

Urban Nature Stats:

Metrics and data on Forested Natural Areas from the 17-city Forest in Cities network.



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November 2023

**FORESTS
IN CITIES**
A NATIONAL NETWORK



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Acknowledgements

This study was supported by the JPB Foundation

Thank you to our Forests in Cities team members for providing the data and information used to write this report.

Cover Photo: Photo courtesy of Green Seattle Partnership, Amy Scarfone

Please cite this report as follows:

Plitt, Sophie, Clara C. Pregitzer, and Crystal Crown. 2023. Urban Nature Stats: Metrics and Data on Forested Natural Areas from the 17-city Forest in Cities network. Natural Areas Conservancy. New York, NY.

The Natural Areas Conservancy champions urban natural areas in New York City and across the nation through innovative research, partnerships, and advocacy. We increase the health and resilience of urban forests and wetlands, catalyze connections between people and nature, and strengthen the environmental workforce. Created in 2012, the Natural Areas Conservancy is a nonprofit organization devoted to restoring and conserving New York City's 20,000 acres of forests and wetlands in close partnership with the New York City Department of Parks and Recreation.

Describing Natural Areas & the Forests in Cities Network

What are forested natural areas?

Across the United States, there are more than one million acres of forests embedded in urban landscapes. Forested natural areas are distinct from other parts of the urban forest, like street and park trees in terms of size, biodiversity, species composition, and how they're managed. These forests are more than a collection of trees—they support plant and animal communities from the soil underfoot to the leaves in the top of the forest canopy.

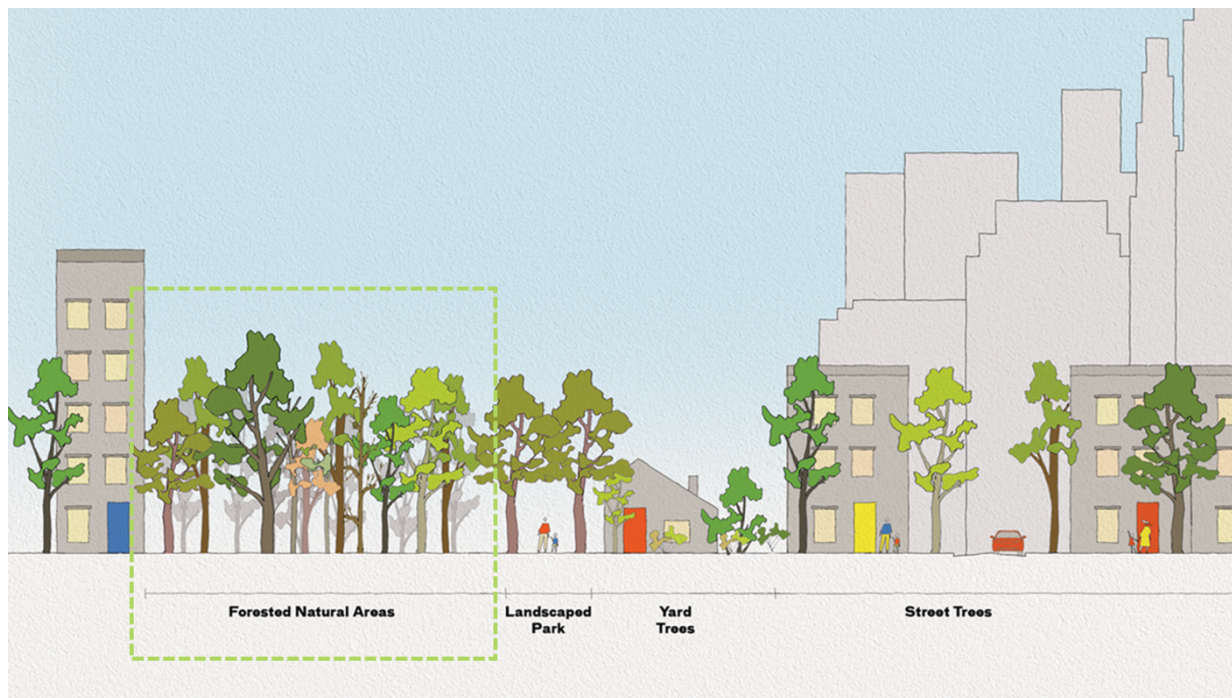


Fig. 1 What are Forested Natural Areas

The Forests in Cities Network

The Natural Areas Conservancy's Forest in Cities Network was created in 2019 to promote and advance healthy forested natural areas in cities across America through science, management, partnerships, and communications. It is composed of expert teams of forest practitioners and advocates from 17 metro regions across the United States. The key program goals for this network are to 1) Nurture and grow a national network of experts 2) Advance urban forest science and practice and 3) Advocate for increased resources and support.



Fig. 2

Cities represented in the Forests in Cities network

Participating city teams include: Atlanta, GA; Austin, TX; Baltimore, MD; Billings, MT; Chicago, IL; Indianapolis, IN; Louisville, KY; Minneapolis-St. Paul, MN; St. Louis, MO; New Haven, CT; New York, NY; Miami, FL; Philadelphia, PA; Tampa-Hillsborough County, FL, Seattle- Puget Sound, WA, Houston, TX; Washington, DC. (Boston, MA and Portland, OR joined the network in 2023, after this data was collected)

Why we collected this data

Urban forested natural areas are some of the most valuable spaces in cities. Along with supporting plant and animal communities, urban forested natural areas are a source of high-quality nature for urban residents who may not have access to natural spaces otherwise. Urban forested natural areas also provide a raft of ecosystem services, such as carbon sequestration and storage; stormwater interception and retention; air pollution removal; and urban cooling.

However, the urban context exposes urban forested natural areas to a number of stressors. Invasive plant and animal species, heightened human activity, and altered temperature and precipitation patterns can affect the natural ecology of urban forested natural areas. Governance structures and

municipal funding changes can also affect how much care or management urban forested natural areas receive. Combined, these factors render these forests vulnerable to degradation over time.

In 2019, the Natural Areas Conservancy conducted a survey of more than 100 cities and organizations managing urban forested natural areas. The results showed that cities across the United States face common challenges, and identified common needs. In this follow up to that survey, we collected data that illustrates the state of forest condition, funding for management, effort exerted, and more in the 12 cities within the Forests in Cities Network. Our goal is to show the state of the forest in these 12 cities, and make the case for increased and sustained funding, protection, and care.

Methodology

To get an in-depth understanding of how urban forested natural areas are managed in the twelve cities across the Forests in Cities network, we solicited responses from twelve city teams via an online survey in the spring of 2021. Using the survey web app Alchemer, we asked a series of questions that explored the following themes:

- Characterization of forested natural area acres
- Budget, staff, effort, and volunteer time for forest management over the course of a year
- Governance structures and prioritization of forested natural areas relative to other programs

Data was collected in the summer of 2021, with the exception of two cities that submitted their responses in winter of 2021/2022. One city did not submit responses, and not all questions were answered by all cities based on available data.

In Spring, 2022, a new cohort of five cities were accepted into the network. Each of these cities were invited to contribute common metrics data. For this round of data collection, questions from the original survey were included in a new iteration of data collection using the software platform Jotform. All responses were combined (n=16) and data was analyzed in excel and visualized using Tableau software.

The following report shares selected results from both data sets. One important note on the data below is that several of our Forest in Cities teams such as Tampa-Hillsborough County, Miami-Dade County, and Chicago-Cook County, reported data from the county level, while the other respondents reported from a city level.

1. Characterizing Natural Areas

The thousands or acres embedded in the cities across the network reflect diverse ecosystems and contain multitudes of plant and animal species. We asked network members to quantify the acres of forested natural areas in their region and tell us about the ecological quality of those forests.

How many acres of natural areas exist in your cities?

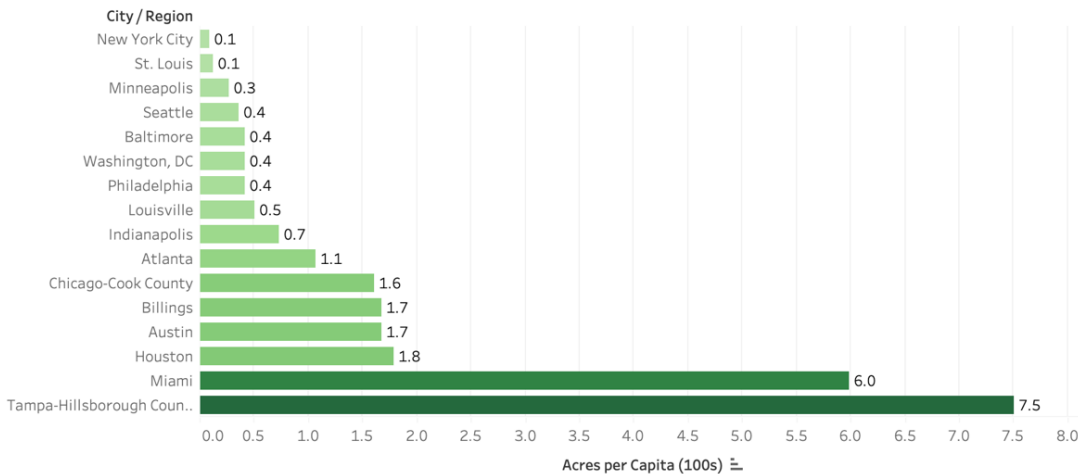
We asked each city to report the number of publicly owned forest and upland acres within their city or county limits. We specified that cities should provide data on forest and upland ecosystems within the municipal boundary of the city. The acreage is summarized below based on both natural areas per capita and percentage of total city acreage that is comprised of natural areas.

Fig. 3
Total Acres of Publicly Owned Natural Areas

City / Region	Total Acres per City/Region	Total acres of publicly owned natural area upland (forest + open areas) within the municipal boundary of your city.
Atlanta	86,598	5,500
Austin	204,762	16,714
Baltimore	51,808	2,391
Billings	27,854	2,001
Chicago-Cook County	1,046,400	85,000
Houston	407,971	41,938
Indianapolis	235,491	6,630
Louisville	28,659	1,760
Miami	23,040	27,000
Minneapolis	34,560	1,170
New York City	192,288	8,356
Philadelphia	85,990	6,777
Seattle	53,651	2,754
St. Louis	39,514	362
Tampa-Hillsborough Coun..	654,010	112,975
Washington, DC	39,123	2,924

Total acres of publicly owned natural area upland (forest + open areas) within the municipal boundary of your city. and Total Acres per City/Region broken down by City / Region.

Fig. 4
Natural Areas Per Capita (100s)



Sum of Natural Areas per Capita for each City / Region. Color shows sum of Natural Areas per Capita. The marks are labeled by sum of Natural Areas per Capita.





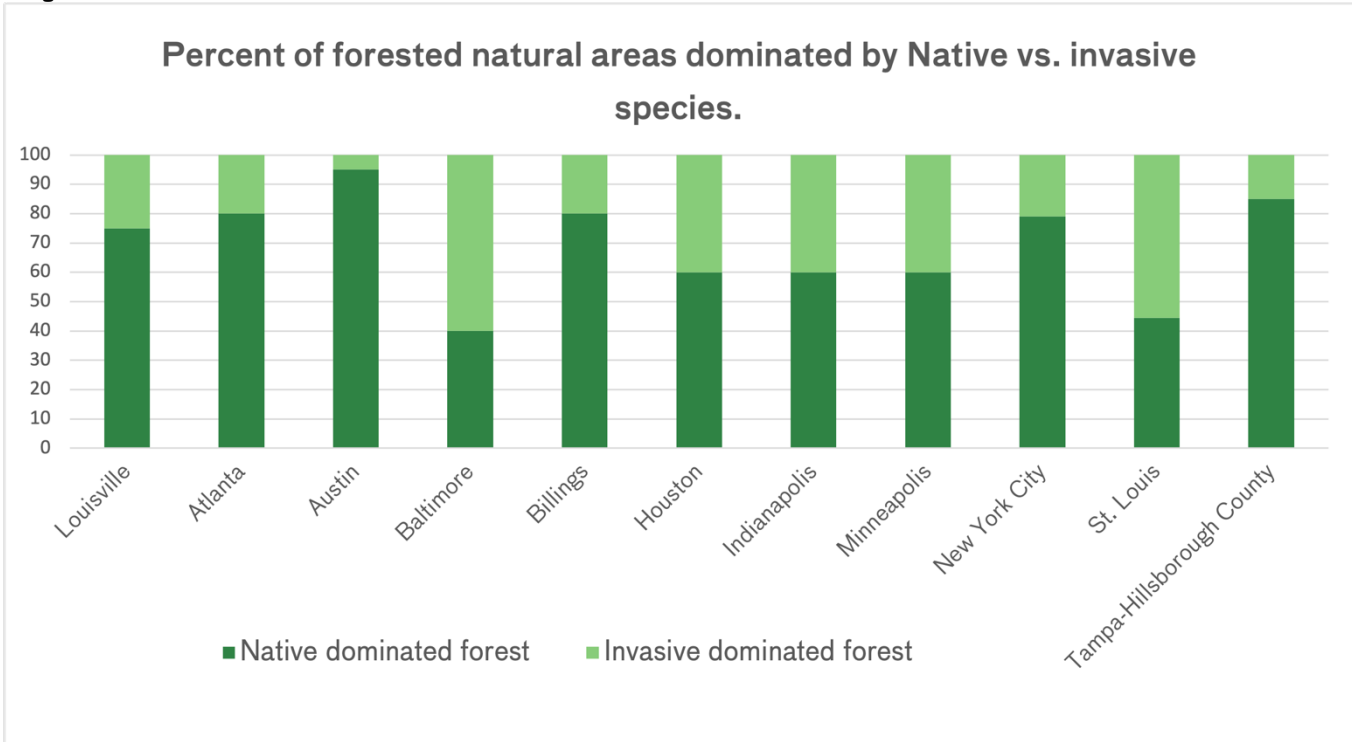
Fig. 5
Photos of diverse forested natural areas
across the national Forests in cities network

1. *St Paul, Minnesota*
2. *New York City, New York*
3. *Billings, Montana*
4. *Indianapolis, Indiana*
5. *Miami, Florida*

What percentage of forested natural areas have invasive species present?

Invasive species are a persistent threat to the health of forested natural areas and often used as a rudimentary measure of overall forest health. We asked cities to estimate what percentage of their forested natural areas are dominated by native vs. invasive species.

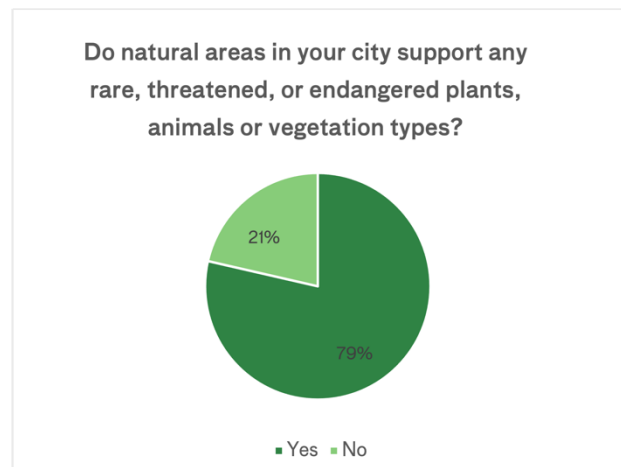
Fig. 6



Do natural areas in your city support any rare, threatened, or endangered species?

Many of the cities in the forest in cities network are actively managing ecosystems that support rare, threatened, and endangered species. Of the 14 cities that responded to this question, 11 are supporting at least one rare, threatened, or endangered plant or animal species.

Fig. 7



2. Equity, Public Access, and Climate

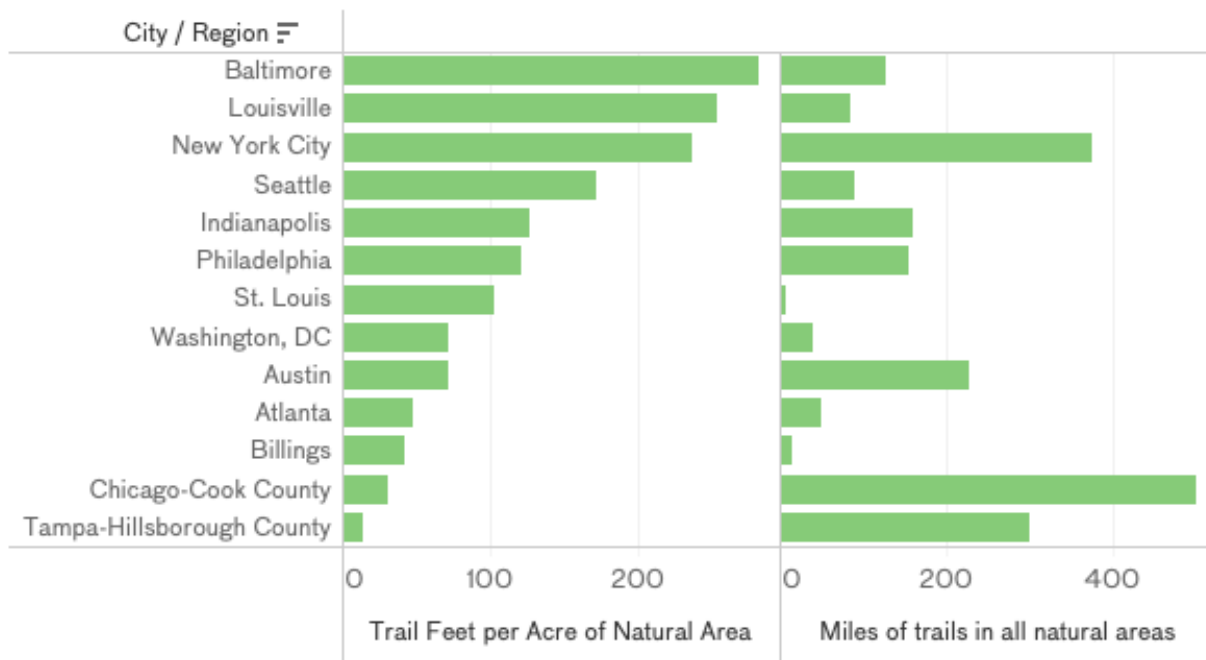
Urban forested natural areas play an important role in tempering the negative impacts of climate change, in maintaining biodiversity and supporting healthy environments, and important role in ensuring city dwellers are happy and healthy. The following data summarize responses to measures quantifying various measures of equity, access, climate impact, and governance of forested natural areas.

How many trails are there in your city’s forested natural areas?

We asked each city to tell us about how many miles of trails exist within their city’s forested natural areas. Trails provide safe access to forested natural areas to the public and can be considered one way to track accessibility of forested natural areas. Here the data is summarized both in total miles, and a calculation of how many feet per trail for each acre of forested natural area.

Fig. 8

Measures of Natural Areas Trails



How are equity and access to forested natural areas considered in your city?

Equity and access have been a subject area of focus within our network, and we wished to dive deeper and learn more about what specific equity considerations are being addressed across the responding cities.

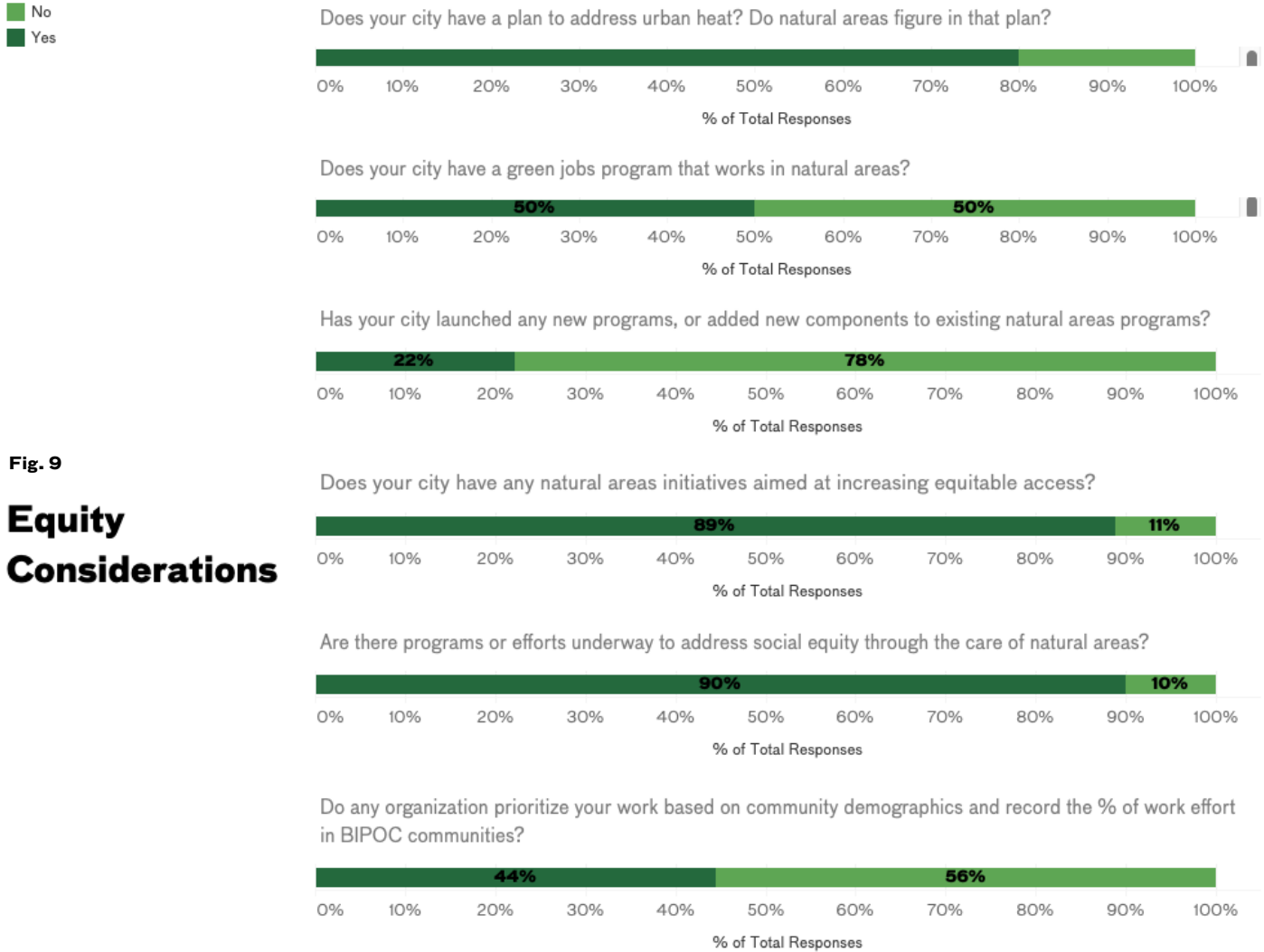


Fig. 9

Equity Considerations

What are the top government priorities for forested natural areas management in your city?

Drawing from key priorities identified in discussions within our network, we asked respondents to rank the following government priorities to better understand what key issues and foci were driving the work of forested natural areas agencies across our network. It is heartening that the majority of responding cities said that incorporating equity into natural resources management and planning is an executive priority of a priority within specific city agencies. However, there is still work to be done.

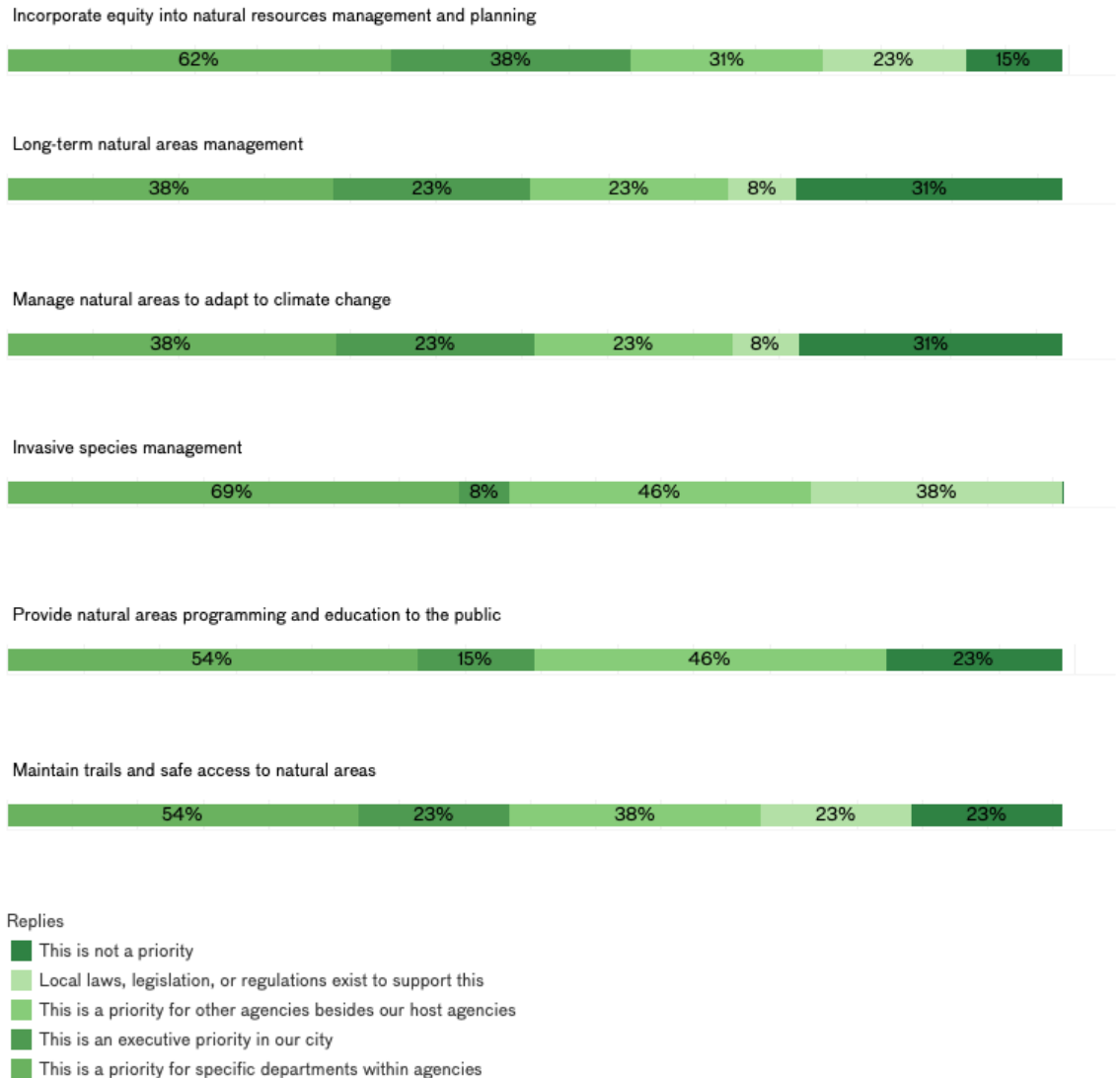


Fig. 10

Government Priorities

What are the top environmental threats posed by climate change that could impact natural areas in your city?



Fig. 11 Flooding in Houston, Texas following Hurricane Harvey (Photo: Justin Bower)

Climate change is creating and magnifying environmental threats that have impacts on forest health. Increased frequency and severity of storm events, as well as extreme temperatures, and shifts in species habitats are just some of the ways that climate change is impacting forested ecosystems. In cities, these impacts are often further intensified leaving our urban forested natural areas highly vulnerable to climate impacts. We asked our respondents to list the major climate threats that their city. The responses can be summarized into three major climate impacts, summarized below.

- 1. Flooding and Storms:** Forest ecosystems are dynamic and can exhibit resilience to natural disturbances. However, the frequency and intensity of storms and flooding associated with climate change may exceed the adaptive capacity of some forests, leading to long-term changes in their structure and composition. Adaptive management practices, conservation efforts, and sustainable forestry practices can help mitigate the impacts of these events on forest health.
- 2. Increased Temperature:** Changes in temperature can influence the timing of biological events such as bud break, flowering, and leaf fall. This can disrupt the synchronization between

tree life cycles and the availability of resources, affecting overall forest dynamics. Some tree species may become less suitable for urban environments due to changing temperature and precipitation patterns. This could lead to shifts in the composition of urban forests as more heat-tolerant or drought-resistant species become dominant.

3. Biodiversity Loss and Invasive Species

Spread As temperatures rise, invasive species may find more suitable habitats in higher latitudes and altitudes. This could lead to the spread of invasive species into new areas, potentially affecting urban forests that were historically less vulnerable to these species. To mitigate the impact of invasive species in urban forests under climate change, it is essential to implement proactive management strategies such as monitoring and early detection of invasive species and developing and implementing control measures

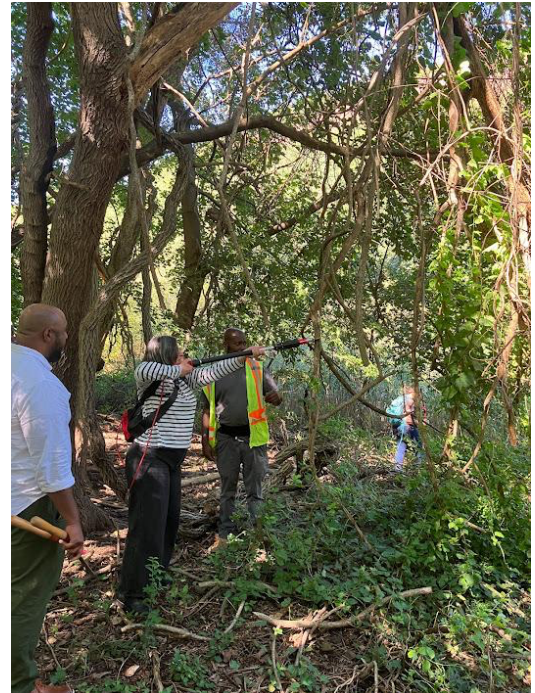


Fig. 12 Forests in Cities network members learning about invasive vine control methods in New Haven, Connecticut.

3. Budget, Staffing, and Effort

Despite the highly valuable benefits that these spaces provide, forested natural areas are chronically underfunded, and subject to inconsistent public funding. Investment in the care of natural areas is often not valued or prioritized in city parkland budgets and there is little existing data summarizing how forested natural areas are funding, staffed and cared for.

What percentage of your agency's annual budget is devoted to natural areas?

We had each respondent choose a recent fiscal year and provide data on their budget from that year. We asked cities to report both on the total budget of their agency (such as a municipal parks and recreation department) as well as the total amount of that budget that is spent on forested natural areas. The average percentage of an agency's given budget is close to 4%, despite these forests making up a large percentage of parkland in each metro area.

Fig. 13

Percent Municipal Agency Budget Devoted to Natural Areas

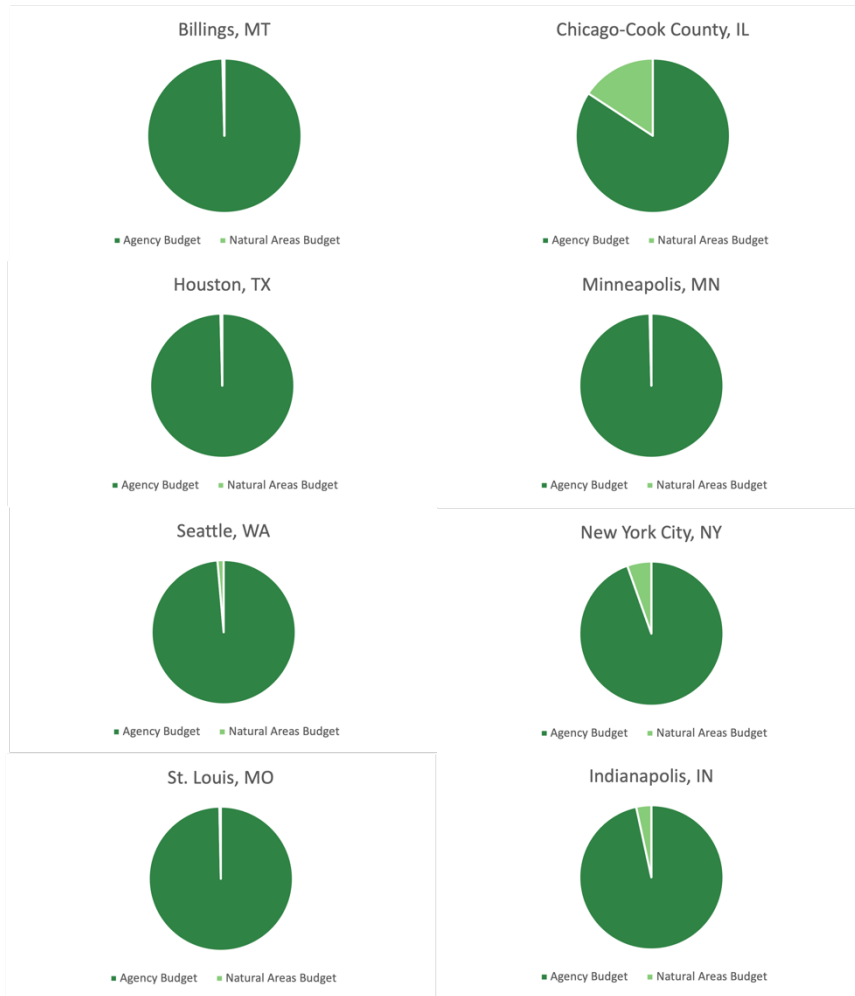


Fig. 14

Annual Spending per Acre of Forested Natural Area	
Billings, MT	\$ 9.25
Chicago-Cook County, IL	\$ 117.65
Houston, TX	\$ 6.38
Indianapolis, IN	\$ 150.08
Minneapolis, MN	\$ 420.51
New York City, NY	\$ 3,261.13
Seattle, WA	\$ 1,176.47
St. Louis, MO	\$ 138.12

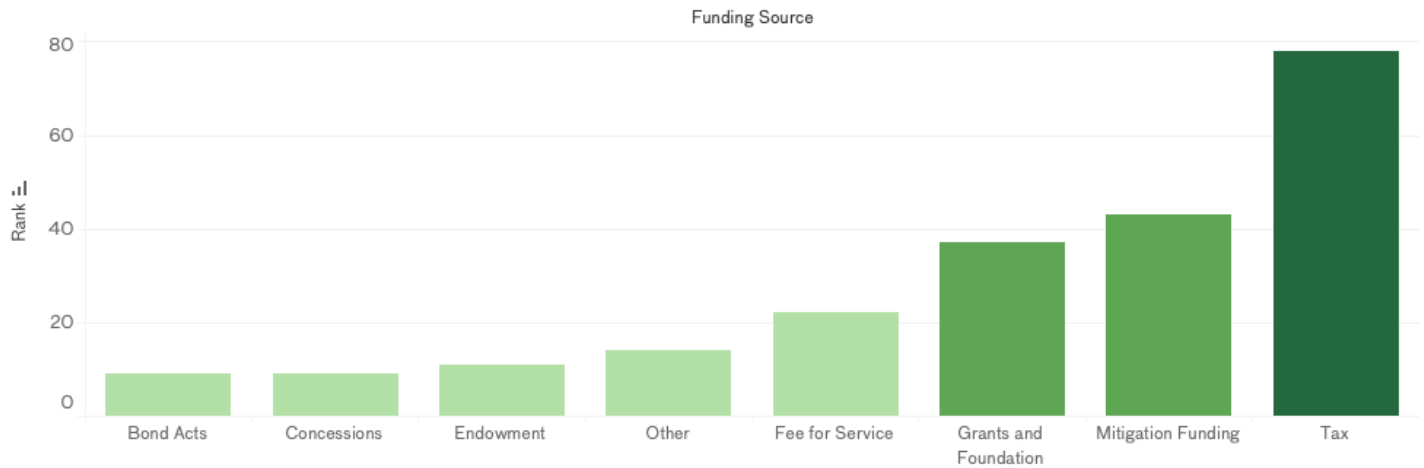
How much does your city spend per acre?

We used data provided on total acres of forested natural areas alongside the total agency natural areas budget to estimate a representation of how much each city spends per each acre of forested natural areas in the reported fiscal year. It's important to keep in mind that there are several factors that influence spending such as local wage regulations.

What are the most significant funding sources for your natural areas budget?

We asked each respondent to rank how significant each known funding source. Municipal tax revenue was by far the most significant source of funding across the respondents. This was followed by mitigation funding and then grants and foundations. It is of note that all three of these top funding sources are often allocated annually or on cycles. Tax funding is often subject to budget cuts and can be inconsistent. Funding sources such as Bonds and Endowments tend to offer much more stable, long-term funding but currently make up very little of natural areas budgets.

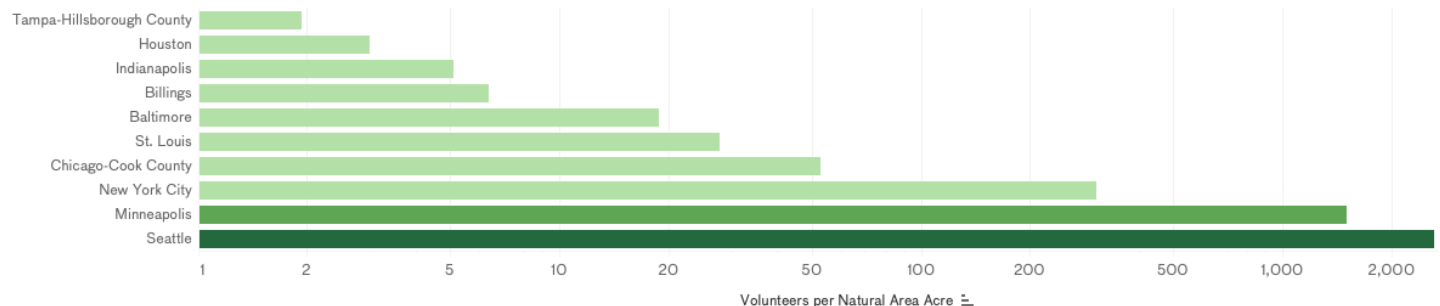
Fig. 15
Funding Source Overall Impact Score



How many volunteer hours are spent in forested natural areas in your city?

Volunteers are a critical source of labor for many cities working to care for forested natural areas. Volunteers participate in activities such as planting trees, shrubs, and grasses; remove harmful invasive exotic vegetation; removing trash and debris, formalizing trails, and providing education and programming. Our respondent cities reported on how many volunteer hours they recorded in forested natural areas in a given fiscal year. The number varied greatly across the reporting cities and the data below is summarized comparing the number of volunteer hours reported in one fiscal year per acre of natural areas across the city.

Fig. 16
Volunteers per Natural Area Acre

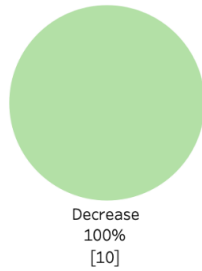


How did COVID-19 impact visitation, volunteerism, and the ability to care for natural areas?

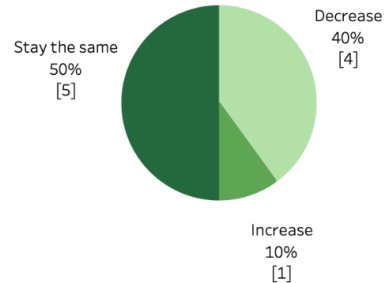
Fig. 17

How did the COVID-19 pandemic impact your agency's ability to care for natural areas in 2020 and their visitation?

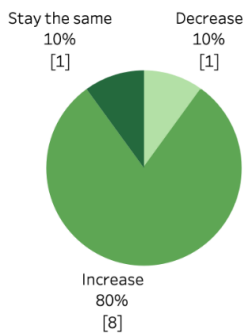
Volunteer Hours



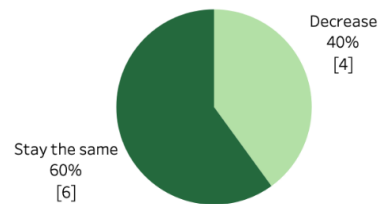
Staffing



Visitation



Budget



The Covid-19 Pandemic had an impact on both how natural areas were being used in cities, and the ability of responsible agencies to care for them. Many urban residents sought out nature and open space as respite to lockdown restrictions in the early months of the pandemic which lead to a noticeable uptick in visitation. Despite increased visitation to natural areas, COVID-19 has resulted in a decrease in resources available and the ability of staff to care and maintain the urban natural areas in these cities.

Reflections and a call to action:

Urban Forested Natural Areas Require Ongoing Care and Investment

These data present a clear trend: forested natural areas are an extremely valuable resources for he collected data covers a spectrum of factors, from the characterization of natural areas to issues of equity, public access, and climate impact. Notably, the report reveals the vulnerability of urban forested natural areas to stressors such as invasive species, climate change, and budget constraints. The findings underscore the critical role these areas play in supporting biodiversity, mitigating climate change, and providing high-quality nature experiences for urban residents.

One key highlight is the chronic underfunding of forested natural areas, with only a small percentage of municipal budgets dedicated to their care. The report's data on budget allocation, staffing, and volunteer hours underscores the need for increased and sustained financial support. The impact of the COVID-19 pandemic on visitation and volunteerism further emphasizes the delicate balance between resource availability and the demand for these natural spaces.

This report emphasizes the importance of ongoing care and investment in urban forested natural areas. The clear trend presented in the data underscores the need for collective efforts from practitioners, federal agencies, researchers, and the philanthropic community. The Forests in Cities Network serves as a catalyst for positive change, offering a platform for cities to share best practices and advocate for the resources necessary to ensure the health and longevity of urban forested natural areas. In conclusion, the report serves not only as a snapshot of the current state of urban forested natural areas but also as a call to prioritize these valuable ecosystems for the well-being of both urban communities and the environment.

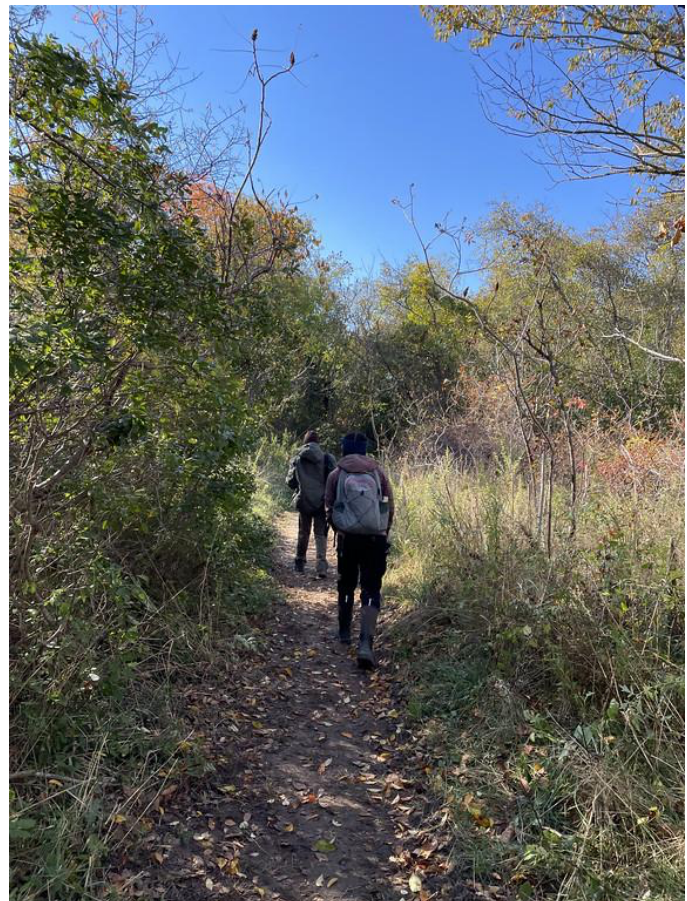


Fig. 18 City residents enjoy a trail through a maritime forest in a New York City park.