The State of the Urban Forest in New York City

Mike Treglia, Emily Nobel Maxwell & Natalia Piland

NATURA
January 11, 2022

The Nature Conservancy

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.

The Nature Conservancy

Photo credit: Charles Gleberman

Photo credit: Jonathan Grassi

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

Meet the Future Forest NYC Team

Emily Nobel Maxwell

Mike Treglia

Tami Lin-Moges

Montserrat Acosta-Morel

Kate Galbo (previously)

Alaina Van Slooten

Darran Crabtree

Hannah Emple

Natalia Piland

State of the Urban Forest Project Team

Project Director and Lead Author: Emily Nobel Maxwell

Lead Scientist and Lead Author: Dr. Michael L. Treglia

Production Managers: Alaina Van Slooten, Kate Galbo, Tami Lin-Moges

Contributing Authors and Analysts: Dr. Montserrat Acosta-Morel, Dr. Darran Crabtree, Tami Lin-Moges, Kate Galbo, Alaina Van Slooten

Contributors

Expert Input and Review: Dr. Novem Auyeung, Dr. Rebecca L. Benner, Uma Bhandaram, Dr. Lindsay K. Campbell, Sarah Charlop-Powers, Crystal Crown, Alisha Deen-Steindler, Hannah Emple, Noemi Gonzalo-Bilbao Fernandez, Basha Gerhards, Jalisa Gilmore, Jennifer Greenfeld, Dr. Richard Hallett, Annel Hernandez, Rachel V. Holmes, Christopher Jage, Dr. Michelle Johnson, Sarah Johnson, Marit Larson, Karen Leu, Craig Mandel, Dr. Mike McCann, Dr. Robert McDonald, Katharine McGlynn, Mackenzie Mock, Priya Mulgaonkar, Karen Murphy, Benjamin Osborne, Sophie Plitt, Dr. Clara Pregitzer, Dr. Elizabeth Smith, Robert L. Smith II, Dr. Erika S. Svendsen, Shannon Thol, Christina Thorbourne, Jeffrey Watson, Fiona Watt, Siobhan Watson, Ellen Weiss, Tim Wenskus, May Yeung

Editors: Ann Holcomb, Heather L. Sisan

The State of the Urban Forest in NYC

Chapter	Description
1: Introduction	Overall description of the urban forest and the report
2: Distribution and Biophysical Status	Distribution of trees and their canopy through time, drivers of change, and general health of the resource
3: Benefits	Description of benefits provided by the urban forest
4: Equity and Environmental Justice	Analysis of the urban forest and socioeconomic variables
5: Public Policy	Review of current policies relevant to the urban forest
6: Funding	Review of recent funding available for the urban forest
7: Management and Stewardship	Characterization of management of urban forest
8: Attitudes	Review of attitudes of NYC residents
9: Strengths, Challenges and Opportunities	Summary and ways forward to expand and protect the urban forest

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

Photo credit: iStock.com/James Andrews

"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 CO_2)

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

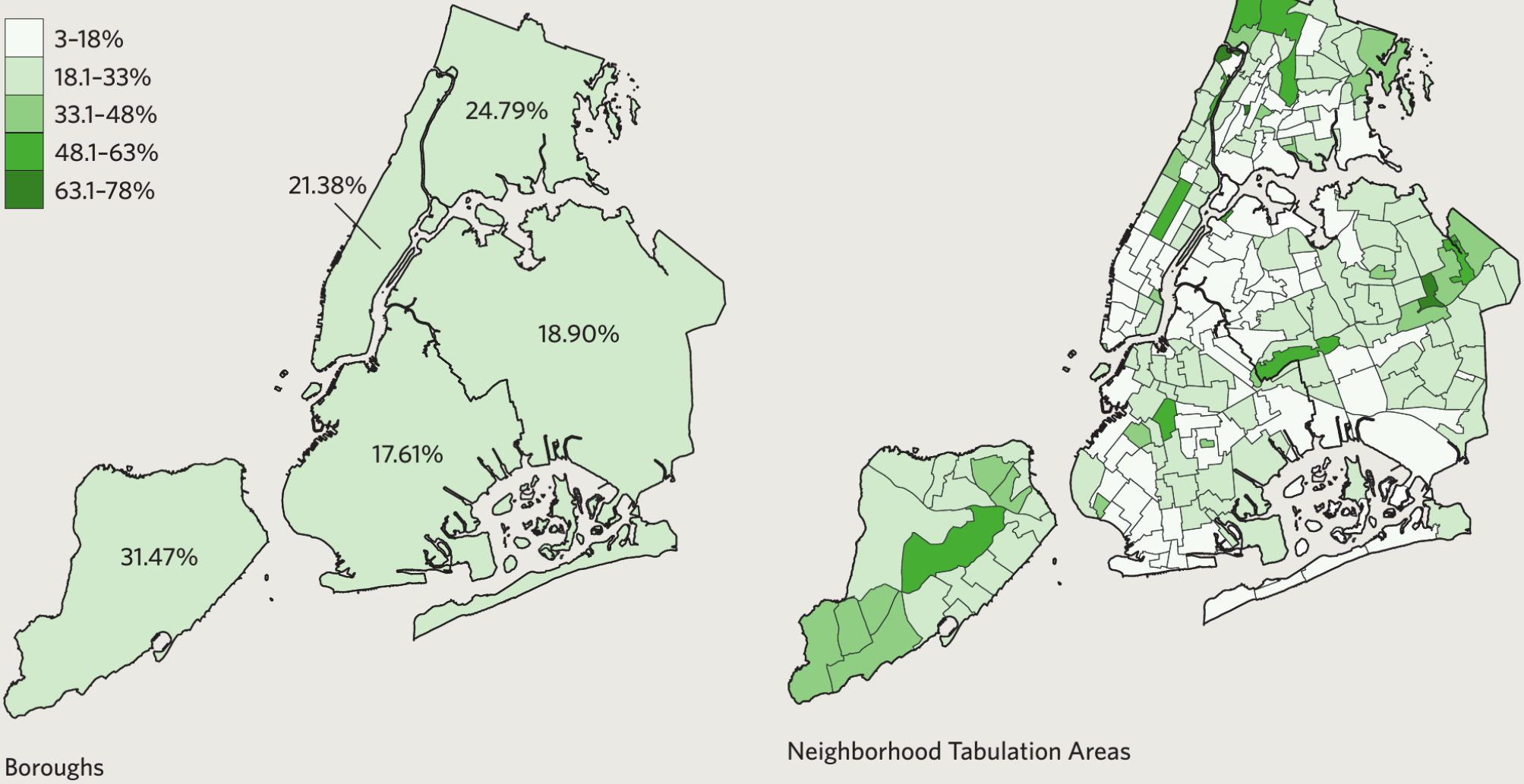
Encourages children and adults to spend more time outdoors engaging in physical activity, therefore reducing childhood obesity rates and improving fitness

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

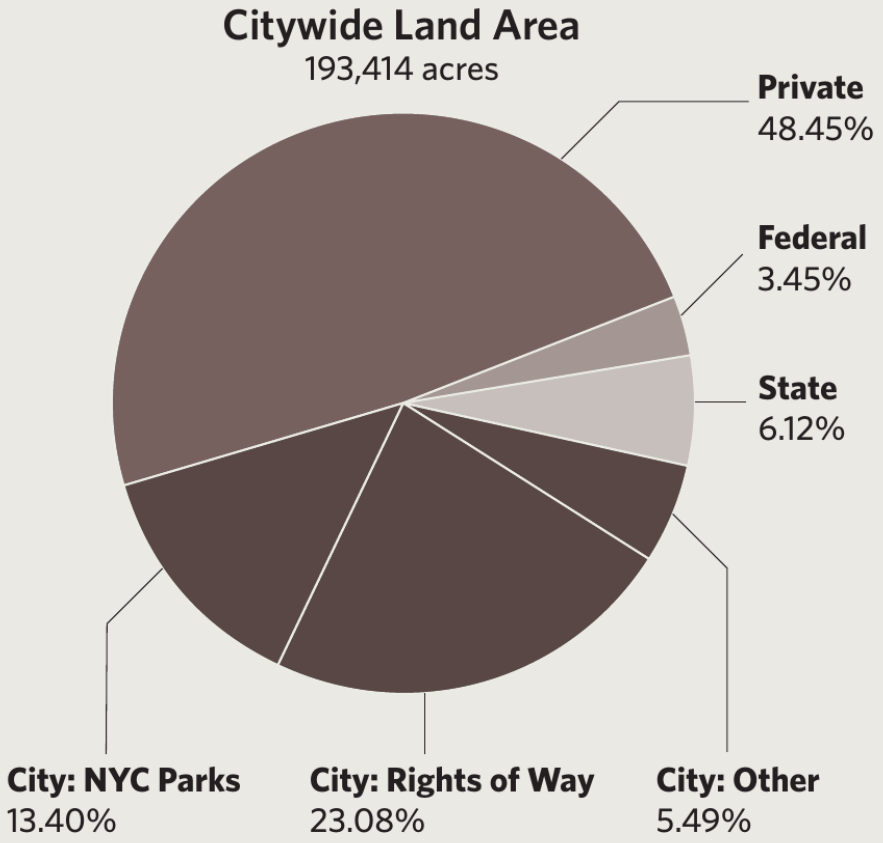
Data source: Nowak et al. (2018). The Urban Forest of New York City. Resource Bulletin NRS-117; 1–82. USDA Forest Service, Northern Research Station

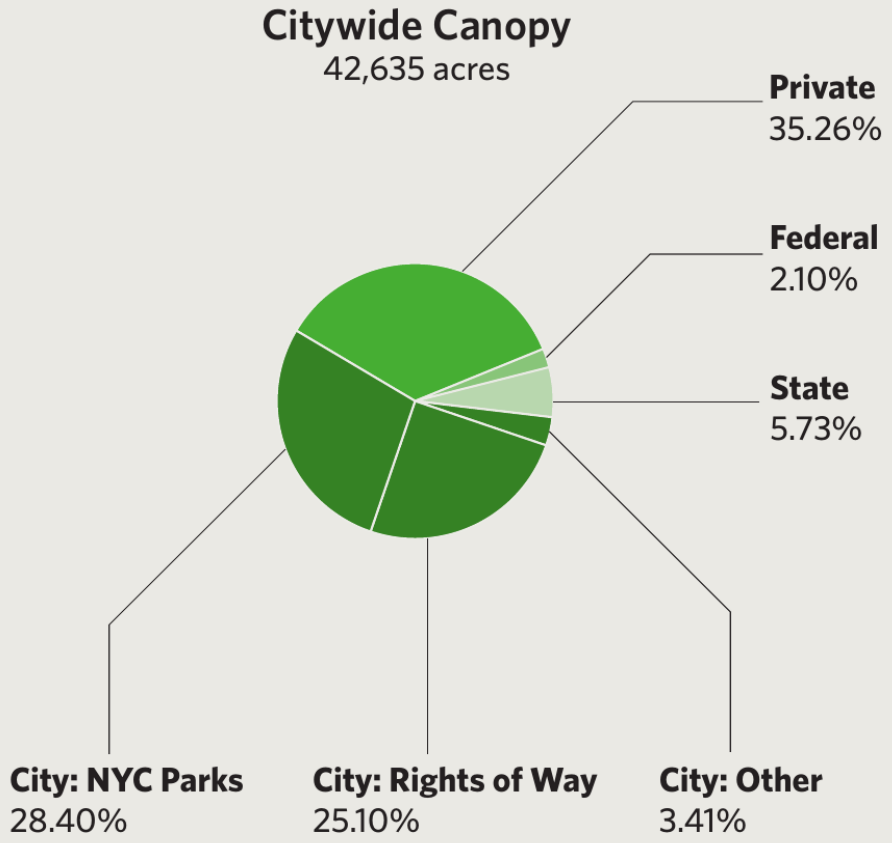
Tree Canopy Distribution 2017



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

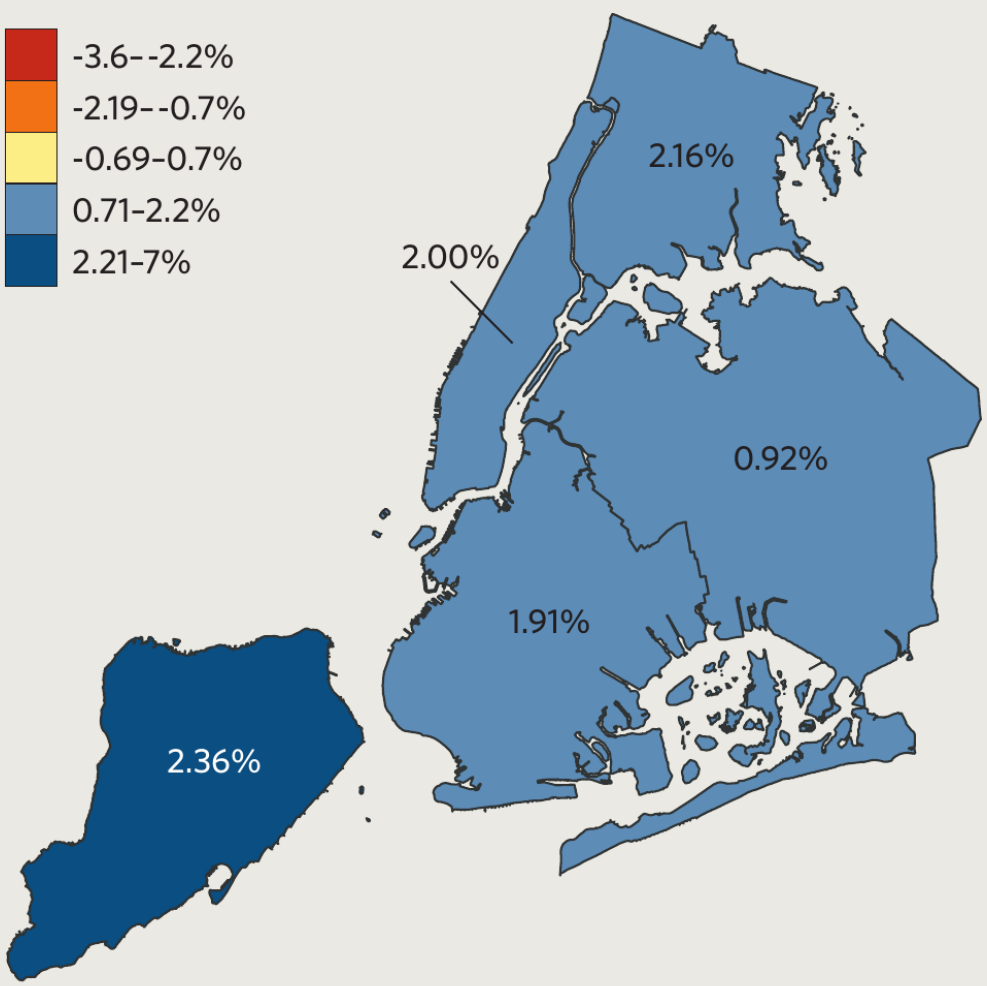
Jurisdiction of Land and Tree Canopy



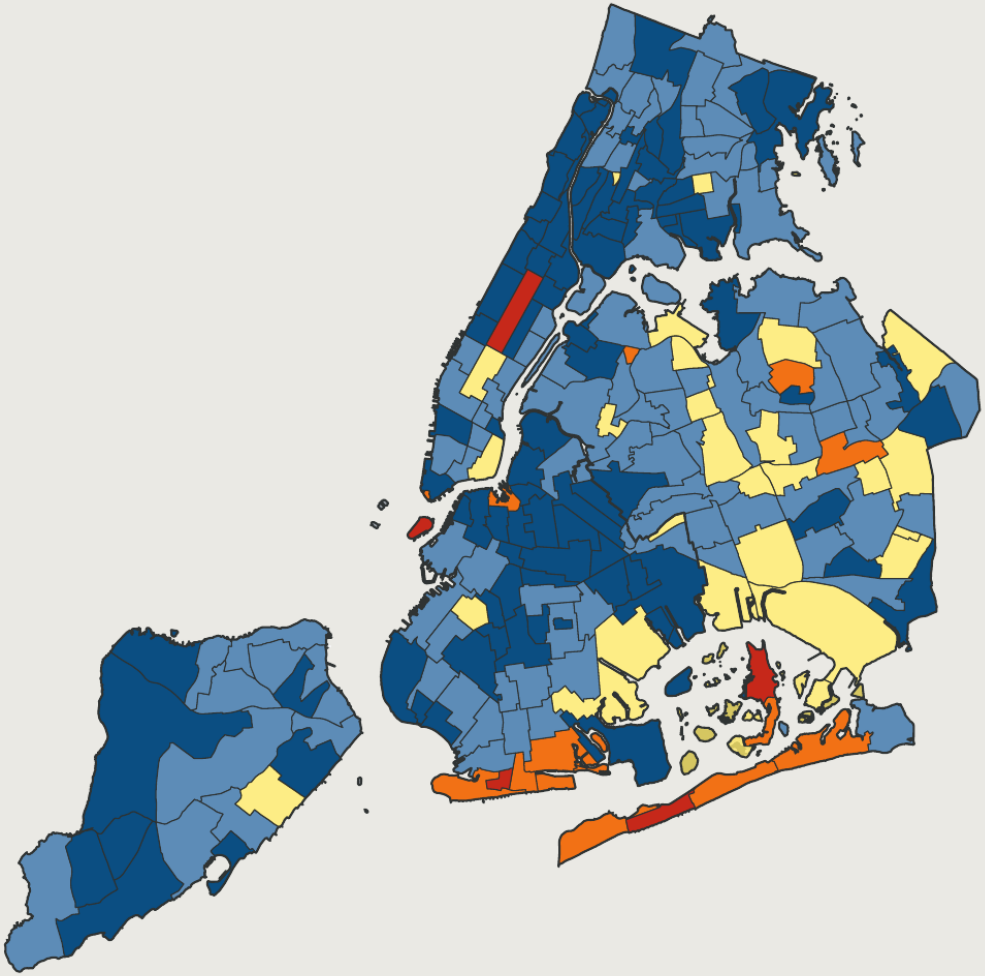


Data sources: Land Area derived from NYC parcel data MapPLUTO 20v6 (NYC Department of City Planning) and agency- or entity-specific datasets where available; Canopy metrics derived from 2017 Tree Canopy Change (2010–2017) data (NYC Department of Information Technology and Telecommunications)

Net Change In Tree Canopy 2010-2017



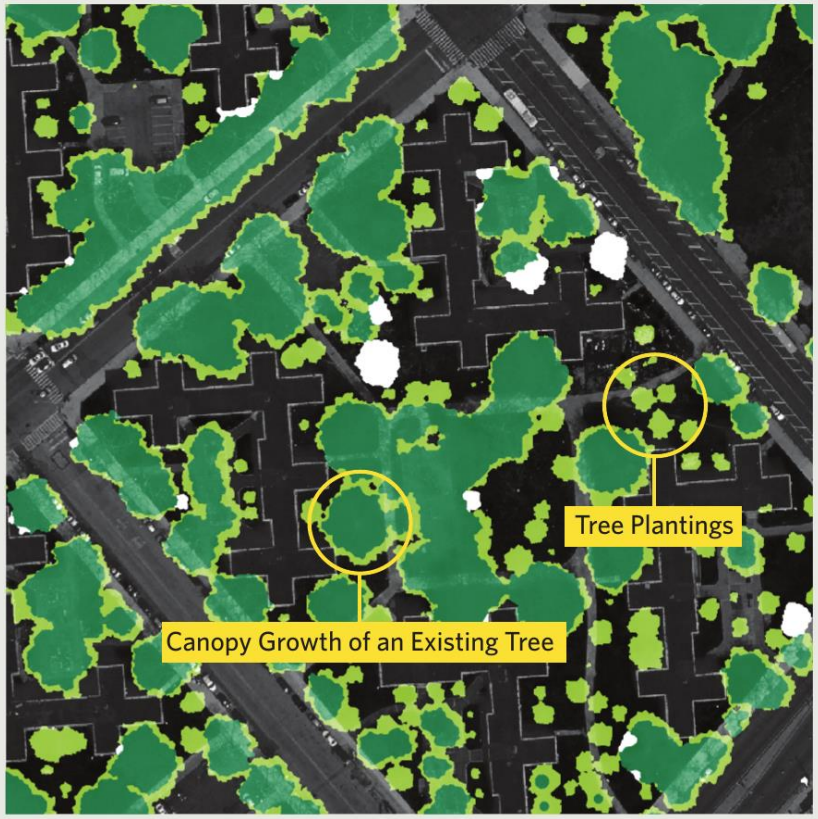
Boroughs



Neighborhood Tabulation Areas

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

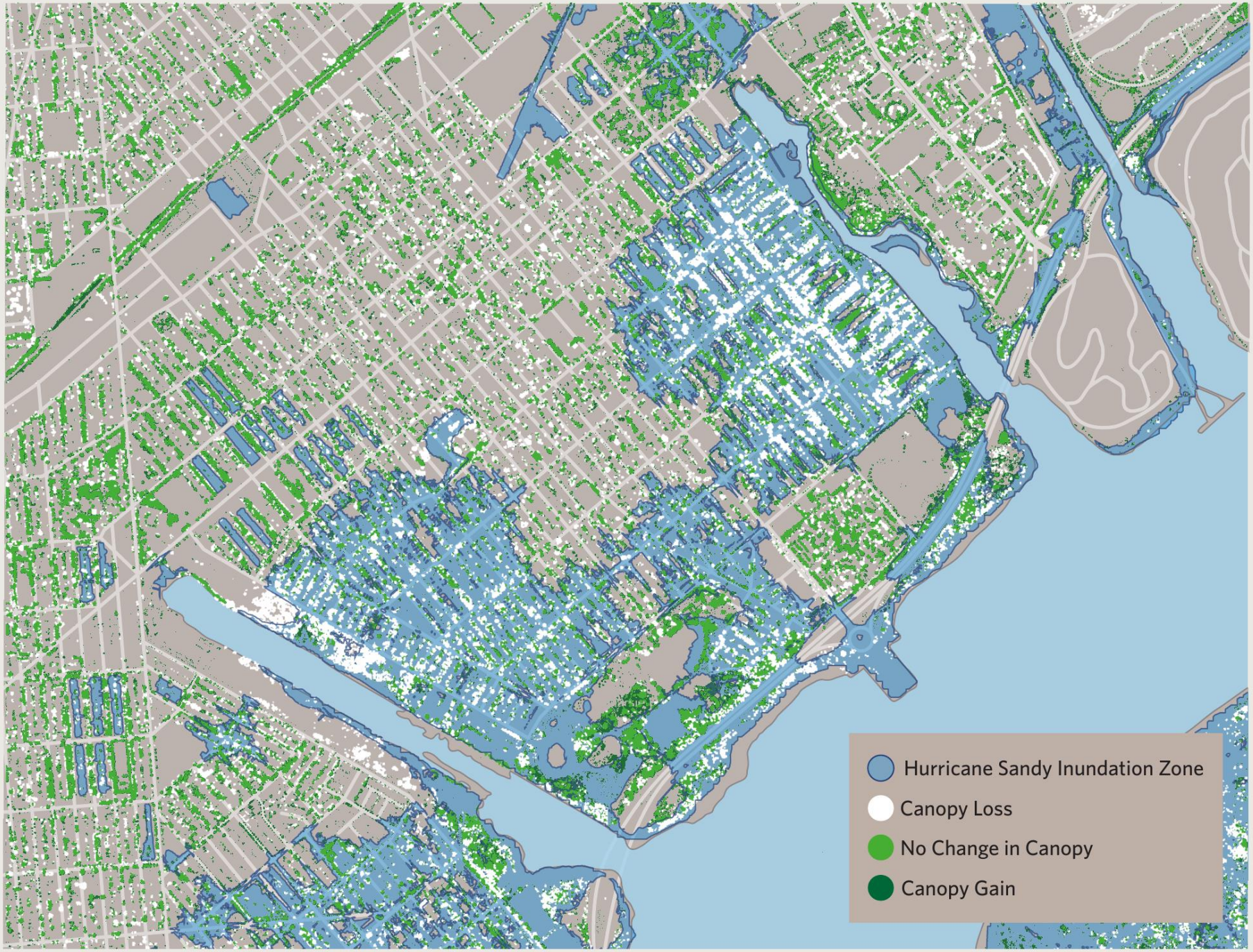
Canopy Change



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)

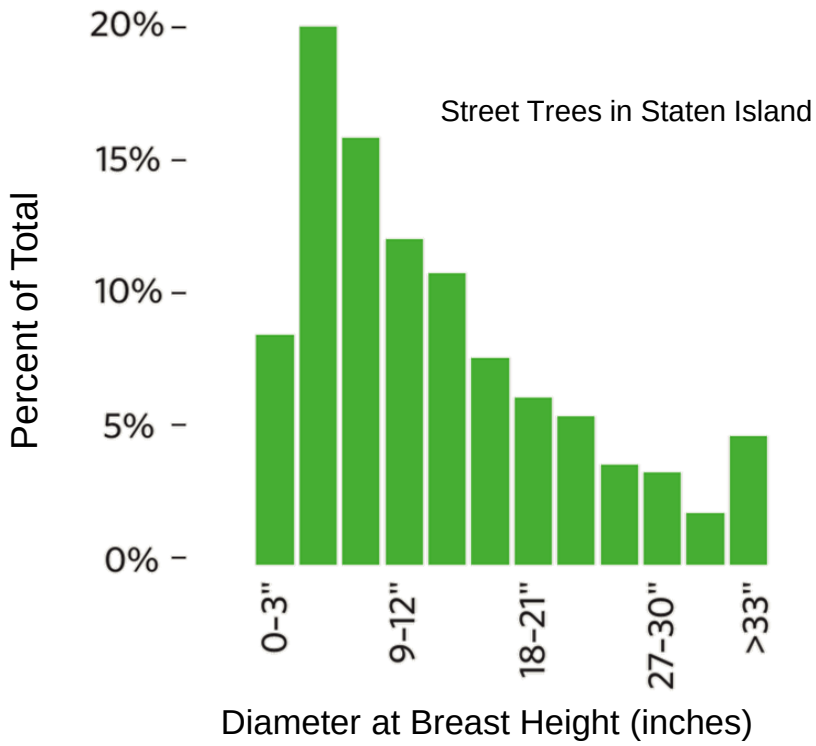
- Up to 86.83% of growth since 2010 occurred on the periphery of existing canopy
- 13.17% of growth was disjunct, assume its new tree plantings
- Natural regeneration

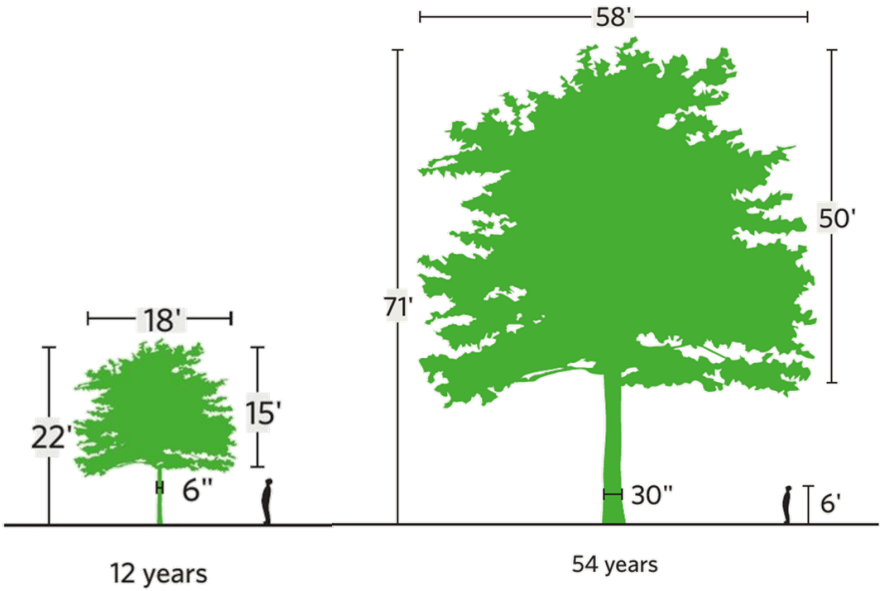
Canopy Change in an Area Inundated by Superstorm Sandy



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

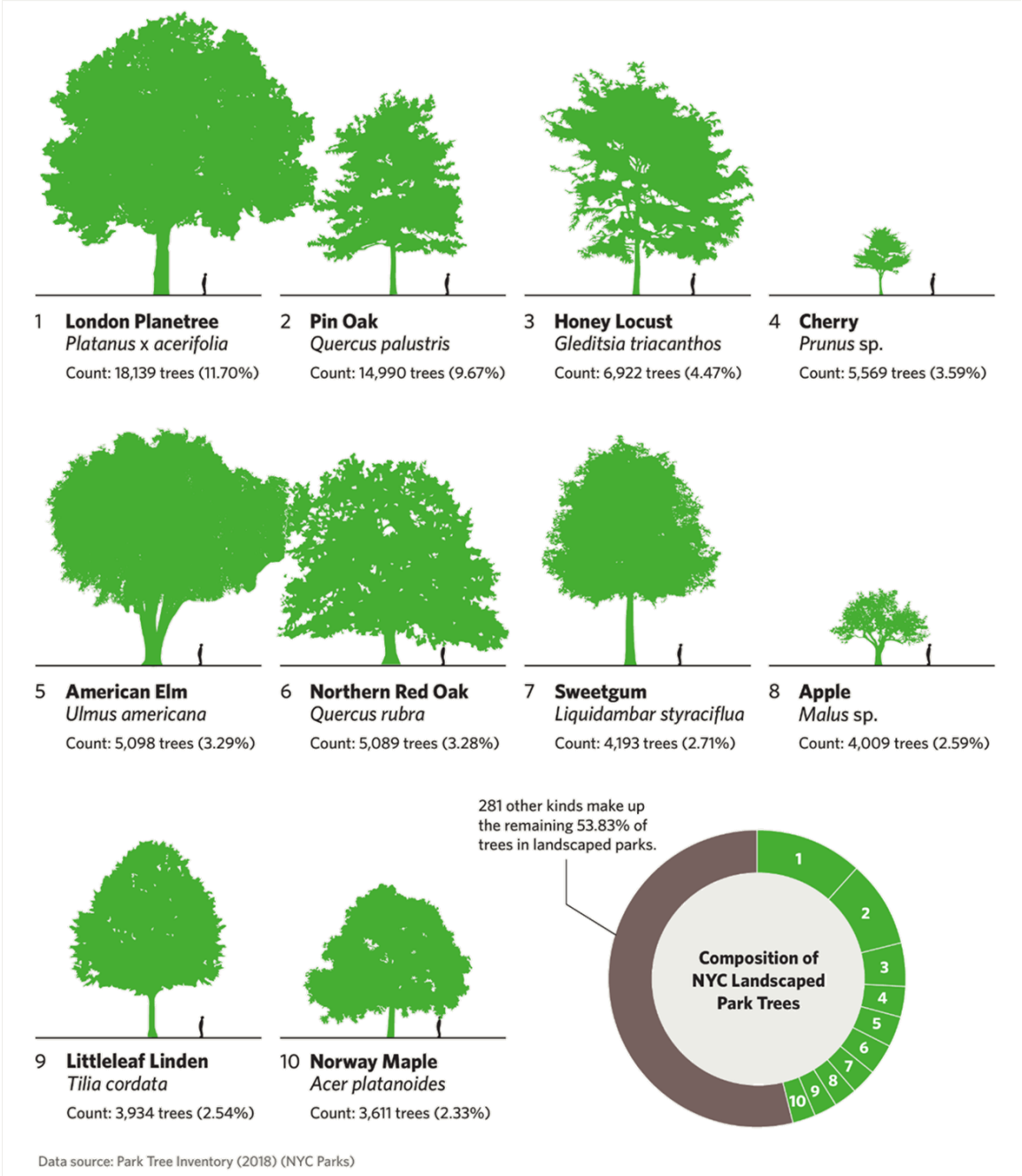




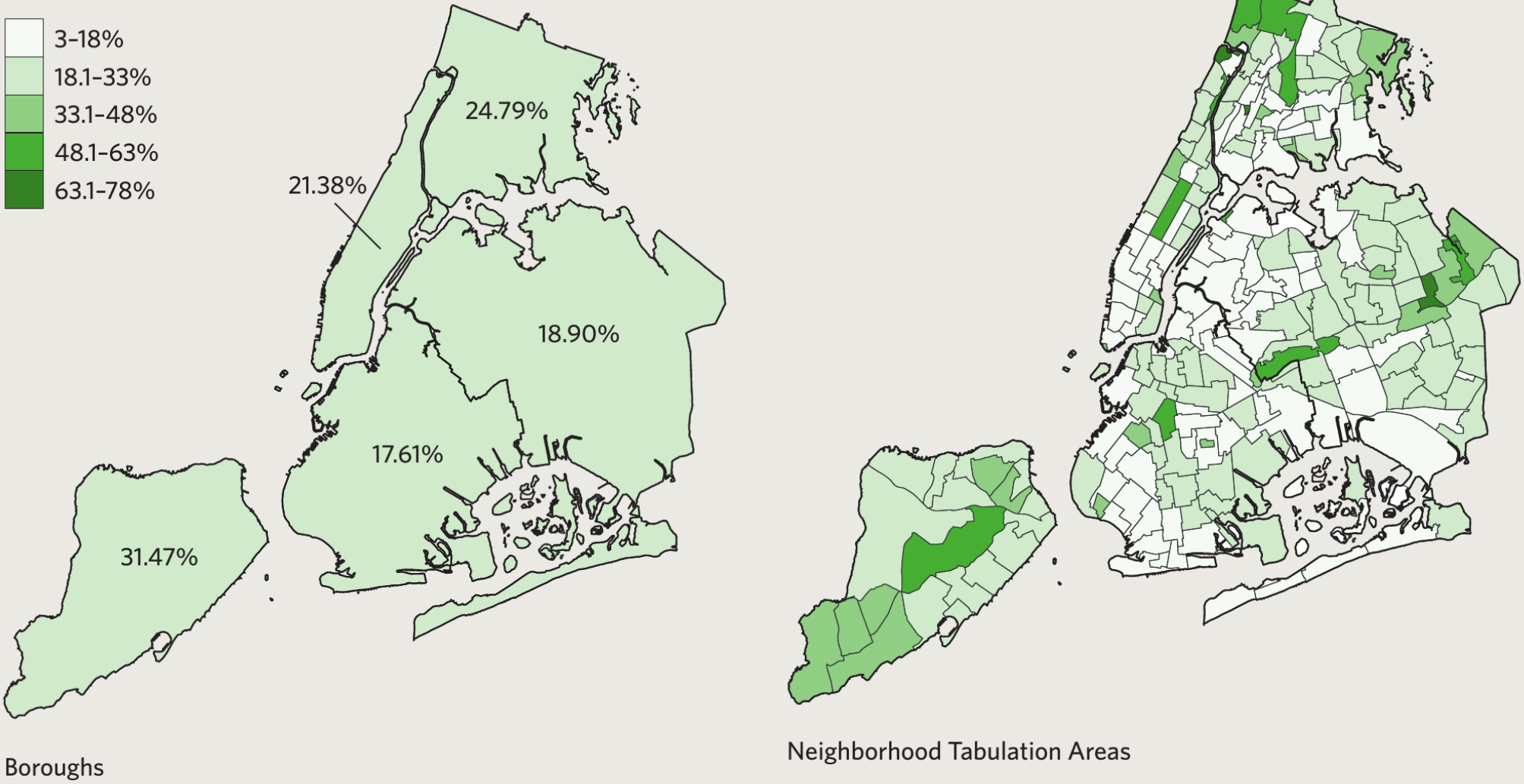
Data source: street tree size distribution derived from 2015-2016 Street Tree Census (NYC Parks)

Healthy Species Composition

Most Common Landscaped Park Trees on City Parkland

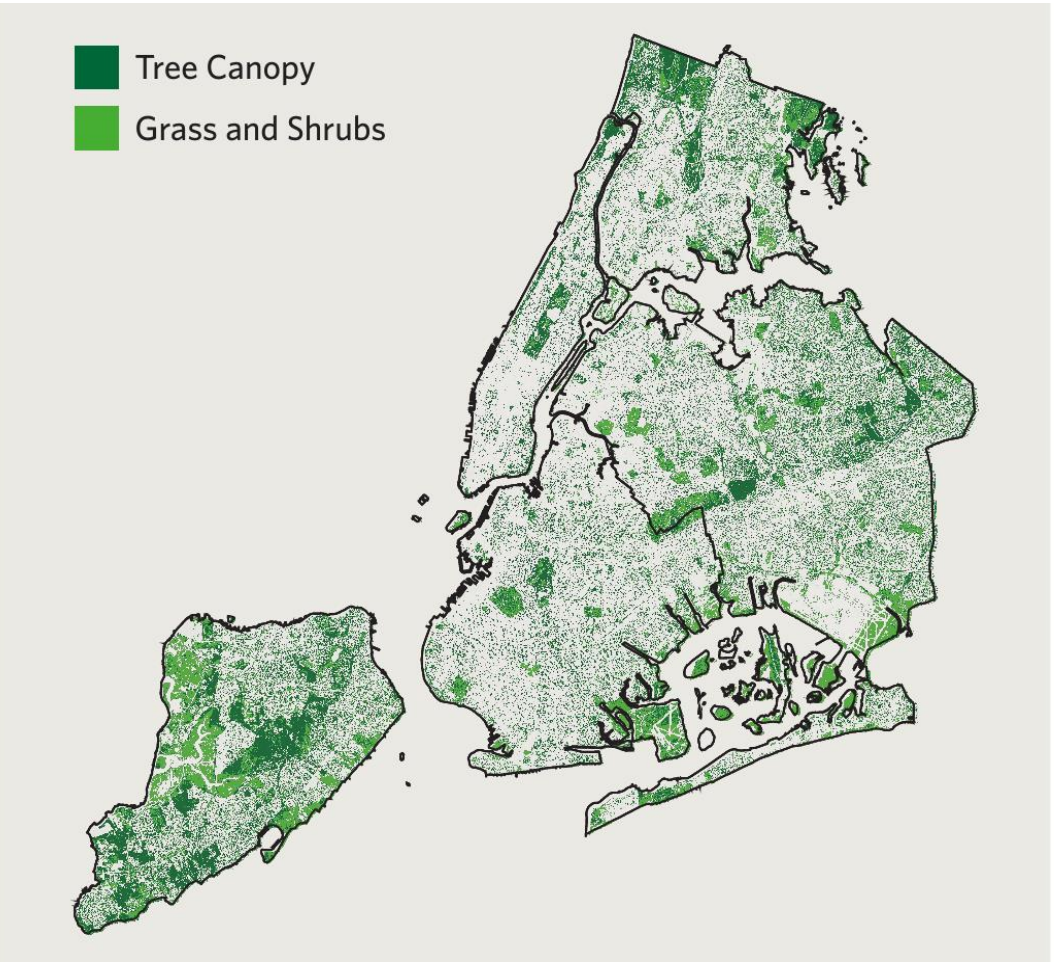


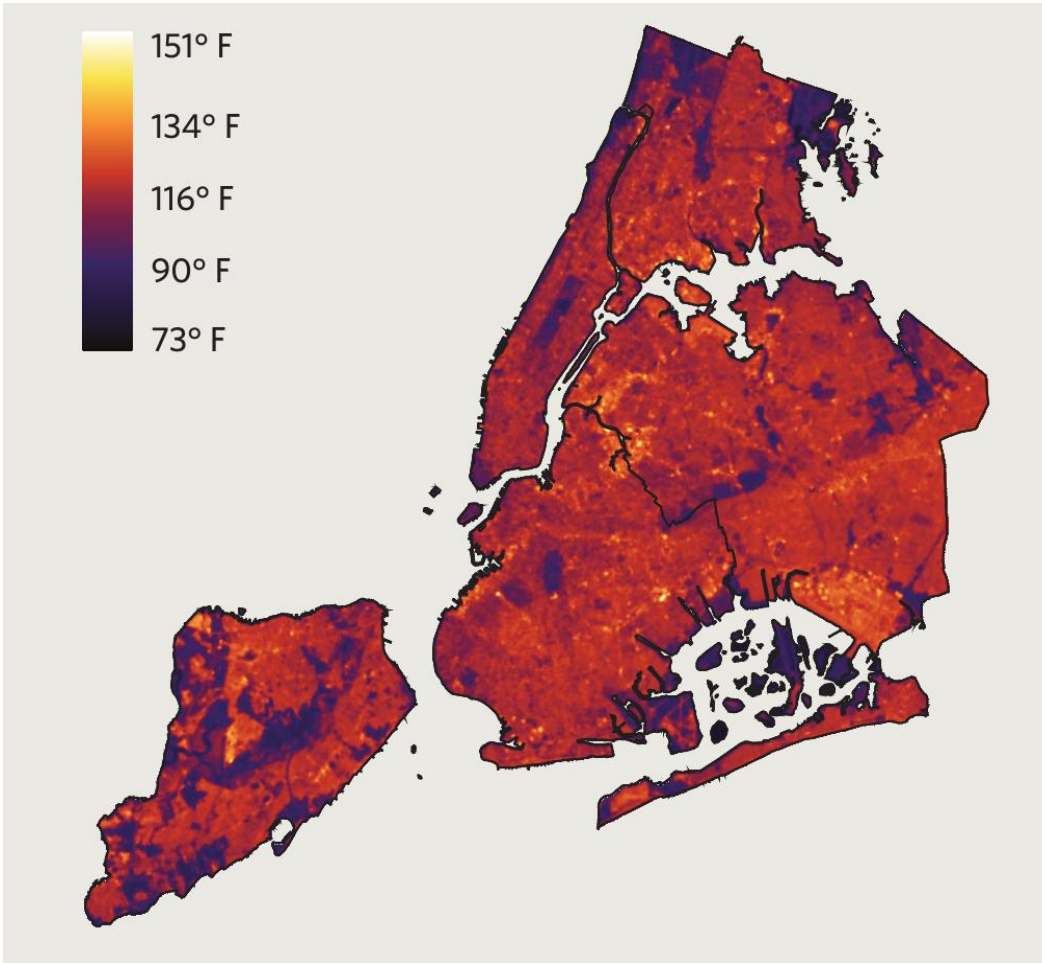
Tree Canopy Distribution 2017



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

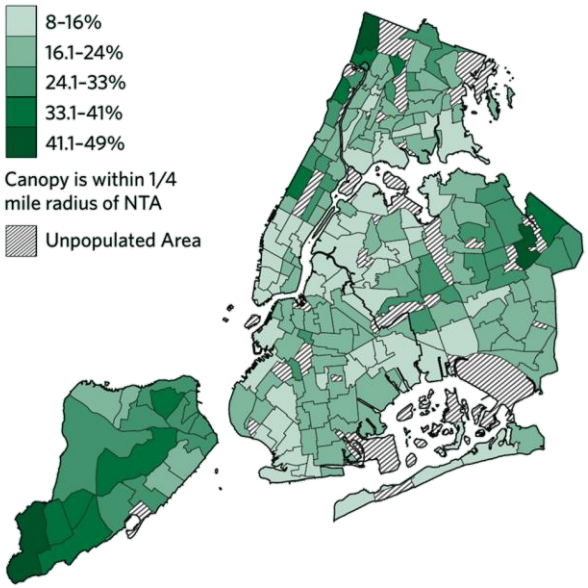
Vegetation and Temperature



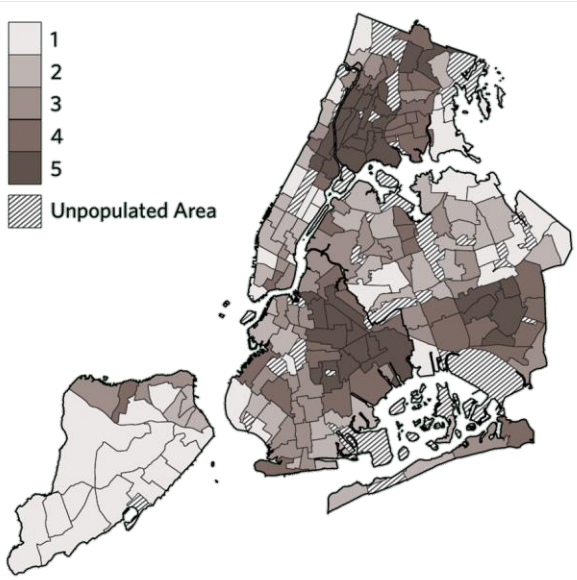


Unequal Distribution

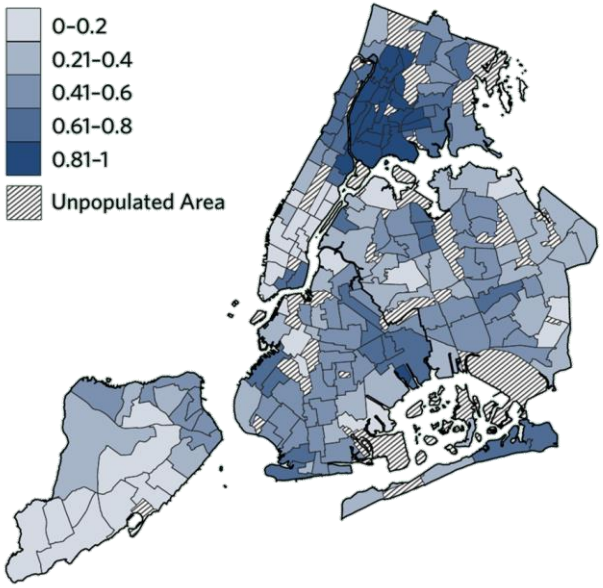
Tree Canopy



Heat Vulnerability Index



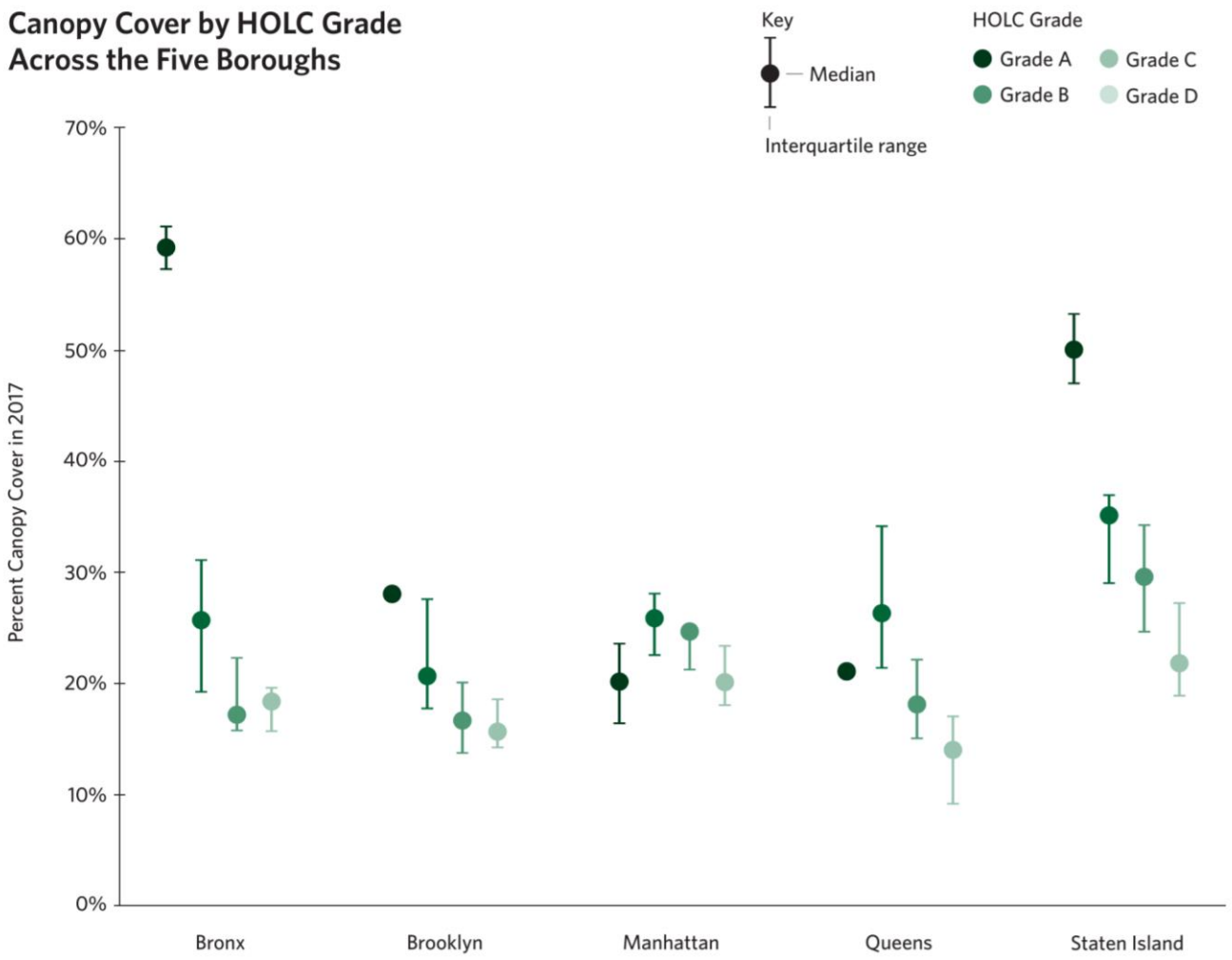
Social Vulnerability Index



Canopy Cover and Income

Street Tree Stocking Rate and Social Vulnerability

History of Redlining



Data sources: Canopy change derived from 2017 Tree Canopy Change (2010–2017) data (NYC Department of Information Technology and Telecommunications); data on HOLC grades are from Nelson, R.K., Winling, L., Marciano, R., Connolly, N. et al. Mapping inequality. American Panorama, ed. Nelson, R.K., and Ayers, E.L. Available: https://dsl.richmond.edu/panorama/redlining/

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

Policy	Rules and Regulations	Programs and Initiatives	Strategic Plans
New York City			
NYC Administrative Code Tit. 18 Ch. 1: Department of Parks and Recreation	●		
NYC Rules Tit. 43 Ch. 6: City Environmental Quality Review *	●		
NYC Rules Tit. 56 Ch. 1: Use of Parks	●		
NYC Rules Tit. 56 Ch. 5: Rules Governing Tree Replacement	●		
NYC Zoning Resolution	●		
Cool Neighborhoods NYC—A Comprehensive Approach to Keep Communities Safe in Extreme Heat		●	
Forest Management Framework for New York City			●
New York City Green Infrastructure Plan—A Sustainable Strategy for Clean Waterways			●
PlaNYC 2030: A Greener, Greater New York			●
PlaNYC: Update April 2011			●
One New York: The Plan for a Strong and Just City (OneNYC)			●
OneNYC 2050: Building a Strong and Safe City			●
New York State			
NY Codes, Rules and Regulations Tit. 9 Subtitle I: Office of Parks, Recreation and Historic Preservation	●		
NY Consolidated Laws, Environmental Conservation Law Art. 8: Environmental Quality Review**	●		
NY Consolidated Laws, General Municipal Law Art. 5 §96-b: Tree Conservation	●		
NY Consolidated Laws, Real Property Actions and Proceedings Law Art. 8 §861	●		
NYS Urban and Community Forestry Program		●	
NYS Forest Action Plan			●
Federal Government			
Code of Federal Regulations Tit. 36 Ch. 1: National Park Service, Department of the Interior	●		
U.S. Code Tit. 42 Ch. 55: National Environmental Policy***	●		
U.S. National Park Service Federal Lands to Parks Program		●	
USDA Forest Service - NYC Urban Field Station		●	
National Urban and Community Forestry Advisory Council Challenge Cost-Share Grant Program		●	
National Urban and Community Forestry Advisory Council Ten-Year Urban Forestry Action Plan: 2016–2026			●

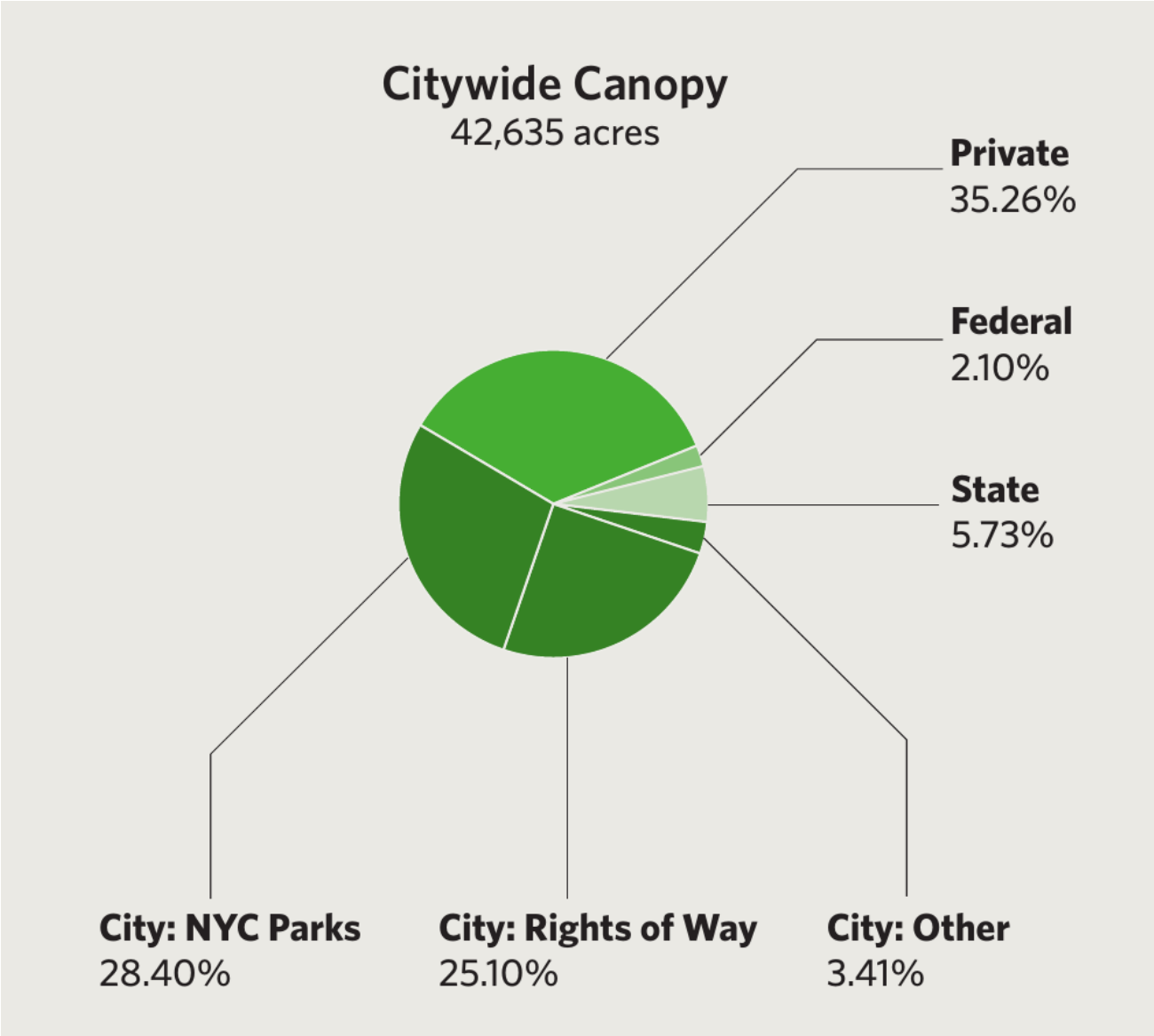
* Pursuant to Executive Order No. 91 of 1977, As Amended.

** Pursuant to New York's Environmental Quality Review Act of 1975.

***Pursuant to the National Environmental Policy Act of 1969.

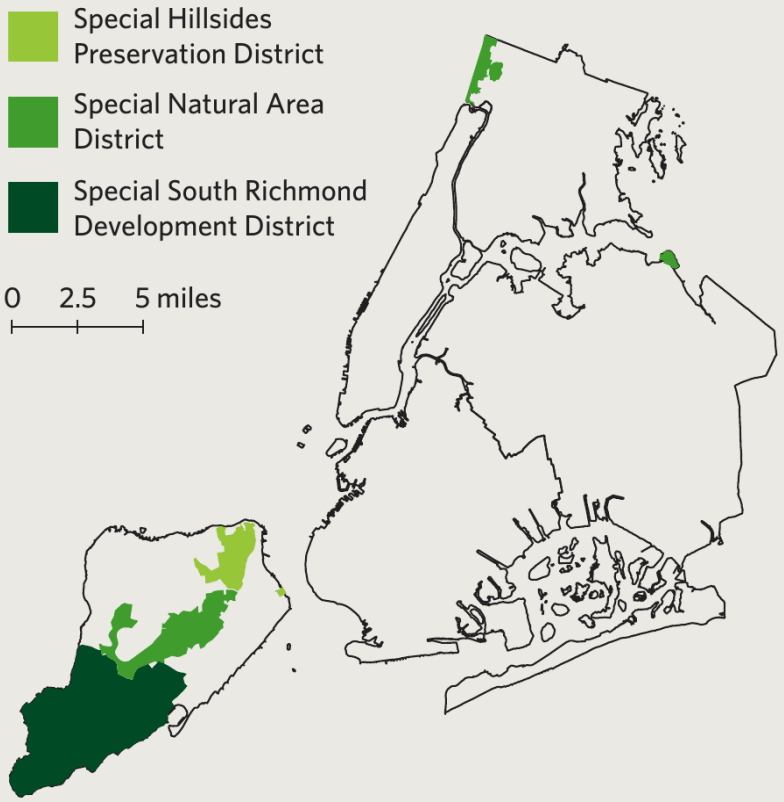
Table 5.1 Examples of policies, programs, and plans that affect the NYC urban forest, organized by the associated level of government.

NYC Parks Jurisdiction

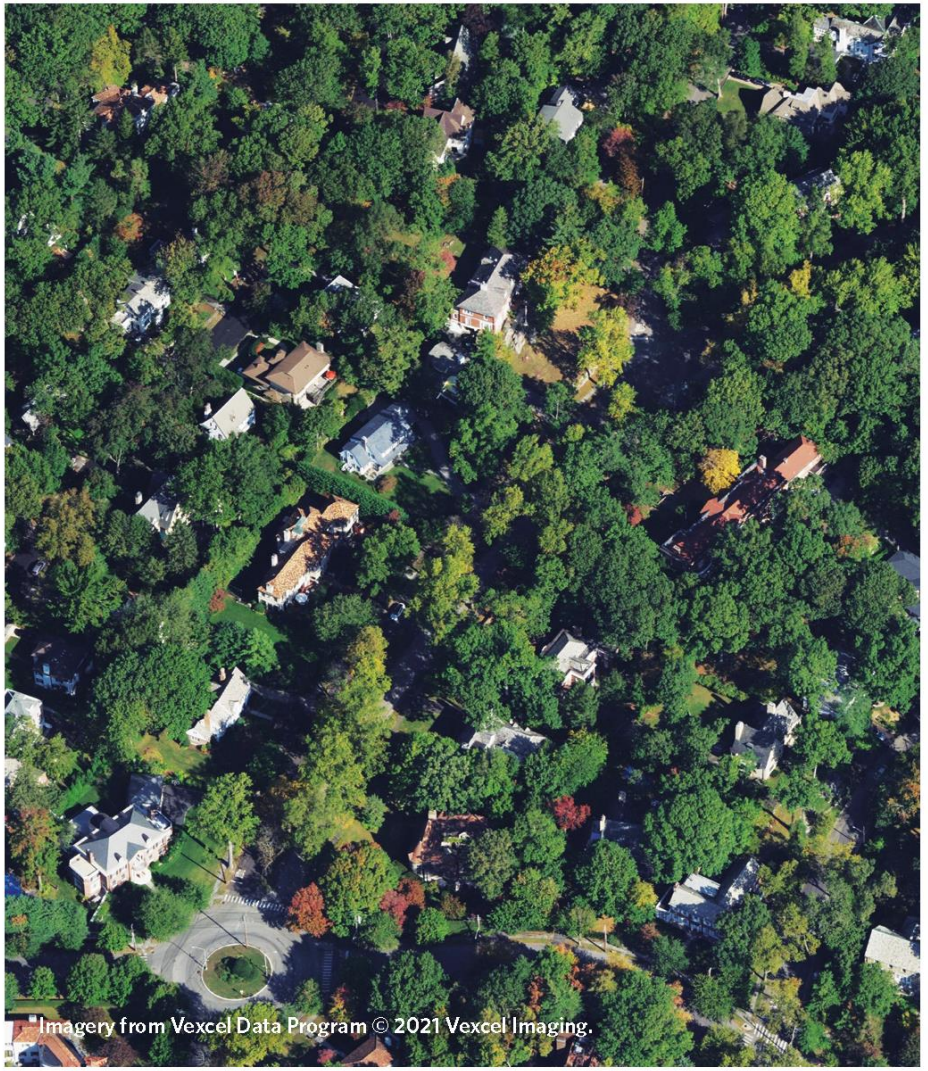


Special Purpose Districts

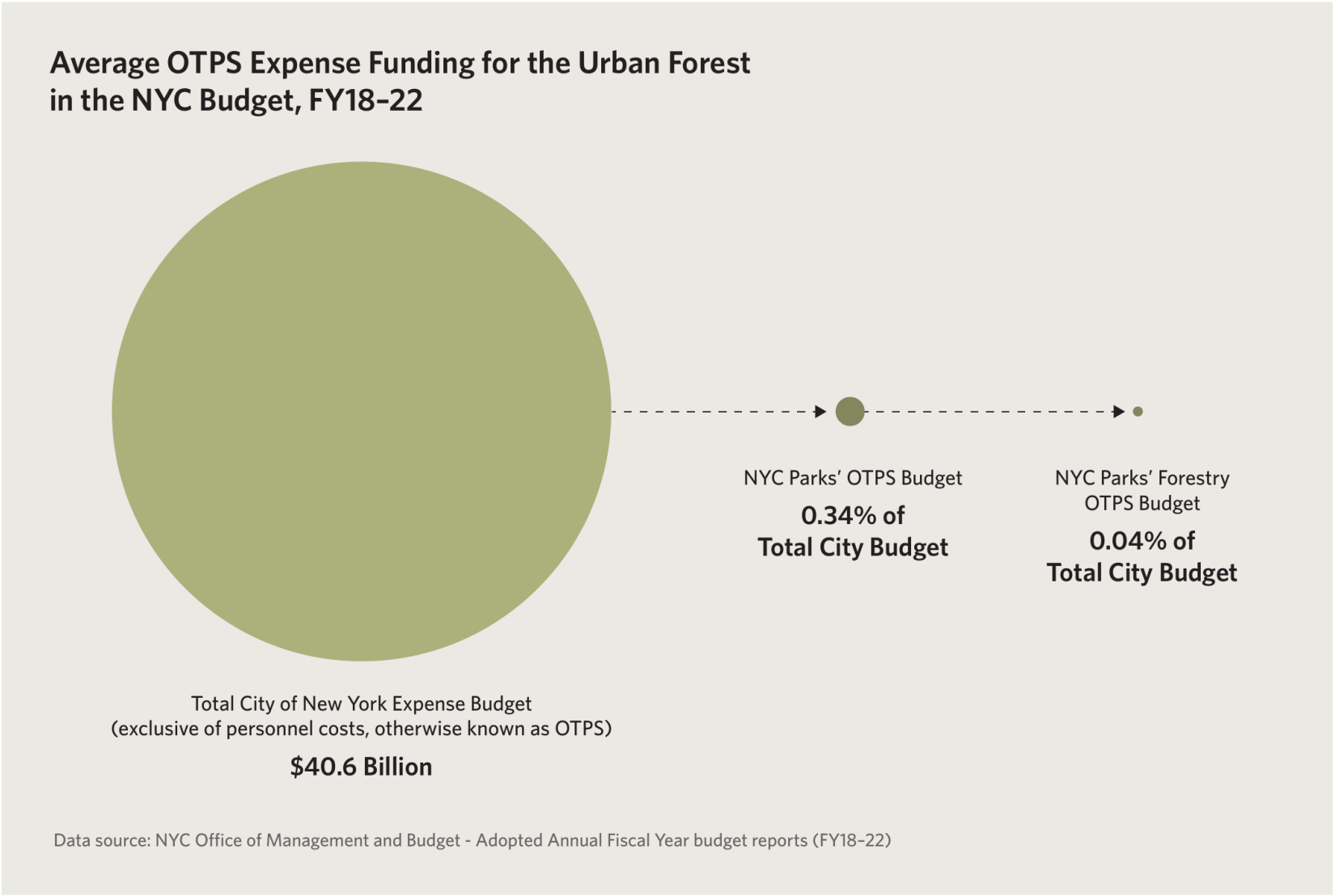
Map of the Special Natural Area, Special South Richmond, and Special Hillsides Preservation Districts



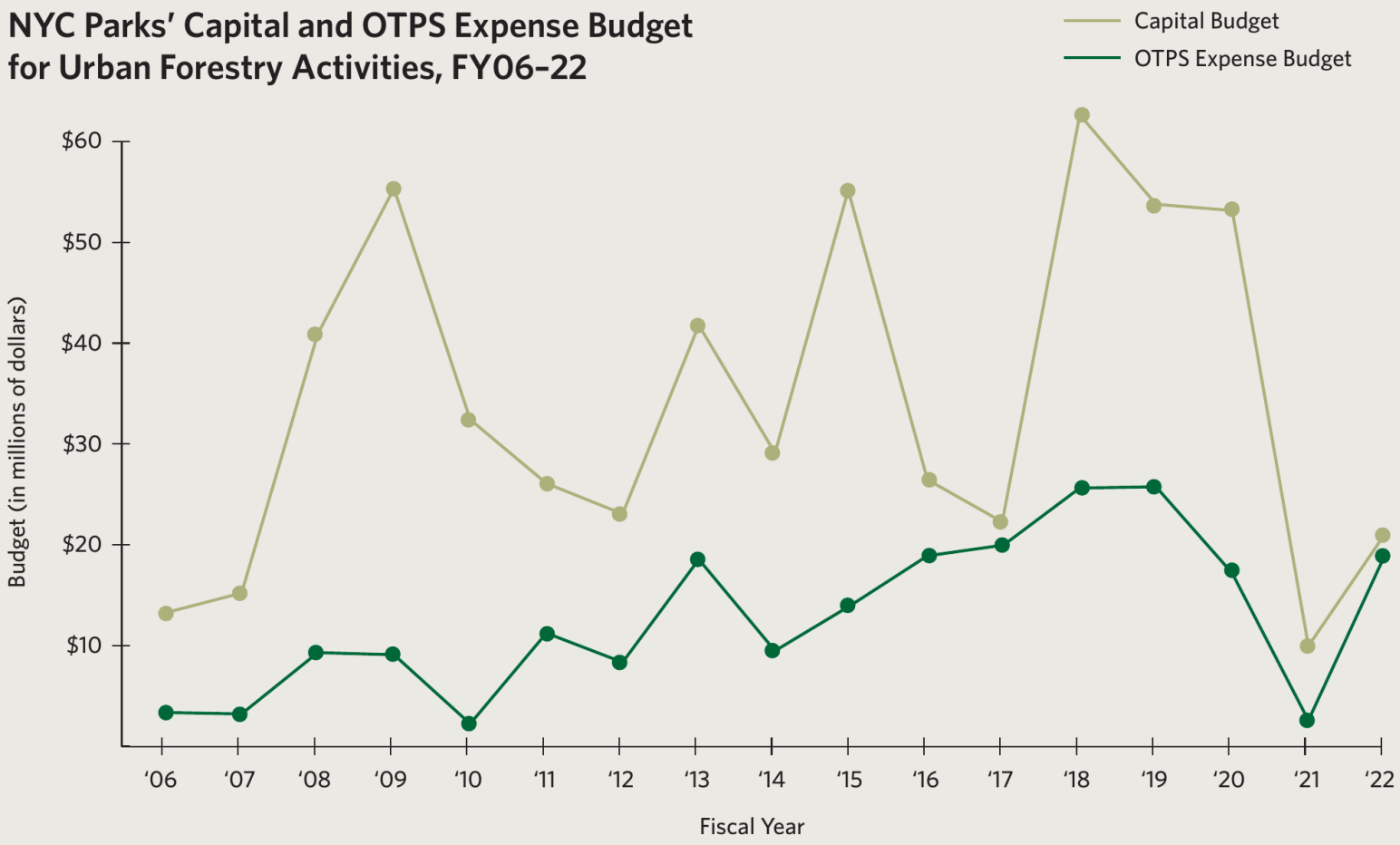
Data Source: Special Purpose District and Borough boundaries from NYC Department of City Planning.



Insufficient Funding

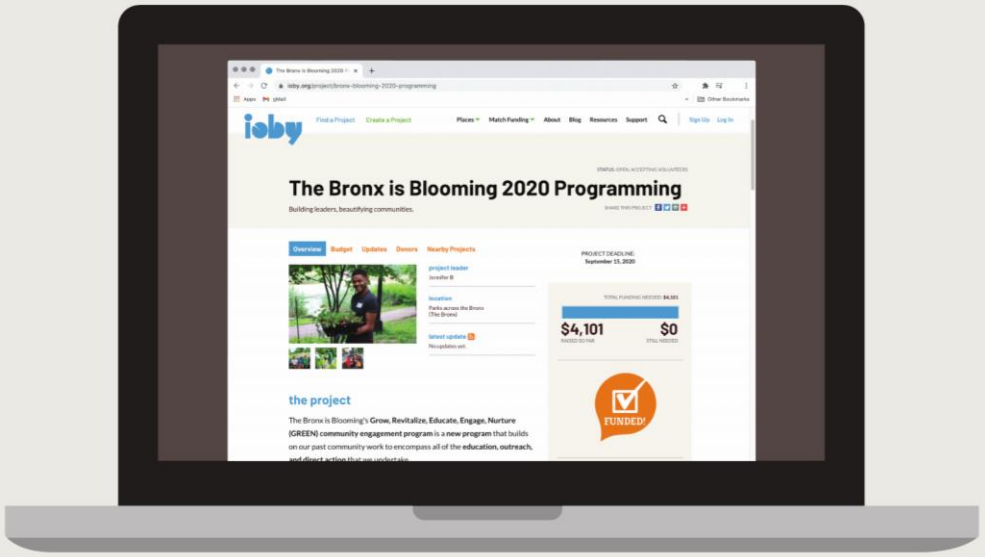


Insecure Funding



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

Private Sources of Funding

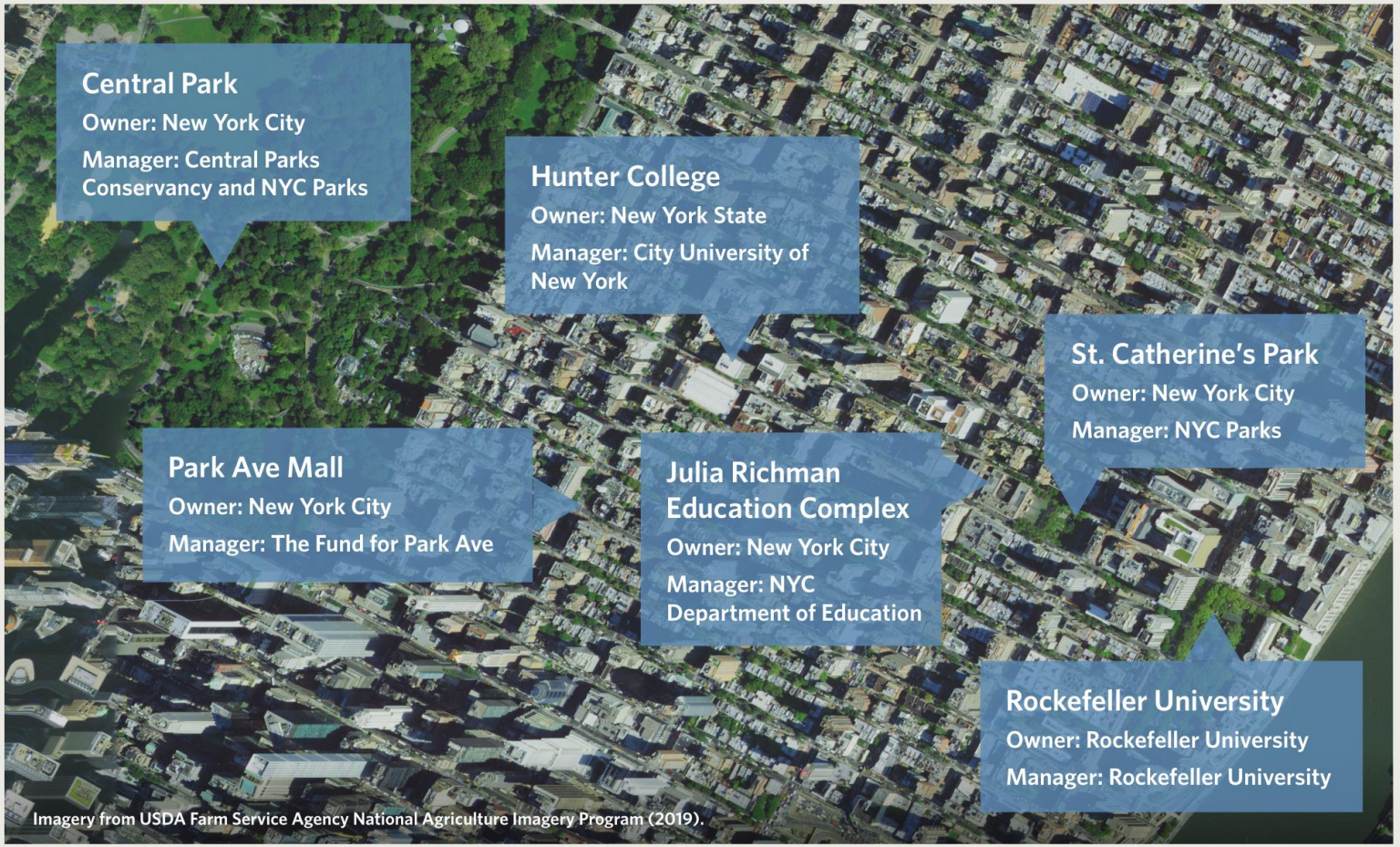


Screen capture from: ioby, https://ioby.org/project/bronx-blooming-2020-programming

A limited list...

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

Complex Landscape of Management



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

NYC Parks Management

Photo credit: iStock.com/James Andrews

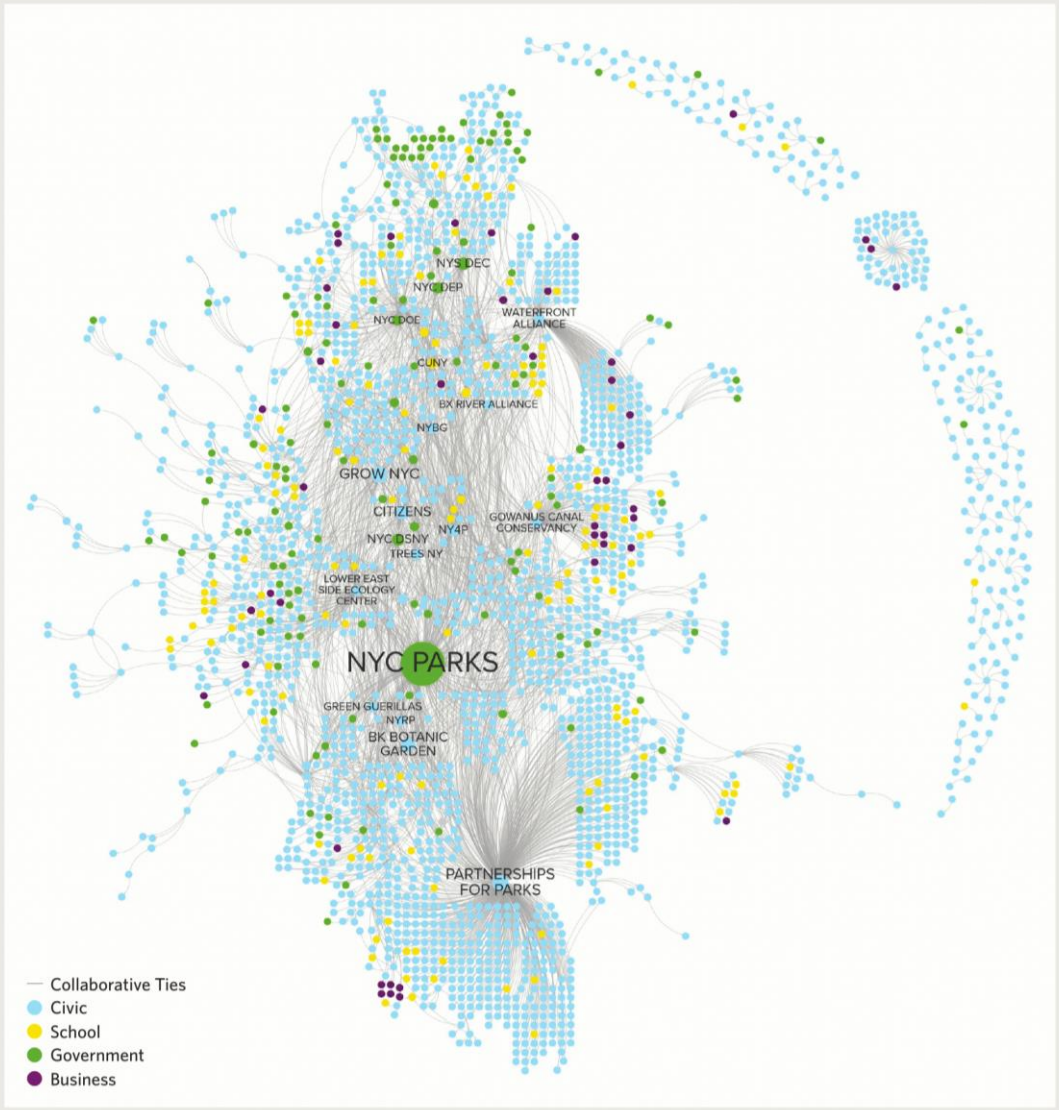
Stewardship

Photo by Natural Areas Conservancy

Photo by Lilian Przedecki

Environmental Stewardship Groups

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



Adapted from: Landau, L., Campbell, L. K., Johnson, M., Svendsen, E., & Berman, H. (2019). STEW-MAP in the New York City region: Results of the stewardship mapping and assessment project, 2017 (General Technical Report NRS-189; 1-69). USDA Forest Service, Northeastern Research Station.

People Like Trees and Nature

Photo by Nina Browne, courtesy of Brooklyn Botanic Garden.

Photo by Nina Browne, courtesy of Brooklyn Botanic Garden.

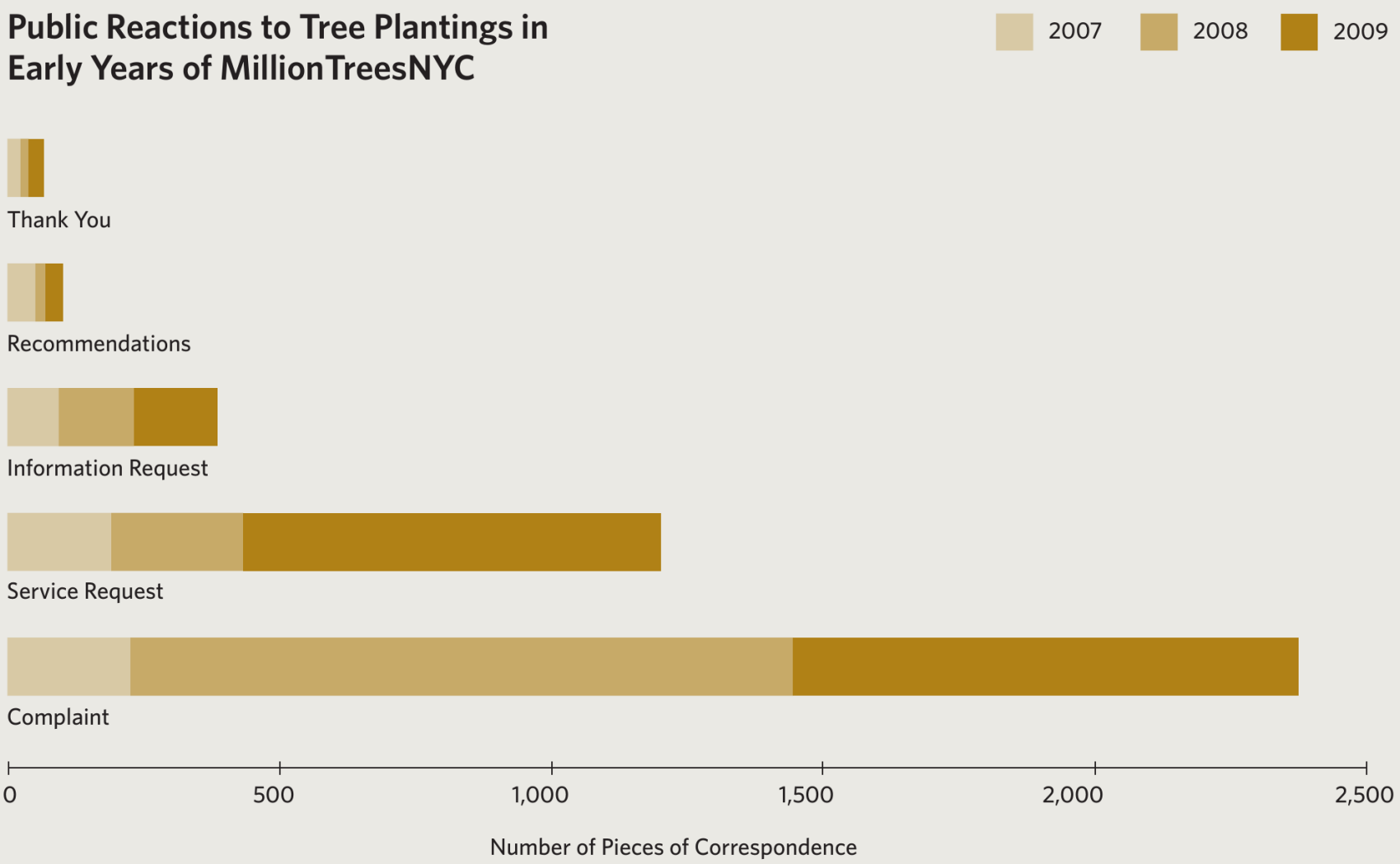
Photo by Brooklyn Botanic Garden staff.

Photo by Amy Musick, courtesy of Brooklyn Botanic Garden.

Photo by Brooklyn Botanic Garden staff.

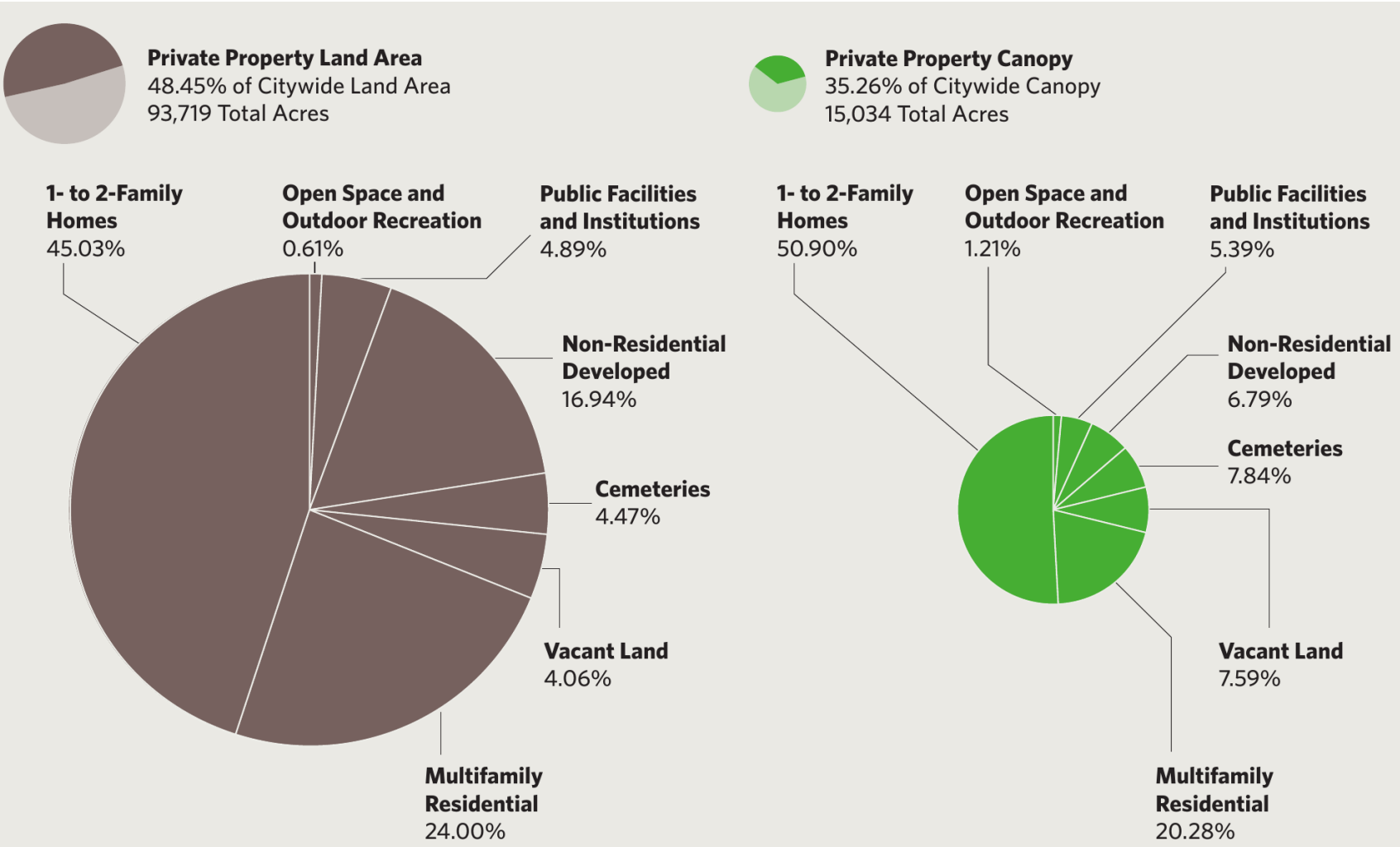
Photo by Jonathan Grassi.

An Engaged Public



Data source: Rae, R. A., Simon, G., & Braden, J. (2010). Public reactions to new street tree planting. Cities and the Environment, 3(1), Article 10.

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

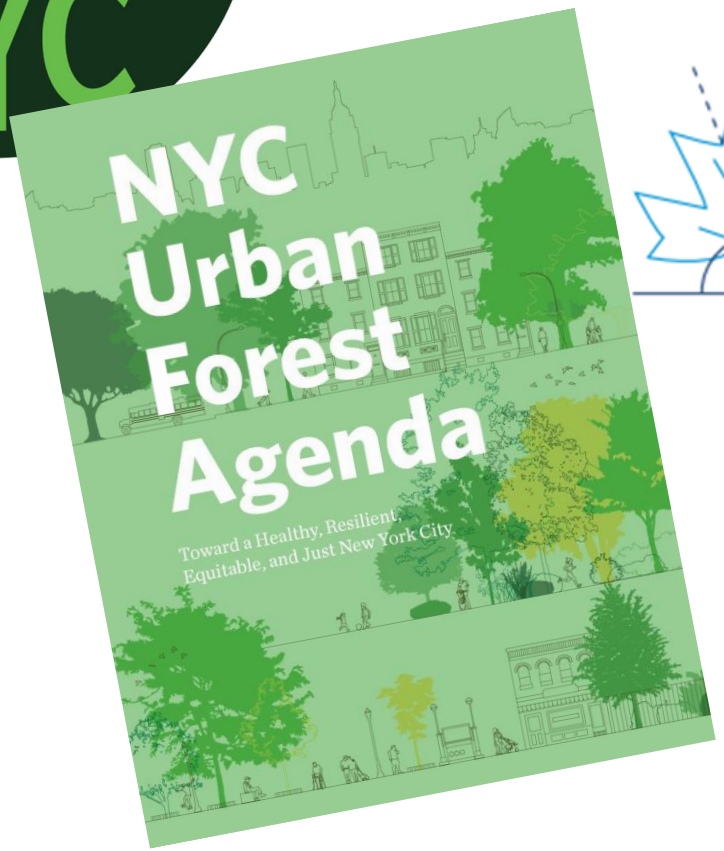

Photo by iStock.com/Terraxplorer

Challenges


Photo by NYC Department of Parks and Recreation

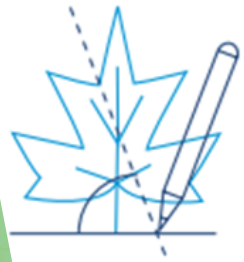
- Inequitable distribution of urban forest
- Patchwork of policies
- Insufficient and insecure funding
- Limited knowledge of NYC residents' attitudes
- Climate change
- Pests and diseases

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:

Questions?

The Nature Conservancy

Photo by Diane Cook and Len Jenshel