



# Brief Research Report: Case Study on the Early Impacts of COVID-19 on Urban Natural Areas Across 12 American Cities

*Sophie Plitt\*, Clara C. Pregitzer and Sarah Charlop-Powers*

*Natural Areas Conservancy, New York, NY, United States*

## OPEN ACCESS

### **Edited by:**

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Veterinary Medicine of  
Cluj-Napoca, Romania

### **\*Correspondence:**

Sophie Plitt  
sophie.plitt@naturalareasnyc.org

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The COVID-19 crisis has impacted the lives of the entire nation. As city residents faced lockdowns, they turned to their public parks and open space for respite from the confines of city living. Many residents sought solace in natural areas, wishing to hike, bird, and experience the sights and sounds of a forest during this fraught time. To understand the impacts of the COVID-19 crisis on the public use of natural areas and organizations' ability to care for them, we deployed a survey in May of 2020 to known partners in 12 US cities that are leaders in the management and care of urban natural areas. These cities represent a combined population of over 18 million people and collectively manage 284,906 acres of natural area parkland. We found that most organizations (83%) reported an increase in use of natural areas but concurrently 72% reported a decrease in the ability to care for natural areas during the pandemic. All organizations reported canceled public programs, and 94% saw a decrease in volunteer events. As these organizations look to the future, only 17% were confident in their organization having adequate funding in 2021. Cutting budgets to care for urban natural areas could have significant impacts on the health and sustainability of urban life. These 12 cities serve as examples of a pattern that could be occurring nationally and internationally. As cities reopen, budgets and priorities for the future will be determined as will the fate of resources to care for nature in cities.

**Keywords:** COVID-19, pandemic, urban green space, urban natural areas, urban natural area forests, urban natural area planning and management, access to nature

## INTRODUCTION

As a result of the COVID-19 pandemic the use of public green space increased, particularly in urban areas (Geng et al., 2021). Urban areas have higher population densities than rural areas, meaning citizens have less space, and may rely more heavily on public parkland and open space to spend time outdoors and in nature, which is increasingly important for public health and wellness (Twohig-Bennett and Jones, 2018). The pandemic resulted in new restrictions, and work from home orders resulted in urban residents searching for opportunities to spend time outdoors, local parkland became increasingly more important to their daily lives or city residents. However, not all urban parkland offers the same recreation opportunities or ability to socially distance.

Unlike more designed forms of parkland (e.g., playgrounds, picnic areas, lawns), natural areas (e.g., forests, wetland, grasslands) offer nature-based experiences such as hiking trails, which can have positive outcomes on physical and mental health and are often larger in area which could offer better opportunity to safely socially distance (Zorbaugh, 2005). Natural areas make up 68% of city parkland in the U.S. (Pregitzer et al., 2021), and despite being a dominant type of parkland, these spaces often lack funding for conservation and management and volunteer stewardship was a focal point of their care before COVID-19 (Pregitzer et al., 2018; Henderson-Roy et al., 2020). As the pandemic progressed, it was observed that urban natural areas were offering respite to an increased number of city dwellers, but at the same time public programming and volunteer stewardship events were being canceled, all while city budgets were being adjusted in response to the crisis. These events highlighted the importance of urban parkland, but also how reliant their management is to local budgets and circumstances.

In order to document and understand how the COVID-19 pandemic could be impacting visitation rates and funding and the care of urban natural areas, we worked with known partner organizations from 12 U.S. cities to document observational patterns in changes in public use, programming, and funding to care for urban natural areas. We asked the following questions (1) Did you observe any changes in access to and public use of natural area parkland? (2) Did you experience any changes to your staffing, programming, or ability to care for natural areas? (3) Have you experienced, or do you anticipate any changes to your budget supporting natural areas care? We offer unique observations and context from selected cities around each question.

## METHODS

To document observed changes in urban natural areas visitation, care, and funding we developed and deployed a survey to known organizations working specifically in urban forested natural areas in 12 U.S. cities that are part of the Forests in Cities Network (Natural Areas Conservancy, 2021). Across these 12 metro regions there are 284,906 acres of urban natural area parkland and over 18 million people live within these cities. Variation exists in city size, park system, and acreage of natural areas. The acres of natural areas represented per organization or city is 220–117,00 acres. The responses to the survey ( $n = 18$ , listed in **Supplemental Material**) represents at least one response from each city, and in some cases multiple organizations within the same city responded. Different organization types include municipal government, county government, and non-profit organizations. The results summarized the 18 responses collected across the 12 cities and each response reflects the views and patterns of the organization rather than an individual. It was suggested to coordinate among multiple individuals rather than a single person's reflections.

We chose to use the Forests in Cities network as a sampling frame for this survey as they represent a group of practitioners who are thought leaders in the field of urban natural area management, and we could easily gather a response during the pandemic. We leveraged an existing network of 12 cities that we know actively work in urban natural areas. Due to this we were able to receive a 100% response rate, which we use here as a case study that represents patterns that could be more broadly reflective of urban natural areas care and use during the early months of the COVID-19 pandemic. While we can't guarantee this case study is broadly representative of all organizations, or cities, our sample comes from cities of varying populations (~109,000–8,300,000), total city park spending per resident (~\$41–\$346, Trust for Public Land 2019), and geographies (e.g., Miami, Seattle, Indianapolis, New York). The survey was administered online using Qualtrics Survey Software (Qualtrics, Seattle, WA, USA) under site license to Yale University. The survey questions were developed based on feedback and observations of the impact of COVID-19 the use of open space and park land and are included in the **Supplemental Material**. All responses were tallied and analyzed in Microsoft excel. For each question we allowed the respondents to provide a quote or example of the observed pattern, and we share those in the results anonymously.

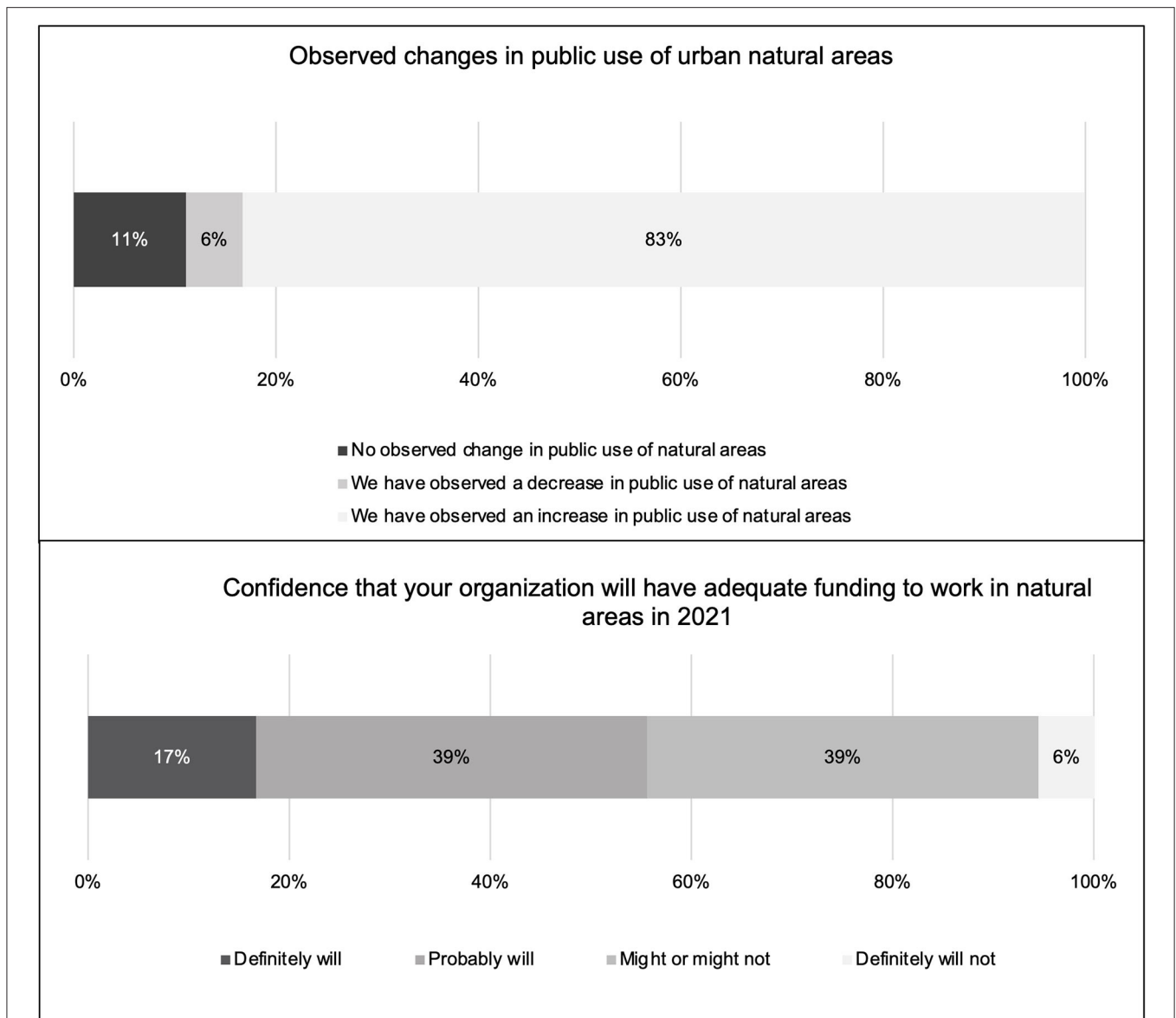
The survey was distributed and completed in Summer of 2020. While the data is limited, and includes a relatively small sample size, taken early in the pandemic, we feel this could be representative of larger patterns or shifts of natural areas in other U.S. cities or global cities. We present these results as a snapshot in time and as a case study of a subset of cities that were able to leverage a response easily and quickly during the COVID-19 pandemic.

## RESULTS

### Access to Natural Areas and Increased Use

We found that overall, the majority of cities (87%) had public parkland (including natural areas) under some combination of closures or restrictions. While many natural areas were restricted, overall, natural areas were less restricted during COVID-19 compared to urban parkland in general with only 6% of traditional parkland open with no restrictions and 38% of natural areas parkland open with no restrictions. Urban land managers cited that they were able to be adaptive to the parks closing and new restrictions in order to allow the public to access natural areas during the pandemic in a way that met health guidelines. These adaptations included posting signs and launching social media campaigns encouraging social distancing in parks. As one survey respondent stated;

*“Parks remained open for hiking and biking; however, citizens were encouraged to maintain social distance and wear face masks. Certain amenities, particularly those involving shared surfaces or confined space, were closed. These included recreation centers, swimming pools, bathrooms, and playgrounds.”*



**FIGURE 1** | Responses from a survey conducted in Summer 2020 of organizations in 12 cities that care for urban natural areas. (Top) Observed changes in public use in urban natural areas and (Bottom) anticipated changes to the budget as a result of the COVID-19 pandemic.

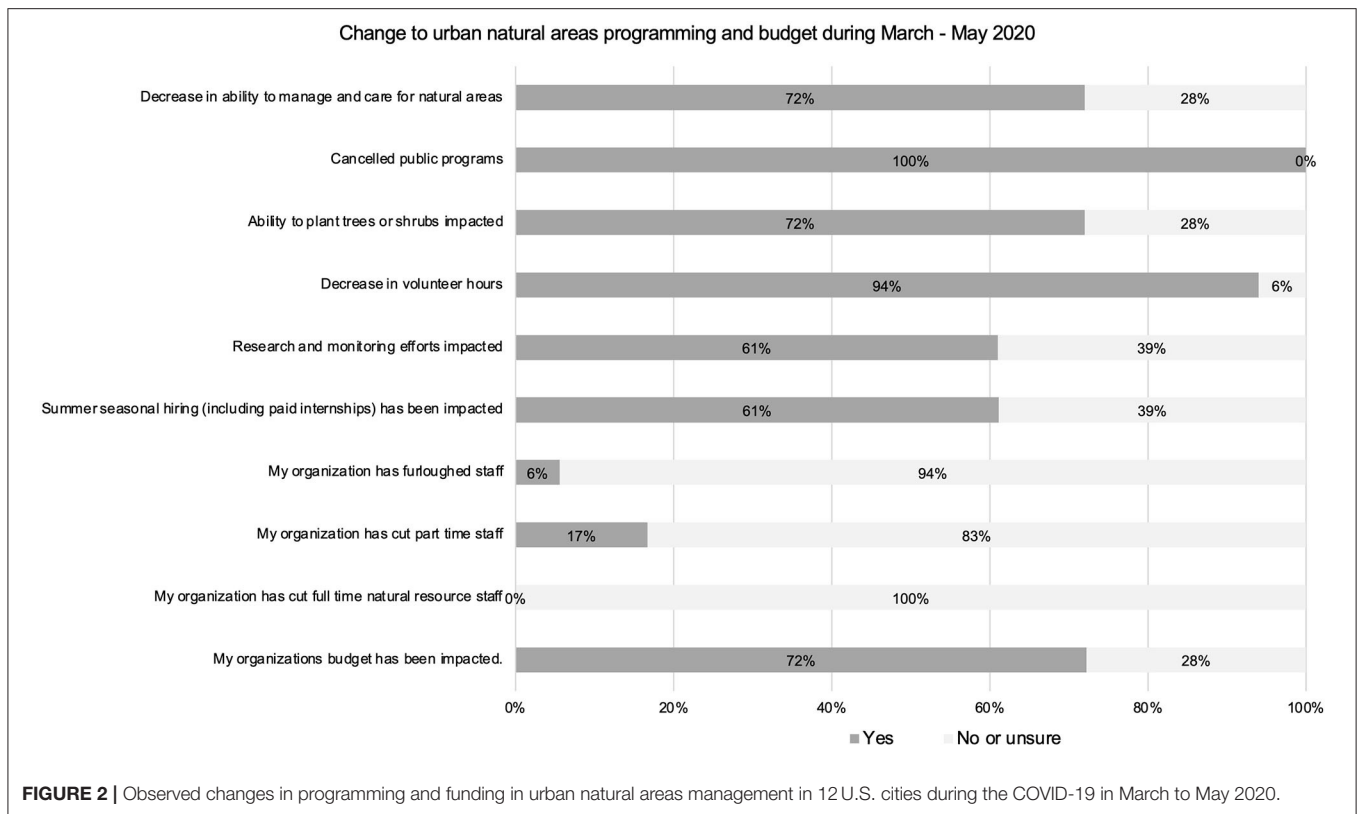
We found that 83% of respondents observed an increase in public use of urban natural areas (**Figure 1**) during COVID-19 (11% reported no change and 6% reported a decrease) with some organizations specifically citing that natural areas trails were observed to be much busier than usual on weekdays as noted here by two survey respondents:

*“[We observed] less accidental public use and an increase of intentional public use—people birding, going on family walks in the woods, etc.”*

*“More people are using ALL parks, but especially natural area trail systems as they try to stay close to home and don’t have access to county or federal public lands.”*

## Funding and Ability to Care for Urban Natural Areas

Overall, we found that a majority (72%) of the organizations have experienced a decreased ability to care for and manage urban natural areas (**Figure 2**). Nearly all (94%) of organizations cited a decrease in volunteer hours and all organizations (100%) cited public programming had been canceled as of May 2020. The majority (61%) cited that research efforts had been impacted in natural area parkland and 72% reported planting trees and shrubs had been impacted (**Figure 2**). In some cities, there had been a moratorium on field work. In other cases, natural areas managers reported that they were making adaptations to find creative ways to continue work. One land



manager described a new method for planting trees that ensured social distancing:

*“Our team is all working from home. However, tree plantings require creative solutions, like ramps for one person to move a tree from the truck to the site and assembly line planting: one person digs the hole, another plants the tree, another mulches and waters. Partners are continuing to provide basic services while keeping staff spaced.”*

Furthermore, many cities rely on volunteer work to handle many management activities such as planting and invasive species removal, most of which was canceled due to social distancing requirements. This loss of volunteer labor was a hard loss for many managers.

*“Almost all work done in natural areas is done by volunteers. We could not leverage volunteers during the pandemic, and several cleanups, invasive species control, and trail building projects were canceled.”*

As of May 2020, most of the respondents (72%) reported that their budget had already been impacted (Figure 2). Then, we asked organizations how confident they are that their organization will have adequate funding to continue work in natural areas in 2021 and found that only 17% of organizations were confident that they will have adequate funding to care for urban natural areas in 2021 (Figure 1). While about half of the respondents suggested they will or probably will receive

adequate funding, the other half were less confident and some certain they would not have adequate funding in the future to care for urban natural areas. While no organizations had described laying off full time natural resources staff as of May 2020 (Figure 2), other seasonal and part time staff had been eliminated by some organizations, and in some cases hiring had been frozen. Organizations from two separate cities describe staffing and budget impacts:

*“All hiring is frozen, including three Natural Area Crew positions that were set to start the first week of the COVID-19 crisis, and we have limited volunteer programming including stipend work with youth and elders.”*  
*“Our two major fundraising events (gala and 5k race) have either been changed or canceled in a way that will severely impact our restoration work.”*

## DISCUSSION

Our results show that during the pandemic more people were visiting natural areas, but funding for their care is declining, which suggests a paradoxical shift in patterns of care and use of these places in cities that could have long term impacts. These results provide a window into one of the many ways that COVID-19 has impacted social, economic, and ecological life in cities, specifically parkland. This finding is in accordance with several other studies that have observed increased use in urban parkland

throughout the pandemic (Alizadehtazi et al., 2020; Xie et al., 2020; Geng et al., 2021).

The fact that we observed an increase in use suggests that natural areas provided a unique space for many cooped-up city residents to socially distance, and find peace, respite during the pandemic. Many urban residents could have been discovering these natural areas for the first time. Due to the pandemic, these new visitors were able to experience the unique benefits of natural areas which one study found allowed visitors to “recharge the body, spirit, and mind, immersing themselves in the restorative and reflective space of nature” (Svendsen et al., 2016). Before the pandemic many city residents may travel outside the city to experience nature (Auyeung et al., 2016) but this suggests those same residents may have shifted to experiencing nature within the city limits. Access to these spaces also has equity implications. While many urban residents had the means to leave urban areas to access nature before during the pandemic, lower income populations may not, and rely on urban parks as their primary way of accessing nature. In New York City, 50% of park users reported experiencing nature ONLY in urban parkland (Auyeung et al., 2016). Proximity to urban parkland and a sense of belonging were *ibid* to be important factors in New Yorker’s access to nature during the pandemic (Pipitone and Jović, 2021). This reinforces public parkland that offers diverse experiences, and especially nature-based experiences (such as those in natural areas) should be understood as unique and considered as a priority for investment and protection among city governments.

While increased use of natural areas was a boon to these spaces, with an increase in use, also comes a potential increase in trampling of vegetation and illegal use. In some cities reports of foraging of rare plants, and vandalism had increased. However, despite those potential negative outcomes of increased use, we hope and believe that the pandemic offered an opportunity for city residents to look deeper for nature locally, and that this was positive. The increased use could catalyze a new generation of city dwellers that appreciate, value and advocate for urban natural areas, which over time could lead to better cared for natural areas.

Despite new users and a new appreciation for urban natural areas, we found that funding for their care was projected to decline. Reduced funding for city parkland and support of healthy urban nature could have significant social and ecological consequences to the health and sustainability of urban life. Before the pandemic, many challenges existed to caring for urban natural areas including limited funding, awareness, policy as well as socio-ecological challenges such as invasive species and climate change (Pregitzer et al., 2021). Looking forward, with reduced funding the magnitude and consequences of these challenges on the quality and condition of natural areas could be exacerbated. For example, the city budget dedicated to city parkland in New York, NY historically receives only 0.5% of the total budget and during the pandemic funding to natural areas was cut by 14% (New Yorkers for Parks, 2020; Whalen, 2020). This halted major momentum to increase investment in natural areas care (Pregitzer et al., 2018). For all our respondents at the time of the survey, the immediate outcomes were a decrease in field efforts, management, research, and planting for one season. If city tax revenue and budgets can rebound this could be a minor

pulse in the social-ecological fabric of urban natural areas, but if these budgets are cut and not replenished for years to come, the consequences could be much more severe.

This pandemic has reinforced the importance of access to healthy and high-quality nature for people, but access to urban nature is important for everyday life and requires long term and sustained support. The social disturbance of the pandemic could also have ecological consequences. While this data provides a snapshot in time and profiles only 12 US metro-regions, we believe that these responses are indicative of a broader pattern within the country, and perhaps globally. As America’s cities begin to recover and reopen, and municipal and organizational budgets are determined, we must look ahead to envision a future that includes support for natural areas in cities.

## CONCLUSION

Forests in cities require investment and protection. The increased use and perceived value of these spaces during the COVID-19 pandemic, along with the paradoxical cuts in budget to share for these spaces indicated the need for more funding and protection for urban natural areas. A sharper focus on managing and supporting forested natural areas is essential to ensuring healthy urban communities for the future. This will require cross-silo cooperation and investment from the scientists, practitioners, federal agencies, researchers, and the philanthropic community. Success will require increased study and analysis of the benefits of urban natural areas in order to make a case to decision makers to continue to protect and invest in these important natural resources.

## DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

## AUTHOR CONTRIBUTIONS

SP wrote the paper, contributed to the creation of the survey questions, distribution of survey, and analysis of results. CP wrote the survey questions, contributed to the distribution of the survey, analysis of results, and contributed to paper writing. SC-P conceptualized the survey, contributed to writing the survey questions, reviewed the analysis, and helped secure funding. All authors contributed to the article and approved the submitted version.

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## SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/frsc.2021.725904/full#supplementary-material>

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