MillionTreesNYC: Growing an Urban Forest through Public-Private Partnerships

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Abstract: One of the central initiatives of PlaNYC was the MillionTreesNYC campaign, which has altered the civic and physical landscape of New York City and made it a more hospitable, comfortable, healthier, and more beautiful place to live. While urban forestry efforts in New York City began before the Bloomberg administration, MillionTreesNYC was a significant investment that resulted in both lasting change to New York City's urban forest including the development of new research-practice models, public-private partnerships, and community stewardship capacities. The rapid scaling of MillionTreesNYC represents a pivotal moment when urban canopy cover began to be understood as critical infrastructure, akin to the provision of housing, water, streets, and sanitation. The initiative, completed two years ahead of schedule, led to a wide range of operational improvements across NYC Parks and other city agencies, and its legacy has had a lasting impact on City operations. The initiatives have been equity-driven, science-based, and deeply reliant on both monitoring and public engagement for tree planting and care. MillionTreesNYC was considered by New Yorkers to be a successful campaign in its citywide approach and ability to leverage co-benefits, strengthening place attachment, social trust, and advancing the field of urban forestry. Cities in many parts of the country, and the world, sought to adopt similar programs, setting goals for two million to 200 million trees. As successful as the campaign was in New York City, the funded programs did not continue in their original form, and funding for continued maintenance and care remains episodic and unstable.

Key messages:

- MillionTreesNYC was a successful PlaNYC initiative due to a strong mayoral commitment, deep partnership between public and private entities, and the centering of science-driven management in influencing and expanding successful existing programs.
- Nature-based solutions require investment in both capital and maintenance. As with any major capital initiative, tensions arose among stakeholders about the sufficiency of funding for long-term maintenance and care, and there were questions of survivorship of the one million trees and perceived risk and responsibility for residents.
- The campaign catalyzed a long-lasting urban forestry movement that engaged hundreds of organizations and thousands of individual volunteers, creating unprecedented community participation in environmental stewardship

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1. Enabling Conditions: New York City Forestry Before MillionTreesNYC

Following the grave cuts to NYC Parks in the 1970's and again in response to the 1990 fiscal crisis, the City of New York Department of Parks and Recreation (NYC Parks) slowly built a respected and effective forestry program through reorganization of agency departments and divisions, strategic use of data, and day-to-day engagement of forestry professionals with New Yorkers. Laws and regulations protecting trees under NYC Parks' jurisdiction were in place as early as 1980. These structural systems and prescient planning provided the enabling conditions for MillionTreesNYC's (MTNYC) success.

In 1995 and 2005, Parks led comprehensive street tree censuses, counting each tree and documenting its size, species, health and location. These counts served as the basis for analytics, fed into a database and improved operations[1]. They also engaged the public through volunteer tree counters, by linking data directly to the City's 311 customer service system, community responsive pilot programs, and tree care volunteer programming that ultimately created a new constituency for the City's trees.

Even before the launch of MTNYC, City capital dollars, managed closely by experienced City staff, funded private contractors to plant street trees- the vast majority of which responded to public requests. This program planted about 9,000 trees per year prior to the start of MTNYC. Smaller scale tree planting programs engaged volunteers, private donors, and partner non-profit organizations (e.g. Trees New York and the New York Tree Trust - now TreeTime). To provide ongoing maintenance, Parks kept a 10-year street tree pruning cycle on target with relatively stable funding engaging private contractors. In-house climbers and pruners responded to the most time sensitive tree conditions.

A small (~$25K) New York State Department of Environmental Conservation grant and the developing relationship with Greening for Breathing, a community organization in the Hunts Point section of the Bronx allowed Parks and The New York Tree Trust to create a Community Forestry Plan for the neighborhood in 2003.[1] Through the engagement of local residents, this plan envisioned a fully planted and supported Hunts Point urban forest, laying out specific targets and partners over a 5-year period. The success of this first plan (measured by community engagement and the creation of operationally useful information) led to the creation of the Trees for Public Health program- a series of community forestry plans for five more neighborhoods, similar to Hunts Point, suffering from high childhood asthma rates with fewer street trees. This program was informed by data from Community Health Surveys conducted by the NYC Department of Health and Mental Hygiene.[2]

Understanding and management of NYC Parks' natural area forests followed a similar trajectory. NYC Parks' Natural Resources Group (NRG) was founded in 1984, and the early work of that team was focused on exploration and ecological assessment of natural area parkland, which resulted in the creation of a Forever Wild initiative to protect and preserve unique ecosystems with rare plants and intact habitats. Their work also included vegetation monitoring reports, park natural areas management plans, and the creation of public-facing materials such as pamphlets and maps that educated New Yorkers about wild

[1] For example, the 1995 census led to the removal of all standing dead street trees and faster resolution of dead tree removal service requests. Both efforts informed funding allocations to reflect needs by precise locations.

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nature in their City. The team implemented forest and wetland restoration projects, using a combination of grant funding and environmental damage settlement funds (e.g., $15 million from Exxon in natural resources damages for restoration and remediation after the Arthur Kill oil spill[3]). The earliest forest restoration projects at NRG were in Northern Manhattan and the Bronx in the 1990s, funded by the Lila Wallace-Reader's Digest Fund. The grant funding was used to hire staff to remove invasive trees such as the allelopathic and overcompetitive Norway maple, and plant hundreds of native trees in their place.

This work, the staff, the systems, the data, and community engagement across NYC Parks' entire urban forest was all in place as Mayor Bloomberg began the PlaNYC effort during his second term. City Hall valued the information and expertise "from the field" as a form of enabling capital.

The authors of this paper also acknowledge our past and present organizational affiliations with NYC Parks and the US Forest Service, agencies that played key roles in the development and implementation of MillionTreesNYC. This positionality shapes the perspectives we bring to this paper. During the MillionTreesNYC campaign, KLK, JG, NA, and BO worked at NYC Parks, and LKC and ES worked at the US Forest Service. KLK joined NYC Parks as a street tree planting forester in 2008 and is currently Chief of the Natural Resources Group. LKC joined the US Forest Service as Community Planning Technician in 2003 and is currently Research Social Scientist and author of a book on PlaNYC and MillionTreesNYC. JG became the Acting Director of MillionTreesNYC at NYC Parks in 2007 and retired in 2025 from her role as the Assistant Commissioner of Forestry, Horticulture, and Natural Resources. NA joined NYC Parks as Urban Field Station Lab Manager in 2013 and is currently Director of Research & Monitoring. ES was Research Social Scientist and Team Leader of the NYC Urban Field Station from 2002 to 2026. BO joined NYC Parks as a Forester in 2007 and is currently Assistant Commissioner of Forestry.

2. **Goal Setting and Program development**

During Bloomberg's second term, PlaNYC was in early stages of development as part of the City's Strategic Land Use Planning Process led by Deputy Mayor Daniel Doctoroff in 2005. City Hall posed the following challenge to agencies: "given an increase in 1 million new residents in New York City by 2030, how can municipal resources be used most efficiently and effectively to serve those residents?" This prompt led NYC Parks staff to leverage research and data to make a pitch for massive investment in the City's urban forest. Fiona Watt, then NYC Parks Chief of Forestry and Horticulture (CFH), was ready with information her division had spent years collecting, organizing, and analyzing through data management systems, GIS and remote sensing studies, and a field-based tree census collected by staff and volunteers.[4]

New technology and analyses led by Jarlath O'Neil Dunne of University of Vermont and J. Morgan Grove of the US Forest Service created urban tree canopy (UTC) reports for Baltimore and Chicago, and ultimately a report for New York City in 2006 that was, by far, their biggest challenge to date. The report found that existing canopy cover was 24%, and made recommendations for

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how and where New York City could increase tree canopy to 30% cover. This goal was based upon Luley and Bond's[5] analysis and recommendation that New York City increase UTC to 30% to significantly mitigate ozone related air quality in the City[6]. Data from the 2005 NYC Street Tree Census was used to develop a report based on a US Forest Service model called STRATUM (Street Tree Resource Analysis Tools for Urban Forest Managers). STRATUM offered a quantitative—and monetized— view of the street tree population, based on estimates of the value of ecosystem services[7]. Also in 2007, another US Forest Service tool called UFORE (Urban Forest Effects, to become i-Tree Eco) analyzed ecosystem service benefits of all of New York City's trees and quantified pollution removal, carbon storage and sequestration, building energy use reduction, avoided carbon emissions, and structural value of trees.[8]

NYC Parks staff worked alongside US Forest Service staff including Morgan Grove and David Nowak via the Baltimore and New York City Urban Field Stations (see https://research.fs.usda.gov/nrs/centers/nyc), to compile and present this clear and compelling research. The founding of the NYC Urban Field Station as a partnership between the US Forest Service and NYC Parks in 2006 contributed to the strong research-based argument for the present and future value of urban trees (see https://research.fs.usda.gov/nrs/centers/nyc). The Urban Field Station was the result of unique interest from Michael T. Rains, then Director of the US Forest Service, Northern Research Station and NYC Urban Field Station Team Leader Erika Svendsen, leading out an emerging network of urban science practitioners in the agency and supporting research-practice coalitions like the Urban Ecology Collaborative (https://urbanecologycollaborative.com/) focused on the northeast and midatlantic. Funding from the federal level for urban tree canopy measurement studies, visits by two Forest Service chiefs and the then Secretary of Agriculture, brought more attention to this work.

Ultimately, the presentation of scientific evidence of costs and benefits of urban tree canopy to the mayor and his staff resulted in an "aha" moment that crystallized support for undertaking an ambitious, large-scale tree planting campaign. Using science to quantify benefits and the bottom line for New Yorkers greatly appealed to the business-oriented mayor,[9] who was especially compelled by the potential of trees to increase real estate values. Then-NYC Parks commissioner Adrian Benepe was quoted in the *New York Times* as saying: "Trees are great for a variety of reasons, but how do you explain that to the Office of Management and Budget? . . . We plan on using these values as a baseline to say that this is what we have now, and argue for additional funds to plant more trees".[10] NYC Parks also knew the exact cost to plant a tree in New York City via its street tree contracting system. Overall, City leadership found that street trees in NYC represented a sound investment- specifically a 5:1 return of $122 million from a $22 million investment.[11]

Concurrently but separate from the government's planning, New York Restoration Project (NYRP), a nonprofit environmental group in New York City, also became interested in tree planting. At NYRP's 2006 spring picnic fundraiser, the organization's founder, entertainer Bette Midler, announced that she wanted to "plant one million trees" in New York City. The announcement surprised many of the long-time staff of NYRP and NYC Parks, as NYRP did not have a forestry agenda or expertise at the time. Midler was

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inspired by the flora in her home and upbringing in Hawaii and motivated by Los Angeles' own Million Tree Initiative. She announced the goal in 2006, and her celebrity offered her a platform for gaining an audience with officials at the levers of power, while her interest represented an easily-identifiable human and emotional response to urban environmental degradation. And vice versa, city officials were equally eager to partner with high-powered outsiders, as the mayor had a track record of developing and funding innovative programs with prominent individuals. More specifically, Midler and NYRP Executive Director Drew Becher made a pitch for the million trees partnership with Deputy Mayor Patti Harris, a key gatekeeper to Bloomberg.

After the declaration at the NYRP spring picnic, Bloomberg and his staff, Benepe, Midler, and Becher worked—initially via a closed door process—to craft a shared tree planting campaign capable of generating excitement through a unique and novel partnership that leveraged celebrity but leaned on science. The story of a serendipitous collaboration between Midler and Bloomberg has been reified. Midler tweeted on January 6, 2016, after the completion of the campaign, "So @MikeBloomberg & I turned to each other & said 'Let's plant 1mil trees in #NYC!'.[12]

The goals and initiatives related to tree planting in PlaNYC were found in the section devoted to open space but also in sections focusing on water quality, air quality, and climate change. See table for a complete list of tree-related initiatives in PlaNYC.

Table 1. Tree-related initiatives in PlaNYC (2007), as compiled in Campbell[13]

Chapter	**Goal**	**Initiative**	**Target Actions**
Open space	Re-imagine the public realm	Green the cityscape	Raise street-tree stocking level to 100 percent by planting approximately 23,000 additional trees annually (p38) Expand the Greenstreets program by undertaking 40 new projects every planting season,

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			bringing citywide total to more than 3,000 by 2030 (p38)
Water quality	Pursue proven solutions to prevent storm water from entering the system	Capture the benefits of our open-space plan	Expand the Greenstreets program Increase the number of trees in the city by one million (p57)
	Expand, track, and analyze new Best Management Practices (BMPs) on a broad scale	Pilot promising BMPs	Plant trees with improved pit designs (p59)
	Expand, track, and analyze new Best Management Practices (BMPs) on a broad scale	Require greening of parking lots	Modify zoning resolution to include design guidelines for off-street parking lots that include trees and landscaping (p60)

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Air quality	Pursue natural solutions to improve air quality	Capture the benefits of the open-space plan	Support street tree planting by revising zoning code to require new construction and major redevelopment to plant one street tree/25 sq ft of frontage Prioritize planting in neighborhoods with lowest stocking levels and highest air-quality concerns (p128)
	Pursue natural solutions to improve air quality	Increase tree planting on lots	Reforest approximately 2,000 acres of parkland by 2017 at cost of $117 million (p128) Partner with stakeholders to help plant one million trees by 2017 (p129)

Staff in the Mayor's Office were initially skeptical that a 30 percent goal was achievable in the highly developed environment of New York City. They believed that a simple numeric goal would be more legible to the public and trackable by managers. One million trees was called a "sexy number," and had value in being good for marketing and branding.[14] In response to this, Fiona Watt of NYC Parks staff made "back of the envelope" calculations to show that the growth from one million new trees would be roughly equivalent to the 6 percent canopy increase that the city sought to achieve. With this calculation, the two different types of goals were merged into one single goal: planting a million trees, with an original timeline as a 10 year campaign from 2007-2017. In fact, the million trees goal was released to reporters one day in advance of the public release of PlaNYC on April 22, 2007. At the time, the

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tree planting goal was viewed as a “feel good” issue, in contrast to the political divisiveness of goals like congestion pricing. The MillionTreesNYC campaign was then officially launched on October 9, 2007.[15]

3. Program Implementation:

In order to meet the ambitious goal and aggressive timeline, the City and its partners met a number of fundamental challenges through creative approaches and rapid scaling. MillionTreesNYC was successful because of a combination of politically-backed funding and innovation, a skilled and ready NYC Parks workforce, and a committed NGO/partner community.

3.1 Funding and Financing

PlaNYC included $330 million in municipal capital funding for MillionTreesNYC, and, when combined with the rest of the PlaNYC Parks funded initiatives (totaling over $1 Billion to Parks), was the largest investment in urban parkland since the Robert Moses era of the mid-twentieth century. In addition to municipal funding, the campaign attracted federal funding and secured $30 million of private funding from lead supporters and sponsors: Bloomberg Philanthropies, The Rockefeller Brothers Foundation, Toyota, BNP Paribas, and Home Depot.[16]

Table 2. Funding sources and distribution across tree planting and care programs during MillionTreesNYC.

	Total
Public Funding	
Capital Funding - Street Tree Planting	**$283,939,000**
Capital Funding - Reforestation Planting	**$45,452,000**
NYC Service Funding - Stewardship	**$874,500**
Expense Funding - 7-year Pruning Cycle	**$2,700,000**
Expense Funding - Stump removal	**$2,000,000**
Public Funding - MTNYC Training Program (MTTP)	**$3,050,000***
Public Funding Subtotal	**$333,315,500**
Private Funding	
Private Funding - Lead Supporters and Sponsors	**$30,000,000**
Private Funding - MTTP	**$1,610,000**

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Private Funding Subtotal	**$31,610,000**
Total Funding for MillionTreesNYC	**$364,925,500**

*$2M of this total came from American Recovery and Reinvestment Act (ARRA) of 2009 via USDA for job placement of MTTP graduates.

3.2 Procedural and Operational Considerations

Are there enough trees on the market for 10 years? City Hall asked this basic question on day one. NYC Parks knew there may be enough trees, but the trees were not necessarily the right trees for NYC. There was also no mechanism for ensuring a steady supply of quality plant material. With the full support of City Hall, the Mayor's Office of Contracts and City Law worked closely with Jennifer Greenfeld, then Director of Street Tree Planting at NYC Parks, to develop long-term procurement contracts directly between Parks and growers.

These new contracts shifted the long-standing dynamic for street trees where NYC Parks had relied upon installation contractors to source trees. The City was now purchasing the trees directly from growers, resulting in significant oversight of the entire growing process - from seed source to species diversity, harvesting and transport. With hesitation from nurseries and resistance from installation contractors NYC Parks carefully designed procurement contracts to address their concerns. For example, to address the concern that the City was locking in prices for nine years - the length of the street tree procurement contracts - the contracts included a one-time price increase part-way through to adjust to the Consumer Price Index (CPI). Installation contracts felt uncomfortable guaranteeing trees, as required by their contracts, that they had not selected. So Parks built in an option for contractors to reject trees upon delivery. The City was successful in attracting qualified bidders with three contracts awarded. Over the course of the contract, quality increased, supply was assured, and species diversity grew from 52 species and cultivars to over 235.

To hit reforestation targets, Parks required native containerized trees. These trees were not available on the market at the scale necessary for the initiative. Parks contracts for native plant material derived from regional genotypes. The contracts required specific seed collection methodology and subsequent proof of seed provenance within 300 miles of the planting sites for the first two years of the contract, and then 150 miles of the planting site for the remaining years of the initiative. These contracts were ultimately awarded to three nurseries, and resulted in the procurement of over 300,000 containerized native trees for forest plantings in New York City, with the rest coming from traditional nurseries on the open market, procured by contractors. Prior to the initiative, NYC

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Parks planted twenty different native tree species in natural areas of parks, and these contracts allowed for procurement of fifty-five different native species, more than doubling the previous planting palette.

Where to plant the trees and how to prioritize? Based upon the 2006 UTC report, NYC Parks generally understood where the greatest potential for tree planting was within the different typologies: e.g. street, park, forest, private backyards, institutional campuses (Figure 1).

The increase in annual funding for street tree planting from $8 million to $34 million allowed NYC Parks to continue the request-based program while implementing a new top-down approach prioritizing neighborhoods in need (Figure 2). The Trees for Public Health community forestry plans were perfect-made for this new approach. Parks designated six neighborhoods for priority street tree planting based on lack of existing street trees and higher-than-average childhood hospitalization asthma rates. The program resulted in a total of over 19,000 trees planted across Morrisania and Hunts Point in the Bronx, East Harlem in Manhattan, East New York in Brooklyn, Far Rockaway in Queens, and Stapleton in Staten Island, considered fully “stocked” at that point. This effort marked the beginning of the “block planting” program, which increased efficiency and allowed for fully stocking neighborhoods in need. Mayor Bloomberg himself approved the strategy to plant a tree even if the adjacent homeowner did not want it.

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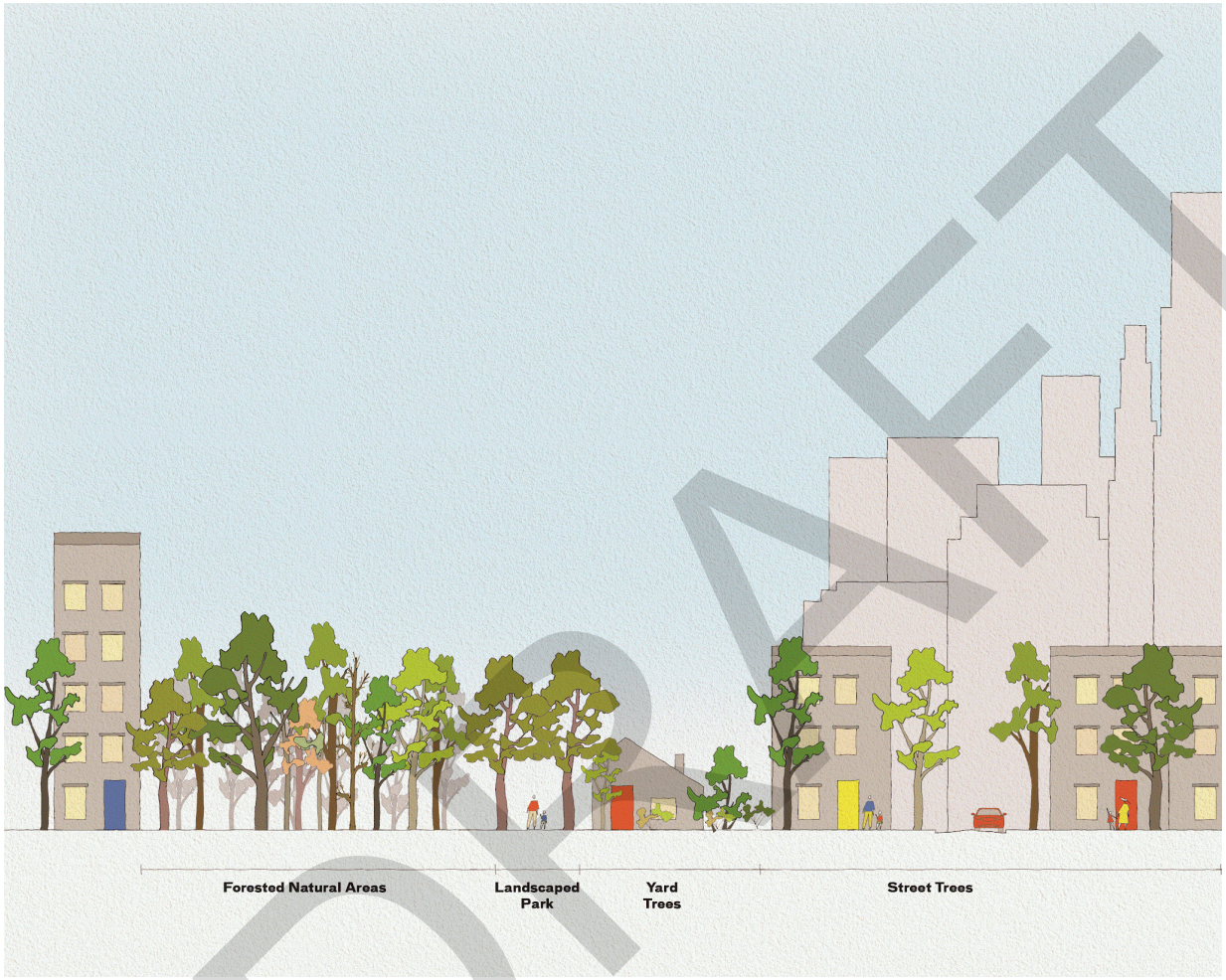


Figure 1. MillionTreesNYC aimed to increase tree canopy across multiple sectors of the urban forest, from forested natural areas, landscaped settings to street trees and private yards. Image courtesy Natural Areas Conservancy.

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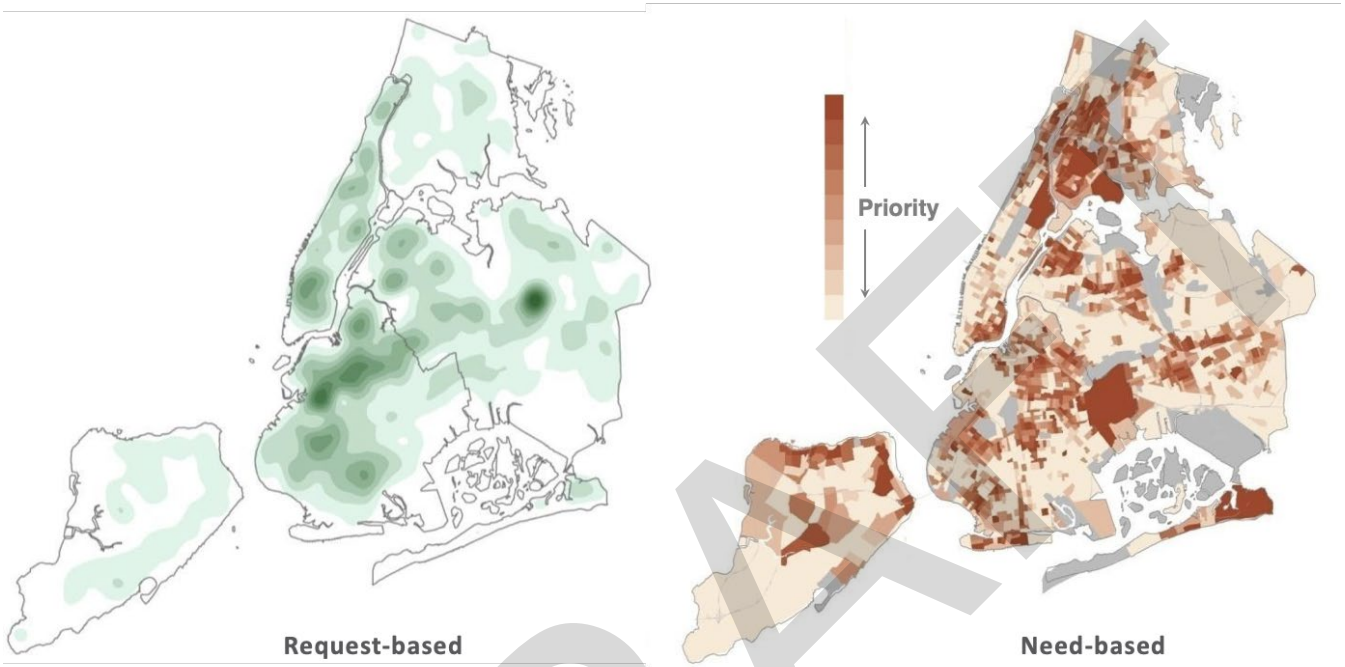


Figure 2: Increased PlaNYC funding for street tree planting allowed Parks to be responsive to tree planting requests while also planting in neighborhoods with fewer requests and greater canopy needs.

To scale up and formalize natural area tree planting, NYC Parks hired a consultant to analyze NYC Parks' properties to identify potential reforestation opportunities. The analysis referenced canopy cover data to identify sites across all parks in the five boroughs, and then further assessed viability by looking at current park uses, soil type and condition, existing vegetation and invasive species, proximity to existing forests, topography and hydrology, historical designs, and community interest. The consultant delivered a book of potential restoration sites.

To meet MillionTreesNYC's aggressive planting goals, site selection focused on opportunities for significant planting - unforested areas without a plan for active park uses, canopy gaps within existing forest, and expansion of forest edges into unprogrammed parkland. NRG staff identified these areas on digital maps, visited the sites to assess local conditions and soil profiles, and advanced projects with approval from NYC Parks operations teams. The first three pilot reforestation sites took place at Kissena Corridor Park and Flushing Meadows Corona Park in Queens, and along the Hutchinson River Parkway in the Bronx. With great pressure to find

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significant opportunities for planting in large quantities, these early sites were a change of focus for the Natural Resources Group since they had not historically been forested. In hindsite, these afforestation sites might have been better served by restoration to historical uses. For example, Kissena Park was the location of a buried stream, and the site identified in Flushing Meadows Corona Park had been a salt marsh.

What new planting practices are needed? NYC Parks staff in the Natural Resources Group, not contractors, customarily performed forest restoration and planting. Both the scale required, and the availability of capital funding for the first time enabled NRG to re-envision their approach to forest restoration. With newly baselined staff and a significant capital budget, NRG developed the first set of capital contract specifications for forest restoration work, turning the knowledge of NRG staff into detailed descriptions of how to perform invasive plant removal and how to plant and care for two-gallon containerized trees. After 2-3 years, the forest restoration program transitioned from contractor tree planting to volunteer planting events. While this change was primarily driven by cost savings, these massive volunteer events ultimately provided significant added value to the initiative as a whole, as described later in this paper.

New programs were also needed for properties not under NYC Park's jurisdiction. Parks developed a partnership with the City University of New York (CUNY) administration, under the leadership of Iris Weinshall, then Vice Chancellor, whose influence eased access to the over 25 campuses across the City. NYRP took the lead working on NYCHA campuses (see later section on Partnerships for details). NYRP also developed a robust tree give-away program targeting private property owners in neighborhoods with the most potential for new canopy and arranged for discounted trees at local businesses.

The administration identified the zoning code as another opportunity to increase the tree count. While mandating planting on private property was proposed during PlaNYC development, it was deemed unpalatable by the private sector and seen as a potential infringement on private property rights. City Hall instead mandated developers to plant on the public right-of-way with each new building or major alteration. Parks worked closely with the Department of City Planning to add new language to the City's zoning code for street tree planting. In 2008, the City Council and City Planning Commission adopted a citywide amendment to the City's Zoning Resolution, requiring street trees for new developments, enlargements of 20% or more, and some changes in use (New York City, NYC Zoning Resolution § 124-32). With these changes, one street tree must be preserved or planted for each 25 feet of property frontage, and NYC Parks was tasked with permitting and enforcement. DCP also instituted changes to planting within parking lots.

How to ensure quality along with quantity? As Parks and its partners scaled up programs, they identified opportunities to increase value. This helped further build goodwill with the public and support from professionals in the field. As a result of the City purchasing

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trees directly from the growers, species diversity vastly increased. Although, more important than species diversity for natural areas was ensuring the genetic diversity and appropriate provenance of the seed source, which improves site adaptability.

To incentivize installation contractors to maintain and water newly planted street trees, contractor guarantees were increased from one to two years. Instead of limiting replacements for dead or dying trees to only once in a guarantee period, contractors were required to replace trees as many times as necessary within those two years. Street tree bed size expanded from a standard 25 square feet to as large as the site could accommodate to further improve survival and good health. To maximize shade and other environmental benefits, foresters now selected a species with the largest mature canopy size for the space.

The need to plant many small trees in forested natural areas required a focus on site preparation to ensure long-term ecological health. Degraded forest sites in NYC require significant remediation, mostly in the form of invasive plant management, debris removal, and sometimes soil amendment, before tree planting can occur. This site improvement added one to three years in advance of planting and increased the cost of forest restoration, initially assumed to be cheap and fast because the trees themselves only cost $10-20 each. City Hall's support of the investment and time required to effectively restore the sites improved planting success. This work resulted in significant learning about best practices to restore degraded urban forests, ultimately documented in a "cookbook" about forest restoration, called "Guidelines for Urban Forest Restoration in New York City"[17]

How to build long-term, widespread support?

Marketing was recognized early as an essential component of MillionTreesNYC. The initiative sought not only to plant one million trees, but also to build public understanding of the many benefits trees provide, encourage volunteer participation, attract corporate and philanthropic support, and foster long-term stewardship of New York City's urban forest. Unlike a traditional government communications campaign, MillionTreesNYC would require sustained public engagement over a ten-year period.

The campaign also presented a unique communications challenge. MillionTreesNYC was one of the first large-scale public-private partnerships built around a citywide environmental initiative, bringing together City government, nonprofit organizations, corporations, foundations, and community groups under a common goal. While tree planting initiatives existed elsewhere, there was no established model for marketing a decade-long campaign of this scale. The communications strategy therefore developed alongside the initiative itself.Compounding this challenge was timing. Following the release of PlaNYC, the official launch date for MillionTreesNYC was established with only a few months' lead time.

To help meet these challenges, MillionTreesNYC partnered in its early years with several successive advertising and marketing agencies that donated strategic planning, branding, and creative services on a pro bono basis. The potential of high visibility and the active encouragement from the Bloomberg Administration motivated participation. These partnerships brought professional expertise

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that enabled the initiative to produce advertising and outreach materials well beyond the resources of a typical municipal program. At the same time, however, the campaign's rapid launch and lack of audience research meant that the creative work became an ongoing process of experimentation. As different agencies contributed new ideas and creative approaches, the campaign evolved organically rather than through a single, long-term communications strategy.

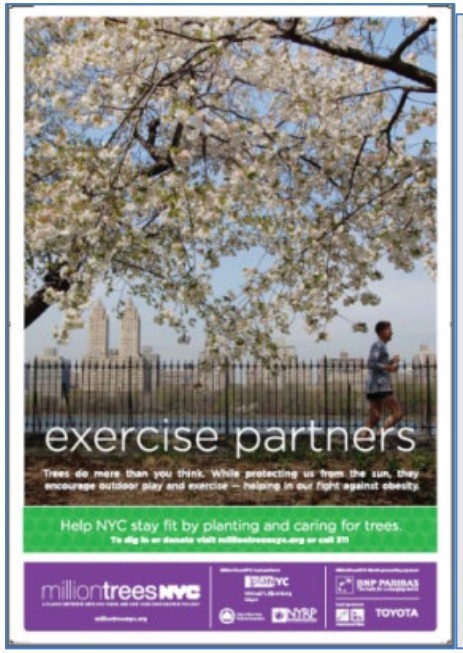
The earliest campaigns focused on introducing MillionTreesNYC to New Yorkers and communicating the environmental, health, and quality-of-life benefits of trees. Seasonal advertising encouraged residents to participate in tree planting events, volunteer opportunities, and educational programs through a broad mix of public service announcements, transit advertising, events, promotional materials, merchandise, educational programming, and partnerships with cultural institutions and community organizations. While these efforts successfully generated awareness and participation, the evolving creative direction also produced multiple messages and visual identities as the campaign sought to determine what resonated most effectively with the public.

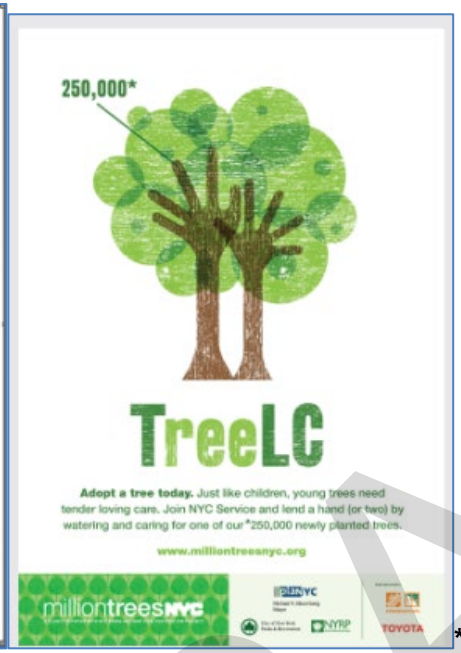
By approximately three years into the initiative, it had become clear that the campaign had achieved broad public awareness but lacked a cohesive brand and strong emotional connection with New Yorkers. Internal assessments concluded that MillionTreesNYC had accumulated "too many messages" and inconsistent creative approaches. In response, the marketing strategy underwent a significant shift in 2011.

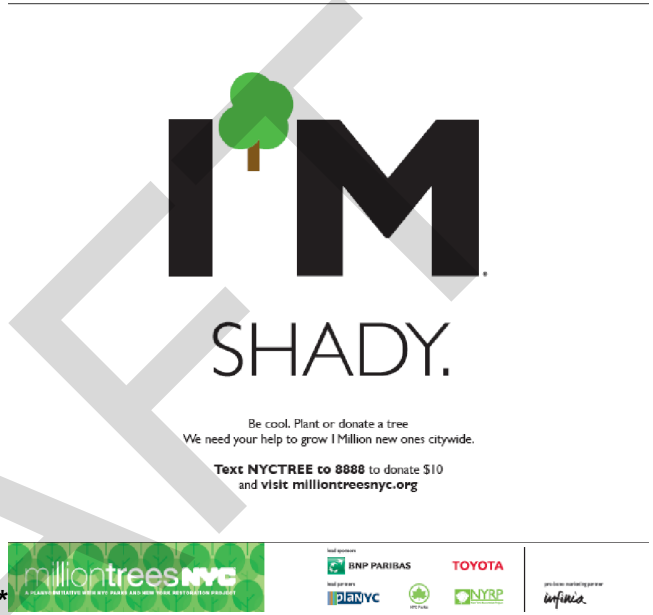
Rather than focusing primarily on promoting tree planting events or communicating the benefits of trees, the campaign began emphasizing a personal relationship between New Yorkers and the urban forest. The objective was to move MillionTreesNYC "from a government-sponsored program to a grass-roots movement that is owned by individual New Yorkers." Achieving this required unifying existing outreach efforts under a cohesive messaging strategy while encouraging residents to see themselves not simply as volunteers at individual events, but as long-term stewards of the city's urban forest.

Figure 3. The evolution of seasonal marketing campaigns for MTNYC, including final installed MTA subway advertisements

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3.3 Partnerships

New York Restoration Project (NYRP)

The primary implementation partner was the New York Restoration Project (NYRP), which focused on planting on non-Parkland, public relations, marketing, tree giveaways, and public events. NYC Parks and NYRP formalized this partnership in the form of a memorandum of understanding in 2008, which detailed their respective roles and responsibilities. NYC Parks would plant on NYC Parks land while NYRP would plant on private land, housing campuses (NYC Housing Authority [NYCHA] properties), and other "publicly accessible private lands".[18] NYRP doubled in size and scope as a result of the initiative: from 2007 to 2010, the organization's budget increased from $6 million to $13 million and added at least 10 full-time staff focused specifically on MillionTreesNYC.[19]

Initially, NYCHA was not specifically named in any of PlaNYC's strategic planning processes or the goals that emerged. NYRP secured a blanket license to plant on NYCHA grounds using its field staff, Americorps members, and corporate volunteers. The NYRP model of bringing in large volunteer groups for single-day planting events was not modified for planting on NYCHA grounds, despite their having a history of isolation, marginalization, and complex—often racialized—politics.[20] NYRP ultimately adjusted their approach and engaged NYCHA through Resident Greening Committees. Even though the relationship between NYRP and NYCHA faced challenges and evolved over time, NYRP had planted nearly twelve thousand trees on NYCHA grounds by fall 2011.[21]

NYRP also planted trees on other publicly accessible private lands, such as the large lawns of Co-Op City in the Bronx, and organized free tree giveaway events at parks and gardens in collaboration with local community organizations. The initiative also tracked what were termed as "influence plantings" that were neither funded nor implemented by NYC Parks or NYRP but by developers and private landowners through NYRP's outreach to planners, landscape and general architects, and developers.[22] Sales information from local tree retailers, such as Home Depot and Lowes, also contributed to the final count of trees planted.[23] The goal of involving outside entities was to build greater awareness of and support for planting on private lands. However, information was often not collected on whether these trees were planted correctly or survived.

While the initial goal was for NYC Parks to plant 60 percent of trees and NYRP to plant the other 40 percent, this final ratio was 75 percent for NYC Parks, 23 percent for NYRP, and 2 percent for other agencies due to differences in the capacity and technical

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expertise in tree planting.[24] Nonetheless, the City government benefitted greatly from NYRP's capacity to build enthusiasm and public support that would last beyond Mayor Bloomberg's tenure, by both fundraising and planting trees on private property.

Advisory Committee

Striving to be more than just a tree planting campaign, MillionTreesNYC created an urban forestry movement through messaging, partnerships, and engagement opportunities. Realizing that MillionTreesNYC would be prominent in the organizational landscape of New York City's environmental groups, its leaders deliberately crafted roles for allies—and even potential competitors—to take part in the campaign. Managed by NYC Parks and NYRP, The MillionTreesNYC advisory committee institutionalized a network of advisors of approximately four hundred individual members from more than one hundred organizations, becoming a focal point for the active engagement of numerous environmental organizations through its advisory committee. There were seven subcommittees focused on stewardship, education, workforce development/green jobs, public policy, marketing and public relations, and research & evaluation. However, as the campaign moved past the planning stage and into more routine implementation, the Advisory Committee stopped meeting regularly, although certain sub-committees remained active for years.

3.4. Research and Evaluation

Within the advisory committee, the Research and Evaluation Subcommittee brought together scholars and practitioners from government, academia, and nonprofits to advance knowledge and practice in urban forestry and green infrastructure. In addition, as mentioned above, the establishment of the US Forest Service Urban Field Station in Queens (MOU signed in 2006, facility opened in 2010) helped to cement a physical and virtual "homebase" for urban forestry research in NYC and beyond. Both short-term tree survivorship tracking and long-term research partnerships with Yale University, the New School, and Columbia University.[25] were incorporated into the program to evaluate its effectiveness. Prior to MillionTreesNYC, the 2-year survival rate of street trees was 91%[26] and this has since increased to 94%. For trees in forested parkland, the 2-year survival rate of trees planted during the program was 79%.[27] The different mortality rates are likely due to the differing approaches to tree planting along the right-of-way (with larger ball-and-burlap trees planted on average 25 feet apart) compared to forested parkland (with smaller, 1- to 3-gallon trees planted a few feet apart to more closely mimic natural forest regeneration). Erika Svendsen, Lindsay Campbell, Michelle Johnson, and Laura Landau, social science partners with the US Forest Service, also conducted research on hundreds of volunteers and stewardship organizations.[28] All of this work improved program impact through adaptive management across the 8-year timespan of the program and built a community of researchers that would continue to work alongside practitioners to conduct applied research after the MillionTreesNYC program concluded.

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With leadership from the US Forest Service (Erika Svendsen) and NYC Parks (Jacqueline Lu) via the NYC Urban Field Station, the research subcommittee also convened workshops and conferences,[29] wrote reports,[30] and organized special issues of journals (see *Cities and the Environmen*t Vol 3, Issue 1: https://digitalcommons.lmu.edu/cate/vol3/iss1/) in order to synthesize and reflect on the breadth of disciplines, areas of expertise, and sectors involved in integrating research into urban tree planting and care. The *MillionTreesNYC, Green Infrastructure and Urban Ecology Research Symposium* held at the New School in spring 2010 was cited by many participants as a key moment in coalescing the network of urban ecology and green infrastructure researchers and practitioners in the city and beyond. Related research products also served as a model for future research programs: they documented the importance of including local government expertise in the conception and design of research and data collection efforts to effectively inform management and translate research findings into agency and institutional practices. This research-practice work in New York City also catalyzed the Vibrant Cities Urban Forest Task Force -- setting out national priorities for urban and community forest and urban research and development, and leading to the creation of the Vibrant Cities Lab, which persists to 2026 as a clearinghouse for information on urban forestry (see https://www.vibrantcitieslab.org/). Several million dollars of federal funds were leveraged to support research, programs, and green jobs as part of the MillionTreesNYC campaign.

3.5 Volunteer Stewardship

With financial support from the Mayor's Fund, the StewCorps was developed to expand public engagement in street tree stewardship. Stewardship activities focused on mulching around trees, watering newly-planted trees, and planting bulbs and annuals in street tree beds. While volunteerism was active throughout the entire MillionTreesNYC initiative, StewCorps started in the summer of 2009 as a partnership between MillionTreesNYC and other prominent greening groups including NYC Parks' GreenThumb community gardening division, the nonprofit urban forestry group Trees New York, the major botanical gardens in the city—New York Botanical Garden in the Bronx, Brooklyn Botanic Garden, and Queens Botanical Garden—and NYC Parks' Staten Island Greenbelt. Each of these partners agreed to deliver a set number of tailored tree care and stewardship workshops and activities for the public in exchange for funding from MillionTreesNYC.

Stewardship programming continued to evolve and expand throughout the later stages of the campaign, with street tree stewardship organized via the TreeLC program of MillionTreesNYC and natural areas stewardship supported via the Natural Areas Volunteers (NAVigators). TreeLC consisted of delivering public workshops and technical guidance, training independent stewards, and offering competitive mini-grants to community-based stewardship groups. For example, in 2012, TreeLC delivered 172 workshops to 3,405 attendees.[31] These programs were designed to expand the reach of the program beyond what MillionTreesNYC and NYC Parks staff could do, acknowledging the advanced level of stewardship of some community-based groups and the importance of grassroots-led,

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bottom-up organizing. Over the course of the entire MillionTreesNYC initiative, nearly 50,000 individual volunteers participated in programs and events to care for the growing urban forest.

Data collected through a two-year study of volunteer stewards participating in the MillionTreesNYC initiative examined how projects of this kind can contribute to the social fabric of a city. Researchers interviewed hundreds of volunteers as they were planting and conducted follow-up interviews months later, finding that for first-time participants, involvement served as a catalyst for sustained civic action and an on-ramp for broader democratic participation.[32] For seasoned volunteers, MillionTreesNYC participation was part of a wider pattern of civic engagement encompassing neighborhood associations, school boards, religious congregations, and politics. The research also identified important equity considerations, finding a persistent divide along lines of race, gender, and class, with volunteers tending to be college-educated, working white females. These findings prompted a broader commitment by the agency to expand stewardship outreach.

3.6 Workforce Development

Launched in winter 2008, the MillionTreesNYC Training Program (MTTP) focused on training, green jobs, and employment. The program offered paid job training in urban environmental restoration work for low-income, eighteen- to twenty-four-year-old adults who were previously disconnected from the workforce.[33] This effort received support from the NYC Center for Economic Opportunity—a mayoral antipoverty initiative responding to the US financial crisis—and from the Altman Foundation, the Arthur Ross Foundation, the Dodge Foundation, and Bloomberg and Rockefeller funding via the Mayor's Fund.[34] In 2009, graduates of the first MTTP class were assisted with placement in one-year follow-up jobs with local agencies and nonprofits, using $2 million in ARRA funding from the U.S. Forest Service to cover those placements.[35] Over five seasons of operation, the program graduated 104 trainees from a seven-month job-training program in which they were paid while learning the skills of horticulture, arboriculture, and ecological restoration.[36] Research found that this green job training and employment presented real opportunities for intellectual stimulation and an increased sense of accomplishment, due in part to the uniqueness of environmental work. Individuals reported positive environmental attitudes and behaviors as a result of green jobs training and employment.[37]

4. Tensions & Controversy

While New Yorkers generally responded positively to the campaign, it was not without controversy. Concerns focused primarily on maintenance of the new trees and potential conflicts with existing or planned uses of the spaces soon to be filled with trees.[38] There was also a sense of loss of agency and a fear of green gentrification. Homeowners and building maintenance staff expressed frustration that they were not consulted in advance of the City planting trees in front of their homes and apartment buildings.

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In spite of the additional funding that reduced the street tree pruning cycle and funding for tree stump removals, the public was concerned that the City was adding new infrastructure without the means to care for it. Fear of trees damaging property and people is not uncommon and not completely unfounded. A tragic accident when a tree fell on a school bus killing several young people was the catalyst to fund the original 10-year pruning cycle in 1997. While the existence of every tree carries some level of risk, accidents are extremely rare given the millions of people interacting with trees each day in New York City. Even so, the funding for tree maintenance does not keep pace with the funding for tree planting to this day.

Homeowners were specifically concerned that they would have to bear the costs of tree care for street trees. They worried about sweeping leaf litter, sidewalk damage, and pipe damage from roots. Individual New Yorkers were also troubled by the perceived impacts of pollen produced by trees on those with asthma and seasonal allergies. Business owners did not want trees blocking signs, garbage placement or restricting pedestrian flow.

In some cases, it was the surprise that trees arrived without notice that bothered people the most. In response, Parks developed a series of notification materials that could be physically distributed by Parks foresters as sites were confirmed for planting, but before work occurred. These materials included the still-used sidewalk decal sticker that was placed on concrete and a small flag for existing tree beds and lawn strips soon to be planted. Other materials such as doorhangers were used but ultimately dropped for efficiency and unconfirmed impact. Digital information sharing increased, too. Forestry would often reach out to Community Boards and elected officials' offices to notify constituents of pending work via email. Early in the MTNYC planting program, Parks foresters frequently participated in community board meetings, though these proved to be contentious or unproductive as a means of disseminating planting plans broadly.

Over time, New Yorkers became familiar with the tree planting program and were less surprised and resistant to planting efforts. City Council hearings on tree planting and maintenance, continued engagement with elected officials, and simply the planting of so many trees made the program more visible.

5. Legacy and current practices

The millionth tree was planted in Joyce Kilmer Park in the Bronx in 2015, two years ahead of the planned ten-year implementation schedule (see Table 3 for final accounting of MillionTrees Plantings by Entity). Since the completion of the MillionTreesNYC initiative, NYC Parks and partners have continued to leverage the energy and excitement around the City's urban forest to a number of new programs and efforts that will ensure the legacy of PlaNYC is not forgotten. Forestry related goals have continued to appear in subsequent updates to PlaNYC - PlaNYC2.0 (Bloomberg), OneNYC (De Blasio), and PlaNYC: Getting Sustainability Done (Adams) – see Cook et al. (this volume) for more detail on how these plans articulated sustainability goals in alignment with different mayoral administration priorities.

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Table 3. MillionTreesNYC final accounting, by entity.

MillionTreesNYC Plantings by Entity	
	Total
PARKS	
Central Forestry	154,541
Natural Resources Group	475,109
Capital Projects	14,799
Parks Boroughs	79,199
Conservancies	21,952
Subtotal	745,600
AGENCIES**	
New York City (DOT/DDC/DEP)	18,454
Other Agencies	467
New York State (NYSERDA/DEC/DOT)	1,572
Subtotal	20,493
NYRP and PARTNERS	
Direct and Grant Planting	47,629
Tree Giveaways	49,058
Influenced Planting	137,220
Subtotal	233,907
TOTAL	**1,000,000**

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MillionTreesNYC was at the forefront of a global movement that saw a shifting understanding of trees as important urban infrastructure - as critical to a sustainable city as a sewage system and clean air (Table 4). While some campaigns were quickly abandoned or fell short (e.g. Los Angeles and London), others followed MTNYC's example by engaging a nonprofit partner, executing a branding campaign, identifying priority neighborhoods all supported by research and reliable data (e.g Our Roots Chicago, Root Nashville, and Forestemi in Milan). "Those that got it done saw MillionTreesNYC as a model and recognized the need

for broad and ongoing investments," remarked Adam Freed, former Deputy and Acting Director of OLTPS and currently Principal at Bloomberg Associates where he advises numerous cities around the world on urban forestry efforts as part of sustainability and resilience plans.

Locally, the NYC Parks team created to manage the overall MillionTreesNYC effort was transformed into a Stewardship team that leveraged eight years of community engagement and relationship-building to advance the broad mission of NYC Parks' Forestry and Natural Resources teams. Once only a Director of Stewardship and three additional staff, the team is now composed of fourteen full time staff and as many grant-funded staff divided into outreach and engagement teams with expertise across landscapes. Their public engagement work has expanded to include the care of green infrastructure installations and wetlands in addition to forests and street trees, and they have carried forward a focus on workforce development and training as critical to an engaged public. Over time, the Forestry and Natural Resources teams further emphasized equity and access. For example, trail mapping and restoration is now important work, recognizing that the City should provide safe access to restored forests.

Today, the Stewardship team operates multiple volunteer outreach and engagement efforts focused on caring for natural resources, including an advanced volunteer program that builds on the success of the MTNYC efforts. In addition to tree and forest care, volunteers can also be trained in wetland stewardship and nature trail maintenance so trained volunteers can operate independent of staff.[39] The Stewardship team at NYC Parks continues to engage upward of 8,000 volunteers each year and serves a unique pathway to employment in natural resources management. Dozens of other stewardship organizations continue to rally behind the care of NYC's urban forest, including but not limited to Trees NY, Gowanus Canal Conservancy, and the Natural Areas Conservancy.

Block by block planting shifted from the Trees for Public Health effort (focused on planting trees in neighborhoods with highest rates of childhood asthma) to Cool Neighborhoods, which prioritized neighborhoods with the highest heat vulnerability indices (HVI) as determined by the NYC Department of Health and Mental Hygiene. This approach garnered support from both the DeBlasio and Adams administrations, which allocated nearly $200M collectively in capital funding to continue planting trees in the most heat-vulnerable communities.

The attention garnered by MTNYC led to a steady and significant increase in public tree planting requests. Prior to MTNYC, Forestry received an average of 55,000 311 Service Requests each year, and that number increased to 80,000 a year after the initiative started. Because need-based planting was still occurring, waiting times for requested trees increased dramatically over time (up to three years). In December 2024, NYC Parks ceased accepting requests and shifted all street tree planting to a rotational approach (Neighborhood Tree Planting), fully planting sections of neighborhoods before moving on to the next, while continuing to prioritize the most heat-vulnerable neighborhoods. This approach estimates it will take nine years to comprehensively plant trees in all available streetscape spaces.

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Lessons learned from public resistance to tree planting influenced the continuation of physical notifications. The agency supplements these physical notifications with an interactive “Tree Work Hub” that displays each planned planting site on a map. Currently, the Neighborhood Tree Planting program uses a series of proactive outreach documents to notify the specific sectors of each community board, elected officials, and stewardship groups where concentrated plantings are planned.

Parks’ groundbreaking tree procurement program continues today. In 2025, new procurement contracts began including large containerized trees, relatively new “grow bag” trees, as well as traditional balled-and-burlapped trees. As the nursery market has shifted since 2007, NYC Parks solicited contracts stretching into the midwest to increase vendor participation and grow sourcing options in similar climate zones. The longest relationship with Whitman Nurseries on Long Island has been extremely fruitful, with that nursery helping to cultivate a “cottage industry” in eastern Long Island with other vendors willing to grow to NYC’s specifications.

The contracts changed local and regional markets with regard to native plant production. One of the contract awardees, Country Gardens Nursery, leveraged increased native plant production to create a subsidiary native plant nursery on the grounds. Their offshoot - Long Island Natives – is now the largest native plant grower on Long Island.

The management framework for forested natural areas underwent a significant shift, as well. In 2012, the non-profit Natural Areas Conservancy (NAC) was created out of NYC Parks’ Natural Resources Group, to advance knowledge and care of forests, wetlands, and grasslands in the City’s natural areas parkland. In 2013 and 2014, the NAC and partners performed an ecological assessment and social assessment of all of NYC Parks’ natural areas. The results of the assessment were woven into a new Forest Management Framework for New York City (FMF), released in 2018[40]. The broad goal of the FMF is to care for New York City’s forested natural areas through 100% active management, focused on the healthiest forests with underlying threats. This is a major pivot from MillionTreesNYC, which focused on identifying canopy gaps and areas for tree planting. This led to most projects occurring in the most degraded areas and very little work performed in mature, healthy forests.

Building a movement around the urban forest also continued after MillionTrees NYC. The Forest for All NYC coalition, spearheaded by a newer partner in the urban forestry movement, The Nature Conservancy, began in 2020. As of 2026 Forest for All NYC includes more than 200 organizational members (see https://forestforall.nyc/). The coalition’s action teams focus on advocacy, research and stewardship, workforce development, and policy development and led to the development of a NYC Urban Forest Agenda[41] and the creation of an annual City of Forests Day in October as a focusing event for stewardship and engagement citywide. The work for Forest for All NYC ultimately resulted in a new canopy goal for New York City, and a law requiring the creation of an Urban Forest Plan that outlines the path forward to reach 30% canopy in NYC (a goal also formally adopted by the City for the first time in the 2023 update to PlaNYC) based on new technology and analysis not previously available at the start of PlaNYC. This plan, published in April 2026, carries the legacy of achievements and lessons learned from MillionTreesNYC, and reinvigorates many of the same long-term goals set forth by the initial mission. It honors the public servants, across many agencies, whose knowledge took

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root here and was generously shared. We are all growing toward a canopy that will reach its fullness with time, and there is both pride and humility in being part of what came before and what is still to come.

Table 4. Global million-tree planting initiatives . Source: Fisher et al. (2015)

Name of Initiative	Year	Location	Goal for Initiative	Number of Trees	Website
Mile High Million	2006	United States-Denver Metro Area	1,000,000 by 2025	2,200,000	http://www.milehighmillion.org/
Million Trees LA	2006	United States-Los Angeles, California	1,000,000	427,500	http://www.milliontreesla.org/
Million Trees NYC	2007	United States- City of New York, NY	1,000,000	1,000,000	http://www.milliontreesnyc.org/html/about/about.shtml
One Million Trees for One Million People/Tree Utah	2007	United States- Salt Lake City	1,000,000 by 2017	325,000	http://slco.org/milliontrees/
Roots & Shoots Million Tree Project	2007	China - Shanghai	2,000,000	1,368,355	http://www.mtpchina.org/index.php/english/home-map/
Plant for the Planet Billion Tree Program	2007	UNEP	14,000,000,000	12,990,399,960	http://www.plant-for-the-planet.org/de/startseite#intro
Million Trees Gurgaon	2008	India – New Delhi	1,000,000	75,000	http://iamgurgaon.org/million-trees-gurgaon/
One Million Trees	2010	Dubai – United Arab Emirates	1,000,000		http://www.dubaipolice.gov.ae/dp/jsps/content/layout_content.do?contentCode=86159
Plant One Million (P1M)	2011	United States –Philadelphia, Pennsylvania (13 counties)	1,000,000	300,000 by 2015	http://www.plantonemillion.org/

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Million Tree Challenge	2011	Canada –City of London, Ontario	1,000,000	175,656	http://www.milliontrees.ca/
Two Million Trees	2012	Australia –State of Victoria	2,000,000		http://www.depi.vic.gov.au/environment-and-wildlife/community-programs/2-million-trees
One Million Trees in One Day	2013	Ireland – Republic of Ireland and Northern Ireland	1,000,000 in one day	350,000	http://www.onemilliontreesinoneday.com/
Million Trees Stellenbosch	2013	South Africa – Stellenbosch Municipality	1,000,000	7445	http://www.milliontrees.co.za/

Table 5. Changes to planting and maintenance practices of street trees in the right of way (first two columns compiled in Campbell[41]; 3rd column prepared by author team)

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	Pre-MillionTreesNYC	MillionTreesNYC	Post MTNYC
Procurement	Landscape planting company under contract to NYC Parks purchases trees from nursery.	NYC Parks contracts directly with a nursery, which grows trees to their specifications. Significant expansion of species palette, more quality control of stock.	The direct procurement process remains in effect. The program has expanded to include a greater variety of hard to find nursery stock, innovative growing techniques such as grow-bag trees, and accommodations for summer storage to allow for earlier fall planting.
Managing tree requests	Request-based system leads to uneven forest cover across neighborhoods.	Environmental-justice approach: block planting in Trees for Public Health neighborhoods plus request-based system means planting trees in areas with lowest stocking level first. Policy change that private residents cannot refuse tree siting in the PROW in front of their homes.	Request-based planting has been discontinued to allow for a more efficient, equity driven tree planting system.
Assessing planting sites	Average tree bed size 25 square feet.	Create the largest tree bed possible to increase soil volume and rooting space. Recommended pit size 50 square feet, where possible. Large expansion to NYC Parks forestry staff involved in site assessment.	Tree beds continue to be as large as possible given site conditions. Where necessary, tree beds are reduced to accommodate the latest Federal Public Rights of Way Accessibility Guidelines.

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Planting trees	Planting on streets conducted by city contractors. Individuals, builders, businesses, and BIDs can plant by permit.	Zoning changed to require developers to plant a tree every 25 ft of street frontage of new or renovated buildings. NYC Parks contractor planting and permitted planting continues.	An in-house tree planting crew was established in 2024. Contractors continue to do most of the tree planting. Permits to allow private entities to plant continue to be issued.
Stewardship and maintenance of trees	NYC Parks block-pruning program provides street-tree maintenance since 1998. Street-tree stewardship occurs mostly through independent action or programs of TreesNY, Brooklyn Botanic Garden, or other nonprofits as well as through New York Tree Trust.	Block pruning continues and is decreased from a ten to a seven-year cycle for the first time. New citywide citizen-stewardship programs developed: StewardshipCorps, TreeLC, mini-grants, adopt-a-tree. Eventually led to the creation of a unique Stewardship team within NYC Parks. Young Street Tree pruning program created. Valid requests for dead tree removals are prioritized, with work subject to a 30-day timeframe.	Block pruning continues at a variable cadence, primarily on a seven-year cycle. NYC Parks shifted away from prioritizing tree removals to prioritizing all tree work (tree pruning and removal and removal of fallen trees and limbs) based on sophisticated risk-based assessments. Stewardship program at Parks continues and has expanded. Engagement in tree care by a range of groups from hyper-local (e.g,. West 80s Neighborhood Association), neighborhood (e.g., Gowanus Canal Conservancy), citywide, (e.g., Natural Areas Conservancy) and national (e.g. The Nature Conservancy)
Removing trees and tree valuation	City removes dead trees, hazard trees, and downed limbs. Public can mulch Christmas trees. Removal of street trees allowed under	Unrelated increase in removals due to extreme storm events during MillionTreesNYC. Local law 3 in 2010 codifies NYC Tree Valuation Method for	Additional changes to tree valuation method caps replacement values at a lower rate for low density zones. Large, capital infrastructure projects including for highway construction, water quality, and storm management, increased design-

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	NYC Parks permit that requires replacement of basal area.	replacement of trees under NYC Parks jurisdiction.	related tree removals (e.g. Grand Central Interchange, Superstorm Sandy and more frequent and intensive storms).

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Table 6. Changes to planting and maintenance practices in natural area forested parks (first two columns compiled in Campbell[41]; 3rd column prepared by author team)

	Pre-MillionTreesNYC	MillionTreesNYC	Post MTNYC
Reforestation sites and scope	Reforestation occurs through grant funding and bond monies, in specific, limited areas across the city from the 1990s.	Citywide attempt to identify 2,000 acres for reforestation. While this acreage was not identified, approximately 2/3 of the first 500,000 trees planted were located in natural areas.	Nearly half of the million trees were planted in natural areas. Site selection is now guided by the Forest Management Framework, which is based on an ecological assessment of forested natural areas that occurred in 2013-2014.
Procurement	NYC Parks or contractor purchase trees and plant material with NYC Parks or grant funding.	PlaNYC funding can only be used for tree planting—NYC Parks staff must use other funds to plant understory and herbaceous layer. Seed source for tree stock must be within 200–400 miles of New York City in order to create native forests. NYC Parks' Greenbelt Native Plant Center (GNPC) used as seed source for tree contracts and for shrubs and herbaceous materials.	NYC Parks Plant Ecology Center and Nursery (PECaN; formerly GNPC) grows native trees, shrubs, and herbaceous plants for forest restoration projects. Starter material for trees is given to a contracted nursery that grows the plants to 2 gallon size. Forest restoration projects now feature a range of sizes planted, including 5- and 10-gallon containers in addition to 2-gallons.
Experimentation	Practices of trial and error leading to established routines and best practices.	Best practices continue, but selected sites are planted explicitly with experimental design (of vegetation palette and management	Best practices for forest restoration are well-established. Standard pre- and post-restoration monitoring protocol is used to measure change over time.

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		treatments, with control plots) and monitored over time by researchers and managers.	Research continues on the effects of deer protection, stand thinning, and wildlife response to restoration.
Planting	Done primarily via in-house staff	Volunteer planting program created, along with staff and contractor roles. Grows to where sites can be planted with 20,000 trees in a morning using volunteers.	Planting continues to be performed by a combination of in-house staff, volunteers, and contractors.
Maintenance	Done through a mix of in-house staff and private contractors.	Natural Area Volunteers program created to engage volunteers in maintenance, along with staff and contractor role; program eventually rolled into citywide Stewardship Programs.	Maintenance is primarily performed by in-house staff, and volunteers play an important role as well. Every restoration site has a post-construction maintenance plan that outlines needs for adaptive management.

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