just nature NYC

HOW A HEALTHY AND EQUITABLE URBAN FOREST CAN HELP COMMUNITIES THRIVE

New York City's Urban Forest and Why It Matters

In a city filled with concrete and pollution from auto (or vehicle) exhaust, heatwaves and other environmental risks, our trees play an essential role in New York City. New York City's urban forest encompasses every tree in the city, including those along streets and greenways, in public parks, community gardens, cemeteries, yards, and other spaces, both publicly and privately owned.

According to the U.S. Forest Service, there are nearly seven million trees across the five boroughs,[1] but we anticipate there is space to plant and maintain more, and an opportunity to improve care of this valuable resource which can directly benefit the health and wellbeing of all New Yorkers.

The urban forest provides multiple benefits that include improving human health, environment, mitigating climate change impacts, and increasing community resilience, particularly in communities that generally lack green and open space.[2] When trees are planted and maintained equitably, the urban forest can help address systemic inequalities and improve the quality of life for New York City's most vulnerable residents, often part of environmental justice communities. As we face the increasingly challenging and dangerous reality of climate change locally, New York City must realize a creative, robust, and equitable vision for leveraging nature-based solutions.[3]

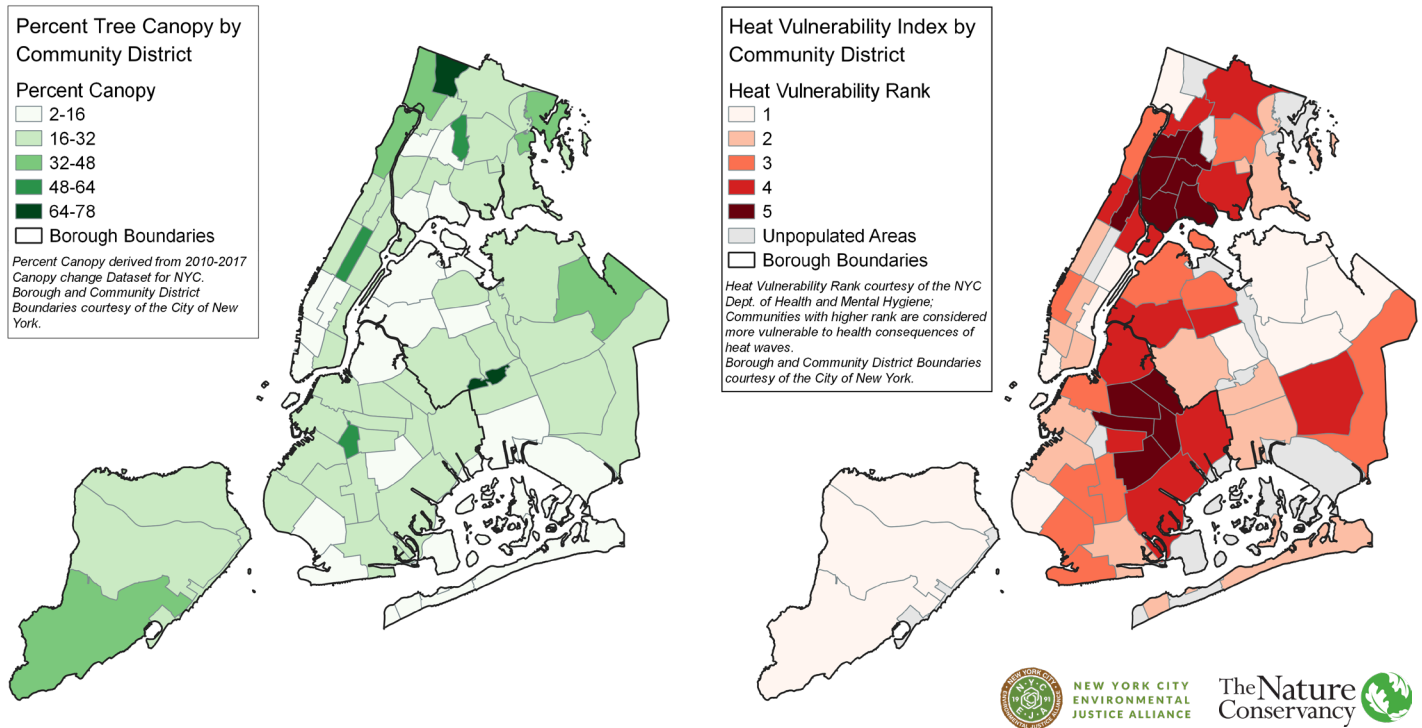**NEW YORK CITY ENVIRONMENTAL JUSTICE ALLIANCE**

The Nature Conservancy

Figure 1. Maps of Tree Canopy Coverage (left) and Heat Vulnerability (right) by NYC Community District.

Environmental Justice and New York City

Environmental justice (EJ) refers to the right of all people, regardless of race or socioeconomic background, to live, work, and play in communities that are safe, healthy, and free of life-threatening and harmful conditions.

EJ communities are low-income communities and communities of color who face disproportionate exposure to environmental hazards due to both intentional design and structural racism. In New York City, EJ communities tend to live close to sources of noise, air and water pollution, including power plants, waste transfer stations, wastewater treatment plants, highways, and industrial sites. They also tend to have less access to environmental amenities such as safe parks and green, open space. These disparities are often associated with higher rates of asthma, heart disease, and cancer, and increased vulnerability to heat-related disease and death in EJ communities.

cover. A Heat Advisory is issued when the heat index is forecast to reach 95°F to 99°F for at least two consecutive days or 100°F to 104°F for any length of time. We are already experiencing more and hotter heat waves, and the

EJ communities deserve access to high-quality, nature-based infrastructure[3] that address these intersecting environmental and public health threats. EJ communities are working to lead in this just transition toward nature-based solutions.

It's Too Darn Hot: Heat Vulnerability in NYC

Rising temperatures affect all New Yorkers, but the high-risk consequences of extreme heat are not felt equally. Factors influencing how vulnerable people are to illness or death associated with heat waves include race, poverty, local temperatures, and local tree

New York City Panel on Climate Change projects that heat waves will increase three to four times by the 2080s.[4] According to the NYC Heat Vulnerability Index,[5] New York City's communities rated the most heat vulnerable are high-poverty areas whose residents are primarily people of color (Table 1).[6] High air temperatures can also lead to

worse air quality when sunlight reacts with pollutants in the air,[7] contributing to additional to air quality related health issues and death. These challenges are predicted to increase with time, as climate change yields warmer temperatures, along with more and longer heat waves.[8]

Environmental Justice and the Urban Forest

Trees, when properly selected and planted, provide numerous benefits to our city that can help reduce the impacts of environmental and climate risks in EJ communities.[9] Trees can:

Reduce Climate Change Risks

- Provide urban green space cooling effect[10] and reducing the urban heat island effect

- Provide shade

- Absorb and store carbon emissions that are driving the climate change crisis

Improve Air & Water Quality

- Absorb pollution blocking particulate matter (fine dust, ash, pollen, smoke) that impacts respiratory health

- Mitigate health issues including respiratory diseases (by lowering air pollution) and skin cancer (by providing shade from UV rays).

- Improve water quality by retaining stormwater during rainfalls to reduce discharges from flooded sewer pipes

Increase Energy Efficiency

- Reduce energy use needed to cool down surrounding buildings by offering shade and lowering overall temperatures in the summer [11, 12]

- Reduce emissions of pollutants from power plants due to lower energy use citywide

Provide Social Benefits

- Promote an active lifestyle and wellbeing[13]

- Improve mental health by providing visible vegetation[14]

- Make outdoor spaces for people to congregate in the neighborhoods more comfortable and increase opportunities to build social cohesion

- Create new jobs to build and maintain nature-based solutions

Biodiversity

- Increase the biodiversity of our city by creating space for other species, including many birds, pollinating insects like bees and butterflies, and various types of plants

Table 1. Statistics of Tree Canopy Coverage, Percentage of People of Color, and NYC Government Poverty Rate for the Community Districts rated the most heat vulnerable according to the NYC Heat Vulnerability Index (those with a Heat Vulnerability Index of 5, or the top fifth most vulnerable Community Districts).

Community District ID	Neighborhoods[15]	Canopy Coverage (%)[16]	People of Color (%)[15]	NYC Government Poverty Rate (%)[15]
Bronx				
CD 1	Melrose, Mott Haven, Port Morris	14.5	98.1	31.0
CD 2	Hunts Point, Longwood	8.4	98.1	31.0
CD 3	Claremont, Crotona Park East, Melrose, Morrisania	20.0	95.8	30.3
CD 4	Concourse, Concourse Village, East Concourse, Highbridge, Mount Eden, West Concourse	16.6	98.3	32.4
CD 5	Fordham, Morris Heights, Mount Hope, University Heights	16.0	98.8	35.6
CD 6	Bathgate, Belmont, Bronx Park South, East Tremont, West Farms	15.4	95.8	30.3
Brooklyn				
CD 3	Bedford-Stuyvesant, Stuyvesant Heights, Tompkins Park North	21.8	75.7	21.2
CD 4	Bushwick	17.2	82.9	24.8
CD 8	Crown Heights, Prospect Heights, Weeksville	21.1	78.4	20.4
CD 16	Broadway Junction, Brownsville, Ocean Hill	17.3	97.4	29.4
CD 17	East Flatbush, Farragut, Flatbush, Northeast Flatbush, Remsen Village, Rugby, Erasmus	15.8	97.5	19.5
Manhattan				
CD 10	Central Harlem	21.3	86.0	20.2
Average of Most Heat Vulnerable Community Districts		**17.1**	**91.9**	**27.2**
Average of All Other Community Districts		**19.7**	**61.5**	**18.1**
Citywide Values		**22.0**	**67.4**	**19.8**

How We Can Improve Our Urban Forest

The health and quality of our urban forest must be maintained to maximize benefits to frontline communities. City, state, and federal agencies manage much of New York City's urban forest which is on public land and often need more resources to do so. Also, many trees in NYC grow on private property where they are largely unprotected and inconsistently managed. This diffuse jurisdiction makes trees – critical public health infrastructure – more vulnerable to inconsistent care and protection. While community-based organizations continue to advocate for more high-quality parks, new street trees, and jobs in their communities, New Yorkers should support them and also demand more investment in street trees, parks, community gardens, and all forms of nature-based solutions as well as better rules and incentives to ensure private property is green as well. Here are some ways you can help to improve NYC's urban forest:

- Support your local grassroots organization's efforts to advocate for more open and green space.

- Go outside and get to know NYC's trees by exploring parks and other natural areas

- Visit NYC Parks' Street Tree Map at https://tree-map.nyc-govparks.org for information about every street tree in New York City.

- Report dead or damaged street trees and request new street trees be planted on your block. Call 311 or put in a service request with NYC Parks at https://www.nycgovparks.org/services/forestry/request.

- Water the trees near you, whether in your backyard or along the street, especially during the hot days of summer

- Expand the NYC urban forest by planting and/or caring for trees at your home, school, work, or place of worship.

- Speak up for the trees:

  - Tell the Mayor and your Council Member to increase the budget for NYC Parks.

  - Ask your Council Member to make the planting, care and protection of trees a budget priority.

  - Ask your Community Board to support the planting, care, and maintenance of trees in your community.

ABOUT JUST NATURE NYC

Just Nature NYC is a partnership between the New York City Environmental Justice Alliance and The Nature Conservancy. We advocate for more green infrastructure, especially trees, across New York City to support climate justice and equity. We believe that these investments must be targeted strategically in frontline neighborhoods to help improve wellbeing and resilience, especially in the most heat-vulnerable communities of our city. We aim to provide analysis and resources to community-based organizers and propose remedies that are rooted in and elevate community leadership.

ENDNOTES

1   United States Department of Agriculture U.S. Forest Service (2018). The Urban Forest of New York City. https://www.fs.fed.us/nrs/pubs/rb/rb_nrs117.pdf

2   Schmidt, R., Chadsey, M., Armistead, C. 2019. Green Infrastructure Today, for Resilience Tomorrow. *Earth Economics*. Tacoma, Wa.

3   Nature-based solutions, sometimes called natural infrastructure or green infrastructure, incorporate features of the natural environment or work with natural processes to provide clean water, clean air, reduction in risks to flood, fire, and drought. Nature-based solutions can also offer various economic, social, and environmental co-benefits. (Adapted from Strategies for Operationalizing Nature-Based Solutions in the Private Sector, available at https://www.nature.org/content/dam/tnc/nature/en/documents/NBSWhitePaper.pdf [accessed December 9, 2019])

4   https://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20190002370.pdf

5   Note: The NYC Department of Health and Mental Hygiene's Heat Vulnerability Index helps identify community districts in which residents are more likely to face adverse health consequences due to heatwaves, based on both environmental conditions and social, economic, and demographic data on who lives there.

6   New York City Environmental Justice Alliance (2018). NYC Climate Justice Agenda 2018, Midway to 2030: Building Resiliency and Equity for a Just Transition.

7   Knowlton, K. et al. (2004). Assessing Ozone-Related Health Impacts under a Changing Climate. *Environmental Health Perspectives*, 112(15), 1557–1563. doi: 10.1289/ehp.7163

8   González, J. E., Ortiz, L., Smith, B. K., Devineni, N., Colle, B., Booth, J. F., … Rosenzweig, C. (2019). New York City Panel on Climate Change 2019 Report Chapter 2: New Methods for Assessing Extreme Temperatures, Heavy Downpours, and Drought. Annals of the New York Academy of Sciences, 1439(1), 30–70. https://doi.org/10.1111/nyas.14007

9   22 Benefits of Street Trees. (2019). *Vibrantcitieslab.com*. Retrieved 22 July 2019, from https://www.vibrantcitieslab.com/resources/22-benefits-of-street-trees/

10   Aram, F., García, E. H., Solgi, E., & Mansournia, S. (2019). Urban green space cooling effect in cities. *Heliyon*, 5(4). doi: 10.1016/j.heliyon.2019.e01339

11   Wells, G., & Donovan, G. (2010). Calculating the green in green: What's an urban tree worth?. *Science Findings 126. Portland, OR: U.S. Department Of Agriculture, Forest Service, Pacific Northwest Research Station*. 5 P., 126. Retrieved from https://www.fs.usda.gov/treesearch/pubs/50539

12   NYC Parks Street Tree Map. (2019). Tree-map.nycgovparks.org. Retrieved 15 August 2019, from https://tree-map.nycgovparks.org/learn/benefits

13   Braubach, M., Egorov, A., Mudu, P., Wolf, T., Thompson, C. W., & Martuzzi, M. (2017). Effects of Urban Green Space on Environmental Health, Equity and Resilience. *Theory and Practice of Urban Sustainability Transitions Nature-Based Solutions to Climate Change Adaptation in Urban Areas*, 187–205. doi: 10.1007/978-3-319-56091-5_11. https://link.springer.com/chapter/10.1007/978-3-319-56091-5_11

14   Tsai, W.-L., Mchale, M., Jennings, V., Marquet, O., Hipp, J., Leung, Y.-F., & Floyd, M. (2018). Relationships between Characteristics of Urban Green Land Cover and Mental Health in U.S. Metropolitan Areas. *International Journal of Environmental Research and Public Health*, 15(2), 340. doi: 10.3390/ijerph15020340

15   Neighborhood, Percentage People of Color, and NYC Government Poverty Rate were retrieved or derived from NYC Community District Profiles (https://communityprofiles.planning.nyc.gov), accessed on November 12, 2019. The values for percentage of People of Color were calculated as percentage of the population not identified as White (Non-Hispanic). Citywide values for percentage People of Color were based on averages of non-White (non-Hispanic) population across community districts, weighted by the 2010 population estimates in each community district. (Though more recent population estimates are generally available from the American Community Survey, and provided in the Community District Profiles, some Community District profiles did not have estimates associated with them, and thus the 2010 population estimates were used in this calculation.) Citywide values for the NYC Government Poverty Rate were retrieved directly from the Community District Profiles.

16   Values represent estimates as of 2017, and were derived from Tree Canopy Change (2010 - 2017) dataset available on NYC Open Data (https://data.cityofnewyork.us). The average values for the most heat vulnerable community districts, and all other community districts, excludes unpopulated areas (indicated on the right panel of Figure 1), though the citywide figure is based on all canopy across the entirety of the city.