the jurisdiction of NYC Parks—street and City park trees.

Planting new trees is also a core need for maintaining and expanding the urban forest over time. With regard to canopy expansion through new tree planting (as distinct from replacement after removal), the primary relevant regulation for new plantings is the zoning requirement for new street trees as part of permitting for new buildings or enlargements on private lots. There are no consistent standards or requirements for how trees are maintained on already-developed private property, nor requirements or broad-based incentives for replacement or new plantings on private property.

The regulatory landscape, or lack thereof, means that the overall urban forest is an asset at risk. NYC has an opportunity to correct this regulatory gap to facilitate the immediate and long-term benefits of the urban forest for New Yorkers.

## IMPACT:

The suite of policy changes described above are intended to create regulatory certainty that should help reduce elective tree removals, establish new trees in suitable areas, encourage more tree protection and replacement, and replace urban forest lost to natural and human-caused stressors. Together, these policy changes will expand the urban forest, increase the city's climate resilience, and support biodiversity.

STORIES SPROUTING FROM THE GROUND

# Having Fun While Bringing Mother Nature Back to the City

**Len Maniace**
Director, Jackson Heights Beautification Group

Nearly a decade ago, our volunteer team began removing granite cobblestones from crowded tree pits in Jackson Heights. Once they were removed, you could almost hear the trees breathe a sigh of relief. Since then we've stepped up our game with our mission of 'bringing Mother Nature back to the city.' We've installed 40 tree guards and created 50 curbside tree gardens on our main street, filling them with pollinator-friendly perennials. The big payoff is a more environmentally sustainable Jackson Heights. Trees are nature's air conditioner, a key to keeping our city and the Earth habitable. We've accomplished this, in large part, because we have fun. Each year we attract more and more volunteers. We're nowhere near done, but we're well on our way to making Jackson Heights Mother Nature's home in the city.


**JACKSON HEIGHTS, QUEENS**
Volunteers in Jackson Heights prune a street tree and care for its tree bed.

Photo by Lillian Przedecki. Courtesy of Jackson Heights Beautification Group.

ACTION 3.2

# Set Tree Planting and Management Standards

Set management and planting standards for all urban forest site types (reflecting health, wellness, and resiliency needs) that support progress toward achieving a 30% citywide canopy goal by 2035, provide online resources about these standards and goals to other City agencies and private properties, and monitor progress toward these goals and the uptake and effectiveness of these standards.

**Key initiatives of the action:**

- Aggregate, and develop as needed, tree planting and management standards (including guidelines for planting and maintaining trees to enhance the city's climate resiliency), relying on existing best practices and new materials as needed to maximize the health, longevity, and benefits of the urban forest.
- Monitor progress toward management standards and goals on a regular basis.
- Create a localized resource defining standards for all tree managers regarding tree planting and maintenance by site type.
- Conduct outreach to City and other public agencies, utilities, and private property owners to gain their commitment to tree planting and management goals and standards, including monitoring tree health (e.g., protocols for data collection and how to report and analyze the data).

WHY:

There are no complete or easily accessible planting and management standards that tree managers can use for public and most private properties. In particular, existing guidelines do not sufficiently account for a changing climate nor the need to increase climate resiliency of the forest and the city at large. There is also uneven enforcement of existing tree management standards, and best practices are not shared between and among the public and private sectors. This leads to inconsistent maintenance of trees across the city that is often insufficient to ensure their long-term survival.

IMPACT:

Planting the most appropriate tree species to maximize their benefits for the city and local community, as well as using the best management practices to care for the urban forest consistently throughout the life cycles of its trees, is critical to forest sustainability and the associated maximizing of benefits. A widely shared set of standards for different urban forest segments throughout the city will help inform the right level of management for different parts of the urban forest and result in better tree survival rates.

*"As I explore the Brooklyn Botanic Garden's plant families collections, I've come to understand that they reflect the diversity of this vibrant City. There are many species planted here in the Pinaceae (Pine) family alone, including pines, cedars, firs, hemlocks, larches, and spruces. In its entirety, the Garden is home to more than a thousand species of trees from six continents representing hundreds of nations and regions. They all take root in the same soil and live trunk by branch with other plant species from all over the world. We can learn many things from these trees and the thousands of other plant species that comprise our living museum. Beyond the symbolic lessons of living in community, they also serve as tangible teachers of how climate change will impact these plants, and how trees and other plants can be crucial tools to mitigate the impacts and slow the growth of climate change."*

**Adrian Benepe**
President, Brooklyn Botanic Garden

**BROOKLYN BRIDGE PARK, BROOKLYN**
The 3,000+ trees of Brooklyn Bridge Park perform critical functions for people and wildlife alike, providing shade and aesthetic benefits, as well as food and habitat for native bees, butterflies, and migratory birds.

Photo by Diane Cook and Len Jenshel.

ACTION 3.3

# Develop Conditions to Transform Wood Waste into a Sustainable Local Resource

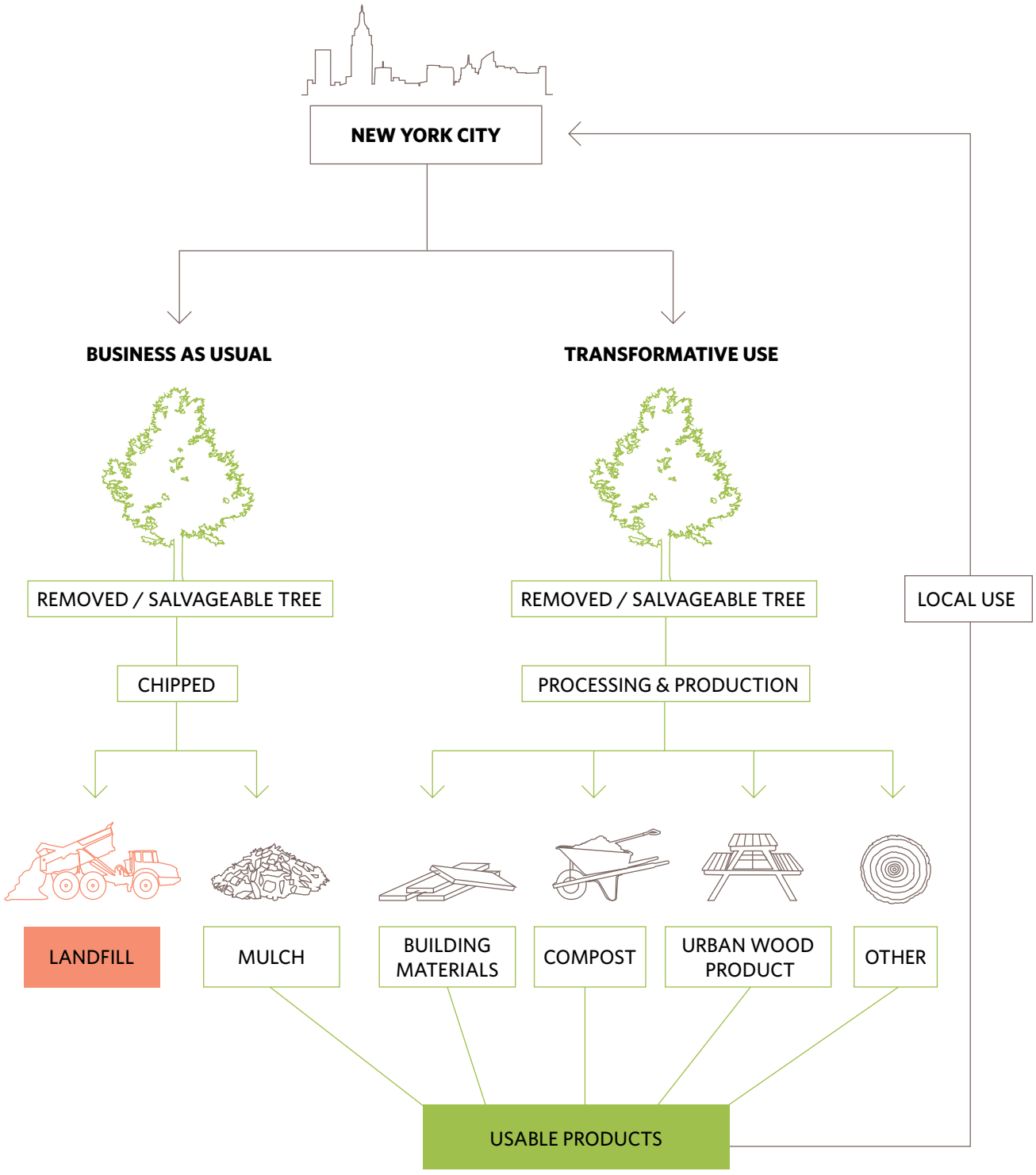
Identify and implement at least two wood waste reuse pilot projects and conduct an assessment of the supply chain for existing fresh-cut wood waste (e.g., wood from tree work activities) in NYC, including its challenges and market barriers. Leverage information from pilot projects and assessment to make policy recommendations to develop a wood reuse policy and establish the necessary infrastructure to transform waste into a sustainable local resource.

WHY:

Trees removed from streets, parks, and other public and private properties due to development, poor condition, storm damage or destruction, or other reasons are often chipped for mulch or sent to the landfill. This practice overlooks important opportunities for reuse. NYC is not currently investing in wood reuse opportunities, which prevents the urban forest from achieving broader citywide goals like more sustainable waste management, equity, career development, storm resiliency, and carbon reduction (in waste management). Urban wood waste holds tremendous potential for diversifying available wood products in the local market, increasing local economic activity (wood salvaging, milling, and product creation), and creating new jobs. Further, solid waste, if not managed well, serves as a costly liability.

## IMPACT:

This action will forward climate change mitigation and resiliency by reducing NYC's carbon footprint and waste volume, and advancing toward a circular economy. It will continue the sequestration of carbon that our trees naturally achieve and transform waste into locally made wood products. This gives wood a second life and allows wood products to act as a carbon sink by continuing to store greenhouse gases instead of releasing them during decomposition. This action will also support innovation in wood waste management strategies, transform waste into a local resource, and catalyze local green careers.

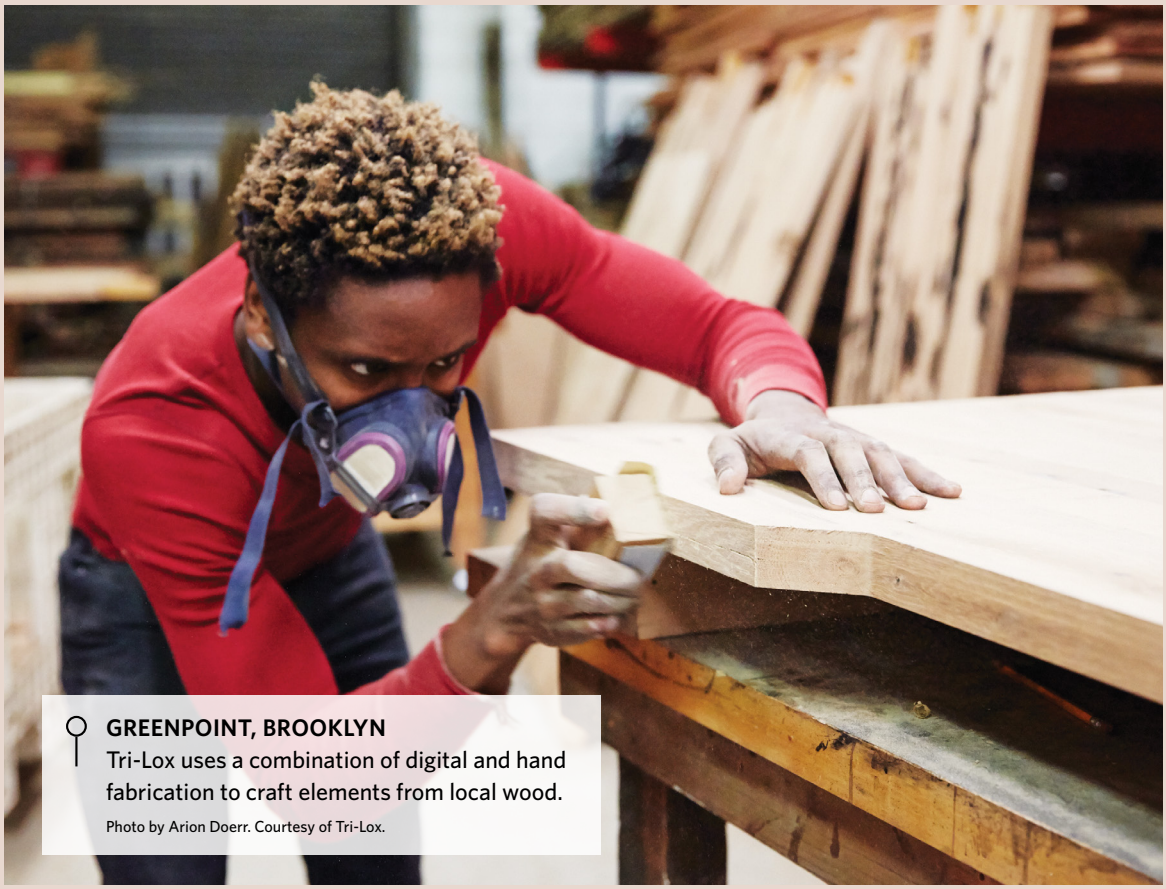


STORIES SPROUTING FROM THE GROUND

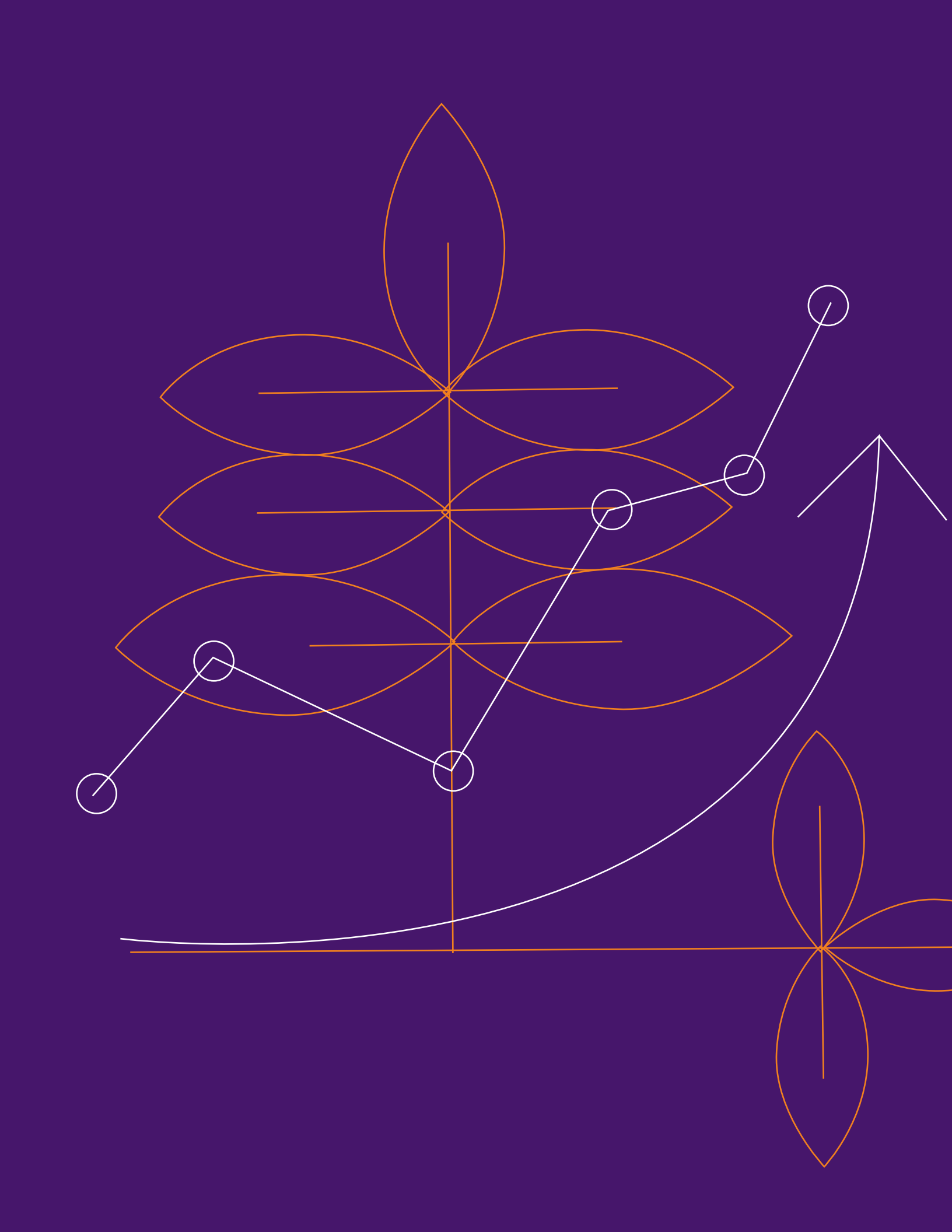
# A Second Life for NYC Parks' Trees

**Alexander Bender**
Founding Partner, Tri-Lox

When parkland and street trees are removed, they are often chipped and used for mulch or end up in the waste stream. However, there is an opportunity to find continued purpose in these trees and prevent correlative carbon emissions through salvage—a system that will also forge a new local supply chain. As a wood supplier in Brooklyn that specializes in reclaimed and sustainably sourced wood, we are currently working on a pilot program and partnership with the New York City Department of Parks and Recreation (NYC Parks) to create a new system for tree salvage and reuse throughout NYC. As part of this "NYC TREE" program, the trees will be locally processed for reuse, transforming logs into a variety of building materials by milling, drying, shaping, and finishing. A primary goal will be to integrate wood back into NYC Parks land as products such as benches, tables, or tree guard components so that salvaged trees can continue to serve New Yorkers. This project establishes a blueprint for a more sustainable system of tree removal not just within parks, but across the city's entire urban forest.



**GREENPOINT, BROOKLYN**
Tri-Lox uses a combination of digital and hand fabrication to craft elements from local wood.
Photo by Arion Doerr. Courtesy of Tri-Lox.



STRATEGY 4

# Learn

**Learn more about the NYC urban forest through research and monitoring, develop better practices related to forest management, and deepen the public's connection to the forest.**

ACTION 4.1

**Create an Urban Forestry Research and Monitoring Agenda**

ACTION 4.2

**Establish Citywide Educational and Tree Stewardship Events**

ACTION 4.3

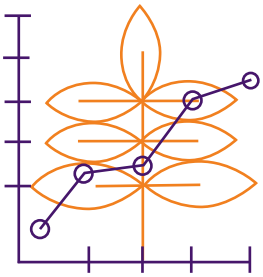
**Monitor Urban Forest Environment and Health**

**BROOKLYN BOTANIC GARDEN, BROOKLYN**
A Brooklyn Botanic Garden arborist checks one of the garden's ash trees (*Fraxinus*) for signs of emerald ash borer (*Agrilus planipennis*).

Photo by Michael Steward. Courtesy of Brooklyn Botanic Garden.

ACTION 4.1

# Create an Urban Forestry Research and Monitoring Agenda



Create a multi-year, multi-disciplinary urban forestry research and monitoring agenda that is targeted to improving design, planting, and management practices of the NYC urban forest. The research and monitoring agenda is intended to identify priority research and monitoring topics, including socioeconomic, biophysical, and other variables of interest within the urban forest that will help inform ways to better plan, manage, and advocate for a healthy, resilient urban forest. The process of developing the research and monitoring agenda will increase collaboration and build trust between researchers, tree managers, policymakers, and others.

WHY:

Current urban forest research and monitoring projects in NYC are often uncoordinated and occasionally redundant. Topics with potentially large benefits to managers and stewards of the urban forest may go unidentified and unexplored. There are mismatches in the resolution or specificity of information being collected compared with the scale at which planning and design activities will take place. In addition, there are gaps in knowledge about best practices for planning, designing, and implementing specific interventions to distribute socio-environmental benefits of the urban forest equitably.

## IMPACT:

This research and monitoring agenda will help identify, prioritize, and communicate research and monitoring findings that can more directly benefit managers, stewards, and advocates of the urban forest. It will help researchers prioritize what information to collect in urban forest studies, which may also help with standardizing methods and study design that make long-term data collection more feasible. In addition, it will give urban forest managers and policymakers information on interventions that are needed to overcome barriers to expanding, managing, and protecting the urban forest. This information is all the more vital when practitioners are looking to help the NYC urban forest adapt to climate change and to more equitably leverage this resource as a natural climate solution in climate-vulnerable neighborhoods.

**Forest Management Framework for New York City**

The Forest Management Framework for New York City is a strategic and comprehensive plan to bolster and protect NYC's forested natural areas.[21] This Framework was co-created by the Natural Areas Conservancy and NYC Parks. The plan, informed by six years of robust ecological data and research by Natural Areas Conservancy scientists, guides the restoration, management, and community engagement for 7,300 acres of New York City's forested parkland. The 25-year plan includes the costs, staffing needs, best practices, and goals for forest management in NYC. The Framework demonstrates the importance of using research and monitoring to lead to on-the-ground applications and improved management practices.

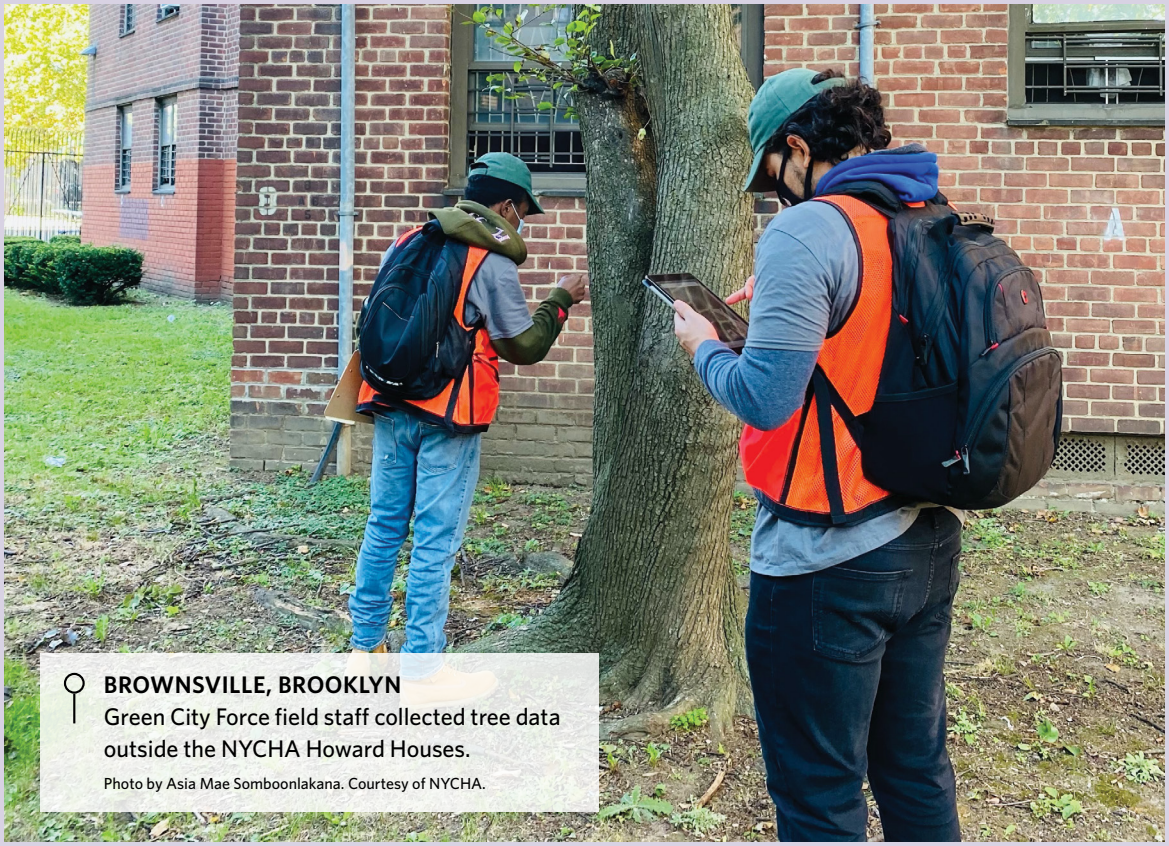
**RIVERSIDE PARK, MANHATTAN**
The Natural Areas Conservancy's 2017 CUNY interns measured tree diameter as part of a forest ecological assessment protocol.
Photo by Natural Areas Conservancy.

STORIES SPROUTING FROM THE GROUND

# Conducting NYCHA's Largest Tree Inventory Ever

**Asia Mae Somboonlakana**
Project Manager, New York City Housing Authority (NYCHA)

In the fall of 2020, we conducted a tree inventory of approximately 3,000 trees—NYCHA's first tree inventory of this scale—and a social assessment across 18 developments in neighborhoods susceptible to extreme heat, including East Harlem, Brownsville, and the South Bronx. NYCHA worked in collaboration with The Nature Conservancy, the USDA Forest Service, the New York City Department of Parks and Recreation, and Green City Force (GCF) to pilot a green jobs training program for young current or former NYCHA residents. GCF field staff inspected trees using the Healthy Trees, Healthy Cities app[22] and collected observational surveys on attitudes about open spaces. In addition, conducting the inventory provided an opportunity for GCF field staff to acquire new skills related to urban forestry and sustainability. By completing this work, we are able to quantify the ecological and social value that NYCHA's trees provide in relation to energy savings, cooling, and stormwater retention, and determine climate-related threats and management concerns trees may face.



**BROWNSVILLE, BROOKLYN**
Green City Force field staff collected tree data outside the NYCHA Howard Houses.

Photo by Asia Mae Somboonlakana. Courtesy of NYCHA.

STORIES SPROUTING FROM THE GROUND

# My Experience with the NYCHA Tree Assessment Project

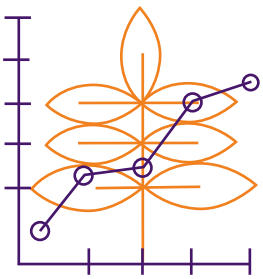
**Sadiqua Minor**
EmPower Program Coordinator, Green City Force

What interested me most about the tree assessment project was the chance to try something different and new. I have never analyzed trees before. Now I know why healthy trees are important. During my work, I saw signs of tree stress such as epicormic sprouts, exudation, cankers, larvae, and bark fissures. I also learned that dead twigs, browning leaves, holes in leaves, and premature leaf loss can be signs of tree damage. But what stood out most were the encounters I had with New York City Housing Authority (NYCHA) residents, who shared many different perspectives on the health and presence of trees. I also learned that when NYCHA's trees and open spaces are properly taken care of they are utilized more by residents. There is a beautiful green space in Wagner Houses that has plants and benches surrounded by London plane trees. I would eat my lunch there some days and there were always people reading, writing, or just taking in the atmosphere. My overall experience has been nothing less than exciting and educating—from identifying trees, to checking for pests, to speaking with residents. It's an experience that I will continue to share with my peers and my child. Even if I do not decide to make forestry a part of my future career plan, I am still extremely honored to have done this work and have new skills under my belt. Trees play a huge role in our everyday lives. Without trees, we will not be able to live. It is important for our community to care for our trees as we care for our lives.

**EAST HARLEM, MANHATTAN**
Sadiqua Minor collected tree data at the Robert F. Wagner Houses.
Photo by Green City Force.

ACTION 4.2

# Establish Citywide Educational and Tree Stewardship Events



Develop and launch a multi-year initiative to foster public engagement with the NYC urban forest. Provide a series of educational and stewardship events, across all five boroughs, that increase the public's understanding of this resource. The events will elevate and amplify the leadership of frontline communities. They will also encourage people to engage in active care and stewardship of the trees that are the most accessible to them.

WHY:

The long-term survival of the city's 7+ million trees on public and private properties will depend on regular maintenance and care by community tree stewards. Many members of the public do not understand the full suite of ecological and social benefits that trees offer and, as a result, do not advocate for or steward the urban forest. Other New Yorkers appreciate trees but don't know how to care for them or get involved in their stewardship. Tree stewardship in cities has been shown to strengthen social cohesion and resiliency, as well as drive motivation for greater civic participation.[23]

IMPACT:

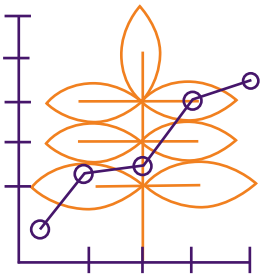
The events will act as a focal point that creates excitement and raises awareness about the importance and relevance of NYC's trees. Through coordinated and mass marketed citywide events, this action will help people to feel a sense of belonging to a community of others who care about trees. It will educate them and encourage them to actively participate in the stewardship of street trees. Over the long term, regular stewardship events in neighborhoods and public engagement will help to foster community resilience and to expand the urban forest community to create a stronger movement for NYC's trees.

**BEDFORD PARK, BRONX**
Tree planting at schools like P.S. 008 is a great way to enhance students' environmental awareness and promote fun outdoor learning.

Photo by Matthew Jensen.

ACTION 4.3

# Monitor Urban Forest Environment and Health



Monitor and track the health of the urban forest and surrounding environmental conditions to deepen our understanding of the resource and inform adaptive management strategies. Conduct a periodic citywide tree health assessment using available best practices and technology, and drawing on the input of a diverse set of stakeholders. Utilize best available technology to remotely and immediately collect fine-scale temporal data from diverse, heterogenous sites across the city (including forested natural areas, landscaped parks, and street trees in each of the five boroughs) over the long term (a decade or more) that will enable better characterizations of the NYC urban forest, its health, and its impact on the city environment.

## WHY:

Currently, there is a limited capacity to collect regular tree health assessment data on a citywide scale to track changes in the urban forest over time, which means that areas at risk may not be identified in a timely way to facilitate management decisions and risk mitigation. New York City also lacks an integrated network of plot-based measurements linked to instrumented sites with the ability to collect data about how the urban forest responds to or helps mitigate impacts of urban heat and flooding. Such an integrated network could provide baseline data, which is the best way to assess changes to urban forest conditions and/or surrounding environmental conditions during and after catastrophic events (e.g., hurricanes, heat waves) or radical changes in urban dynamics (e.g., congestion pricing policy, pandemic). The lack of these data limits our collective understanding of the NYC urban forest, diminishes opportunities to draw inferences about it across space and time, and makes it more difficult to identify at-risk segments of the urban forest that require attention and resources.

## IMPACT:

This integrated urban forest assessment and monitoring will provide the information we need to successfully manage the NYC urban forest, and to inform our understanding of the changes within and impact of the NYC urban forest. Periodic tree health assessments will be useful for tracking detailed changes in the health of the NYC urban forest, allowing us to detect issues such as invasive pests or diseases earlier. In addition, NYC tree health assessment data can generate new knowledge about urban forest systems and tree health across the country. The network of instrumented sites across NYC that will collect climate data (e.g., precipitation, humidity, solar radiation), soil physical and chemical data (e.g., carbon, moisture, temperature, pH levels), and physiological data (e.g., sap flow, dendrometer bands) will enable us to better characterize the urban forest, its health, its ability to sequester carbon, and its impact on the environment. This information will help quantify the benefits it provides (e.g., heat and stormwater mitigation) and better inform effective management and policy for the urban forest across the city.

In addition, this action will provide a pathway for building partnerships and capacity among urban forest stakeholders in NYC; provide the groundwork to coordinate monitoring efforts and engage the public in these efforts; and enable the sharing of resources so that monitoring and data collection can proceed more efficiently.

**BROOKLYN BRIDGE PARK, BROOKLYN**
A view of the Brooklyn Bridge from amidst the trees of Brooklyn Bridge Park highlights the mix of urban and natural elements throughout New York City.

Photo by Kevin Arnold.

# Carrying Out the Agenda and Getting Involved

**INWOOD HILL PARK, MANHATTAN**
A volunteer plants native sweet pepperbush (*Clethra alnifolia*) during a fall 2020 volunteer planting with the Natural Areas Conservancy.
Photo by Natural Areas Conservancy.

Forest for All NYC advocates for and advances the *NYC Urban Forest Agenda*. By working together, we are expanding our collective ability to realize the full potential of the *Agenda* and the NYC urban forest. Each member of this growing coalition plays an integral role in caring for, enjoying, advocating for, and promoting the urban forest in New York City and offers a unique perspective. We encourage others to join this coalition and help to ensure the success of the *NYC Urban Forest Agenda* and ensure our urban forest thrives, adapts, and meets the needs of the day. We invite you to join us!

Here are some of the ways to get involved:

**If you represent an organization or institution:**
**Have your organization join Forest for All NYC.**
**Visit ForestforAll.nyc to learn more.**

**If you are a decision-maker or public official:**
**We urge you to champion the *NYC Urban Forest Agenda* as a whole or to promote specific actions.**

**If you are a private individual:**
**Take action in your own community on topics ranging from individual tree care to working in your neighborhood to advance the *NYC Urban Forest Agenda*.**

**Whenever you have the opportunity, talk with others about trees, their benefits, and the *NYC Urban Forest Agenda* to amplify the message and advocate for trees.**

**Email info@ForestforAll.nyc to connect and share your ideas or questions.**

Our trees and our communities need all of us to grow a just, green, resilient future. On the next page, we provide an overview of the actions, their timelines, and the list of partners who have committed to achieve these actions. We invite you to join this diverse and growing group to uplift a collective voice for the NYC urban forest.

| STRATEGY | ACTION | PRIORITY | TARGET TIMELINE |
|---|---|---|---|
| **PLAN** | **1.1 Achieve 30% Canopy Cover by 2035** | ★ | Y1 ● |
| | **1.2 Support Development of Community-Scale Urban Forest Plans and Goals** | | Y1 ● Y2 ● Y3 ● |
| | **1.3 Establish a Master Plan for the Urban Forest** | ★ | Y1 ● Y2 ● |
| **INVEST** | **2.1 Grow and Sustain the Forest for All NYC Coalition** | ★ | Y1 ● Y2 ● Y3 ● |
| | **2.2 Cultivate Urban Forest Careers** | ★ | Y1 ● Y2 ● Y3 ● |
| | **2.3 Increase and Equitably Distribute Funding for Urban Forestry Projects** | ★ | Y1 ● Y2 ● Y3 ● |
| **MANAGE** | **3.1 Strengthen Tree Regulation and Establish Incentive Programs** | | Y1 ● Y2 ● Y3 ● |
| | **3.2 Set Tree Planting and Management Standards** | | Y3 ● |
| | **3.3 Develop Conditions to Transform Wood Waste into a Sustainable Local Resource** | | Y3 ● |
| **LEARN** | **4.1 Create an Urban Forestry Research and Monitoring Agenda** | | Y2 ● Y3 ● |
| | **4.2 Establish Citywide Educational and Tree Stewardship Events** | | Y2 ● Y3 ● |
| | **4.3 Monitor Urban Forest Environment and Health** | | Y2 ● Y3 ● |



Priority Actions will be started within the first 3 months of releasing the *NYC Urban Forest Agenda*.

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Coney Island Beautification Project, Inc., Davey Resource Group, Inc., Jackson Heights Beautification Group, Natural Areas Conservancy, New York State Department of Environmental Conservation, Snug Harbor Cultural Center & Botanical Garden, The Nature Conservancy, Trees New York, USDA Forest Service (NYC Urban Field Station)

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**WILLIAMSBURG, BROOKLYN**
An eastern redbud tree (*Cercis canadensis*) in full bloom reminds us that with spring comes growth and renewal.

Photo by Charles Gleberman.

# GLOSSARY AND ABBREVIATIONS

**Canopy** Measurement encompassing the layer of leaves, branches, and stems of trees that cover the ground when viewed from above.[24] Quantitative measures of canopy, as used in this document, are based on data developed using 3-D remote sensing techniques, in which canopy refers to vegetation greater than 8′ above the ground.

**Circular Economy** Aims to redefine growth in order to gradually decouple economic activity from consumption of finite resources and and to design waste out of the system, focusing on positive society-wide benefits.[25]

**Climate Justice** The fair treatment of all people and creation of policies and projects that address climate change without discrimination against specific groups of people.

**Combined Sewer Overflow** Events in which a mix of stormwater and untreated sewage discharges directly into waterways when combined sewer systems experience higher than normal throughputs during heavy rainstorms.[26]

**Cool Neighborhoods NYC** A program of Mayor de Blasio to invest in the City's most heat-vulnerable neighborhoods through a range of activities to address the urban heat island effect, including tree planting.[27]

**Environmental Justice** Equal distribution of environmental risks, hazards, investments, and benefits, without direct or indirect discrimination, at all jurisdictional levels. Environmental justice also implies equal access to environmental investments, benefits, and natural resources; access to information and justice in environmental matters; and participation in decision-making.[28]

**Environmental Justice Communities** Communities most impacted by environmental harms and risks. They are both more vulnerable to environmental hazards and disproportionately exposed to these hazards.[29]

**Equity** The fair or just treatment of people. Promoting justice, impartiality, and fairness within the procedures and processes of institutions or systems, as well as in their distribution of resources.[30]

**Evapotranspiration** The combination of evaporation of water from the land surface plus transpiration, the biological process of plants releasing water vapor through leaves, from plants.[31]

**Forest Bathing** Developed in Japan during the 1980s, it is the conscious and contemplative practice of being immersed in the sights, sounds, and smells of the forest.[32]

**Forested Natural Areas** Forested natural areas comprise a subset of the urban forest that is distinct from street trees and trees in landscaped areas in terms of biodiversity, size, composition, and management. They are complex ecosystems that include soil, microorganisms, and myriad species of flora and fauna throughout their various life stages, in addition to the humans who live near, visit, and manage these spaces.[33]

**Frontline Communities** Communities that are directly burdened by harmful impacts, that can collectively name the ways they are burdened, and that are organizing for action.[34]

**Heat Vulnerability Index** A statistical index of the risk of heat-related illness or death calculated using social and environmental factors. In this work we focus on the Heat Vulnerability Index developed specifically for NYC, made available by the NYC Department of Health and Mental Hygiene.[35]

**Just Transition** A vision-led, unifying, and place-based set of principles, processes, and practices that build economic and political power to shift from an extractive economy to a regenerative economy. This means approaching production and consumption cycles holistically and designing them to be waste-free. The transition itself must be just and equitable, redressing past harms and creating new relationships of power for the future through reparations. If the process of transition is not just, the outcome cannot be just. Just Transition describes both where we are going and how we will get there.[36]

**Management** The process of planning and implementing practices for the stewardship and use of forests to meet specific environmental, economic, social, and cultural objectives.[37]

**MillionTreesNYC** A citywide, public–private program, launched in 2007 by Mayor Bloomberg as one of the 132 PlaNYC initiatives, that set the goal to plant and care for one million new trees across the City's five boroughs.[38]

**Native Plant** A plant that occurs naturally in an ecosystem in which it historically evolved.

**Nature-Based Solution** An action to protect, sustainably manage, and restore natural or modified ecosystems, that addresses societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits.

**Pruning** Selectively removing branches from a tree to improve tree structure and promote tree health.

**Right of Way Trees** Trees growing in the mapped right of way, defined as all non-parcel areas. Right-of-way tree canopy is generally attributable to street trees, trees growing in traffic triangles and plazas, and trees along roads and highways that are not mapped parkland.

**Stewards** People who seek to conserve, manage, monitor, restore, advocate for, and educate the public about a wide range of issues related to sustaining the local environment.

**Stewardship** Doing any of the following: conserving, managing, monitoring, advocating for, or educating the public about local land, air, water, waste, energy, or toxics issues.[39]

**Stormwater** Water from rain or melting snow that flows off rooftops, other paved areas, and bare soil, that does not soak into the ground but runs off into waterways.[40]

**Street Trees** Trees that are planted along streets, sidewalks, and medians of surface roads, in designated tree beds that are within the sidewalk or along the curb, or in grass strips between the sidewalk and the curb.

**Tree** A woody perennial plant, typically large, with a single well-defined stem carrying a more or less definite crown.[41]

**Tree Bed** A soil area for tree roots and surface treatment surrounding a tree in a hardscape zone.

**Tree Guard** A fence around the perimeter of a tree bed that provides a physical barrier around a tree to reduce soil compaction, shield from physical damage, and prevent waste build-up.[42]

**Urban Forest** Socioecological system that includes all the trees in NYC and the physical and social infrastructure on which they depend.

**Urban Forest Master Plan** A roadmap for a city to establish and execute urban forestry goals over a certain set of time that can help the city increase its urban tree canopy, create cost-effective maintenance routines, build partnerships between local stakeholders and the city, and help reach the city's sustainability goals.[43]

**Urban Forestry** The planting, management, maintenance, care, and protection of tree populations and forest resources in urban settings.[44]

**Urban Heat Island** A phenomenon caused by the lack of trees, vegetation, and green open spaces in urban areas, combined with dense, hard surfaces of concrete and asphalt. Heat is generated by everyday activities, such as idling traffic, air conditioning of buildings and homes, and other activities. The landscape factors trap this heat and create a feedback loop that further exacerbates high temperatures.[45]

**Urban Tree Canopy** Measure of tree canopy either by area or percentage of an urban landscape.

**Abbreviations**

NYC refers to New York City as a whole, not the government entity that is the City of New York, unless the abbreviation precedes a government agency name.
NYCHA = New York City Housing Authority
NYC Parks = New York City Department of Parks and Recreation
UFA = New York City Urban Forest Agenda
UFTF = New York City Urban Forest Task Force
USDA = United States Department of Agriculture

**BROOKLYN BOTANIC GARDEN, BROOKLYN**
People pause to enjoy the view at Brooklyn Botanical Garden in New York.

Photo by Charles Gleberman

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**NEW YORK BOTANICAL GARDEN, BRONX**
An American elm (*Ulmus americana*) grows in the Thain Family Forest at the New York Botanical Garden.

Photo by Diane Cook and Len Jenshel

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