The State of the Urban Forest in New York City

Mike Treglia, Emily Nobel Maxwell & Natalia Piland

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Photo by Kevin Arnold
Who We Are

The mission of The Nature Conservancy is to conserve the lands and waters on which all life depends.
Future Forest NYC Projects

- State of the Urban Forest in NYC Report
- NYC Urban Forest Task Force → Forest for All NYC
- NYC Urban Forest Agenda
- Stewardship
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# The State of the Urban Forest in NYC

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Key Take-Aways

• Expanding and Generally Healthy
  • Increases in street trees & canopy
  • Healthy size & species composition
  • Substantial benefits provided
  • Numerous committed actors and institutions
  • 53.5% of canopy is in NYC Parks’ jurisdiction with robust management and stewardship, and some protections
  • Remainder (mostly private) has few protections and limited management
• Inequitable distribution
• Patchwork policy
• Insufficient and unstable funding
• Persistent threats, including climate change

Photo credit: iStock.com/PM10
Today we’ll share…

• Urban Forest: What is it? Why does it matter in NYC?
• Key takeaways in detail
• Strengths, challenges and opportunities
“The urban forest of New York City includes over 7 million trees, as well as the physical and social infrastructure that supports them.”
Urban Forest Benefits

- Removes 1,100 tons of pollutants from the air per year, which improves air quality and leads to fewer emergency room visits, lower rates of chronic diseases, and fewer hospitalizations.
- Stores 1.2 million tons of carbon and annually sequesters 51,000 tons of carbon (or 187,000 tons of CO₂).
- Decreases air temperature by an average of 0.13°F, therefore cooling city streets and mitigating the urban heat island effect and extreme heat.
- Reduces stress (as shown by slower heartbeats, lower blood pressure, and relaxed brain patterns) and promotes healing and contemplation.
- Increases the cohesiveness of communities by fostering stronger connections between neighbors, feelings of attachment to place, and an opportunity to experience nature.
- Encourages children and adults to spend more time outdoors engaging in physical activity, therefore reducing childhood obesity rates and improving fitness.
- Reduces stormwater runoff by 69 million cubic feet per year, decreases the rate that runoff travels off surfaces (e.g., streets and sidewalks), and stabilizes soil by preventing erosion.
- Provides habitat and refuge for a variety of wildlife and plant species and enables pollinators, seed dispersers, and other species to move throughout the region.

Tree Canopy Distribution 2017

Data sources: Percent Canopy Cover derived from 2017 Tree Canopy Change (2010-2017) data (NYC Department of Information Technology and Telecommunications); Administrative Boundaries from NYC Department of City Planning
Jurisdiction of Land and Tree Canopy

Citywide Land Area
- Private: 48.45%
- Federal: 3.45%
- State: 6.12%
- City: NYC Parks: 13.40%
- City: Rights of Way: 23.08%
- City: Other: 5.49%

Citywide Canopy
- Private: 35.26%
- Federal: 2.10%
- State: 5.73%
- City: NYC Parks: 28.40%
- City: Rights of Way: 25.10%
- City: Other: 3.41%

Data sources: Land Area derived from NYC parcel data MapPLUTO 20v6 (NYC Department of City Planning) and agency- or entity-specific datasets where available; Canopy metrics derived from 2017 Tree Canopy Change (2010-2017) data (NYC Department of Information Technology and Telecommunications)
Net Change In Tree Canopy 2010-2017

Data sources: Percent Change in Canopy derived from 2017 Tree Canopy Change (2010-2017) data (NYC Department of Information Technology and Telecommunications); Administrative Boundaries from NYC Department of City Planning
Canopy Change

- Up to 86.83% of growth since 2010 occurred on the periphery of existing canopy
- 13.17% of growth was disjunct, assume its new tree plantings
- Natural regeneration

Data sources: Canopy change derived from 2017 Tree Canopy Change (2010-2017) data (NYC Department of Information Technology and Telecommunications); Imagery from 2010 and 2016 collections of Orthoimagery for NYC (NYC Department of Information Technology and Telecommunications)
Canopy Change in an Area Inundated by Superstorm Sandy

Data sources: Canopy change from 2017 Tree Canopy Change (2010-2017) data and basemap are both courtesy of NYC Department of Information Technology and Telecommunications; Hurricane Sandy Inundation Zone from NYC Department of Small Business Services
Healthy Size Distribution

Street Trees in Staten Island

Diameter at Breast Height (inches)

Data source: street tree size distribution derived from 2015-2016 Street Tree Census (NYC Parks)
Healthy Species Composition

Most Common Landscaped Park Trees on City Parkland

1. London Planetree
   Platanus x acerifolia
   Count: 18,139 trees (11.70%)

2. Pin Oak
   Quercus palustris
   Count: 14,990 trees (9.67%)

3. Honey Locust
   Gleditsia triacanthos
   Count: 6,922 trees (4.47%)

4. Cherry
   Prunus sp.
   Count: 5,569 trees (3.59%)

5. American Elm
   Ulmus americana
   Count: 5,098 trees (3.29%)

6. Northern Red Oak
   Quercus rubra
   Count: 5,089 trees (3.28%)

7. Sweetgum
   Liquidambar styraciflua
   Count: 4,193 trees (2.71%)

8. Apple
   Malus sp.
   Count: 4,009 trees (2.59%)

9. Littleleaf Linden
   Tilia cordata
   Count: 3,934 trees (2.54%)

10. Norway Maple
    Acer platanoides
    Count: 3,611 trees (2.33%)

281 other kinds make up the remaining 53.83% of trees in landscaped parks.

Data source: Park Tree Inventory (2011) (NYC Parks)
Tree Canopy Distribution 2017

Boroughs

Neighborhood Tabulation Areas

Data sources: Percent Canopy Cover derived from 2017 Tree Canopy Change (2010–2017) data (NYC Department of Information Technology and Telecommunications); Administrative Boundaries from NYC Department of City Planning
Vegetation and Temperature

- Tree Canopy
- Grass and Shrubs

Temperature Scale:
- 151° F
- 134° F
- 116° F
- 90° F
- 73° F
Unequal Distribution

Tree Canopy

Heat Vulnerability Index

Social Vulnerability Index
Canopy Cover and Income

Street Tree Stocking Rate and Social Vulnerability
History of Redlining

Canopy Cover by HOLC Grade Across the Five Boroughs

Recent Progress

Photo by NYC Department of Parks and Recreation.

Photo by NYC Department of Parks and Recreation.
# Diversity of Policies

## Major Policies Related to the NYC Urban Forest

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<td>National Urban and Community Forestry Advisory Council Challenge Cost-Share Grant Program</td>
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* Pursuant to Executive Order No. 91 of 1977, As Amended.  
***Pursuant to the National Environmental Policy Act of 1969.

Table 5.1 Examples of policies, programs, and plans that affect the NYC urban forest, organized by the associated level of government.
NYC Parks Jurisdiction

Citywide Canopy
42,635 acres

- Private: 35.26%
- Federal: 2.10%
- State: 5.73%
- City: NYC Parks: 28.40%
- City: Rights of Way: 25.10%
- City: Other: 3.41%
Special Purpose Districts

Map of the Special Natural Area, Special South Richmond, and Special Hillsides Preservation Districts

- Special Hillsides Preservation District
- Special Natural Area District
- Special South Richmond Development District

Data Source: Special Purpose District and Borough boundaries from NYC Department of City Planning.

Imagery from Vexcel Data Program © 2021 Vexcel Imaging.
Insufficient Funding

Average OTPS Expense Funding for the Urban Forest in the NYC Budget, FY18-22

Total City of New York Expense Budget (exclusive of personnel costs, otherwise known as OTPS)
$40.6 Billion

NYC Parks’ OTPS Budget
0.34% of Total City Budget

NYC Parks’ Forestry OTPS Budget
0.04% of Total City Budget

Data source: NYC Office of Management and Budget - Adopted Annual Fiscal Year budget reports (FY18-22)
Insecure Funding

NYC Parks’ Capital and OTPS Expense Budget for Urban Forestry Activities, FY06-22

Data source: NYC Office of Management and Budget - Annual Fiscal Year Adopted Budget reports
Private Sources of Funding

A limited list...

- Crowdsourcing
- Partnerships for Parks
- MillionTreesNYC example – New York Restoration Project raised $30 million for plantings
Complex Landscape of Management

Central Park
Owner: New York City
Manager: Central Parks Conservancy and NYC Parks

Hunter College
Owner: New York State
Manager: City University of New York

Park Ave Mall
Owner: New York City
Manager: The Fund for Park Ave

Julia Richman Education Complex
Owner: New York City
Manager: NYC Department of Education

St. Catherine’s Park
Owner: New York City
Manager: NYC Parks

Rockefeller University
Owner: Rockefeller University
Manager: Rockefeller University

Backyard Trees
Owner: Private property owners
Manager: Private property owners

Street Trees Citywide
Owner: New York City
Manager: NYC Parks and Partners

Forested Natural Areas Citywide
Owner: (Primarily) New York City
Manager: (Primarily) NYC Parks and the Natural Areas Conservancy

Imagery from USDA Farm Service Agency National Agriculture Imagery Program (2019).
Stewardship
Environmental Stewardship Groups

Collaboration Network of NYC Respondents and Named Groups from 2017 STEW-MAP Effort

People Like Trees and Nature

Photo by Nina Browne, courtesy of Brooklyn Botanic Garden.

Photo by Nina Browne, courtesy of Brooklyn Botanic Garden.

Photo by Brooklyn Botanic Garden Staff.

Photo by Amy Munick, courtesy of Brooklyn Botanic Garden.

Photo by Brooklyn Botanic Garden Staff.

Photo by Jonathan Grossi.
An Engaged Public

Public Reactions to Tree Plantings in Early Years of MillionTreesNYC

- Thank You
- Recommendations
- Information Request
- Service Request
- Complaint

Number of Pieces of Correspondence

What We Don't Know

Data sources: Land area derived from NYC parcel data MapPLUTO 20v6 (NYC Department of City Planning); Canopy metrics derived from 2017 Tree Canopy Change (2010–2017) data (NYC Department of Information Technology and Telecommunications)
Today we’ll share...

- Urban Forest: What is it? Why does it matter in NYC? ✓
- Key takeaways in detail ✓
- Strengths, challenges and opportunities
**Strengths**

- A healthy and expanding forest with many kinds of trees
- Diverse people and institutions steward the urban forest
- Strong NYC Parks leadership
- Expansion opportunities
Challenges

• Inequitable distribution of urban forest
• Patchwork of policies
• Insufficient and insecure funding
• Limited knowledge of NYC residents’ attitudes
• Climate change
• Pests and diseases
Urban Forest Agenda

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: