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## Cities and the Environment (CATE)

Volume 13

Issue 1 *The Science and Practice of Managing  
Forests in Cities*

Article 2

March 2020

# Realizing the Potential of Urban Forests: Forests in Cities Workshop Themes and City Case Study Descriptions

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### Recommended Citation

Pregitzer, Clara C.; Plitt, Sophie; and Charlop-Powers, Sarah (2020) "Realizing the Potential of Urban Forests: Forests in Cities Workshop Themes and City Case Study Descriptions," *Cities and the Environment (CATE)*: Vol. 13: Iss. 1, Article 2.

DOI: 10.15365/cate.2020.130102

Available at: <https://digitalcommons.lmu.edu/cate/vol13/iss1/2>

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## Realizing the Potential of Urban Forests: Forests in Cities Workshop Themes and City Case Study Descriptions

Like all forests, forests in cities require resources, science, management, protection, and programming in order to achieve desired conditions. Yet, achieving the desired condition in an urban environment may require new approaches that account for the dynamic and complex nature of the urban setting. These decisions and actions are occurring at the city, park, or site scale. Unlike national parks, or wilderness areas that have a national or state budget, staffing structures, and regulations; forests in cities are regulated and managed primarily at the local municipal scale. This also makes the approaches to forest management planning and policy regulations tailored to individual city governance structures, despite many similar challenges arising at the national level. As part of our Forest in Cities Workshop, we partnered with 12 cities across the United States to create case studies around common themes related to achieving healthy forests as a part of sustainable and healthy cities. Our goal was to provide examples of work on the ground but also provide a lens upon which the work of individual cities could be contextualized as part of common themes and solutions that could be applied broadly. Below we describe the themes of the workshop and the case studies developed by the cities that are included in this special issue.

### Keywords

urban forest, urban natural area, urban forest management, urban forest assessment

### Acknowledgements

We would like to thank The JPB Foundation, the J.M. Kaplan Fund, and The Ittleson Foundation for support of this project. This work could not have happened without the contributions of the participants of the 2019 Forest in Cities Workshop.

## INTRODUCTION

Expanding the footprint and improving the quality of greenspace within cities is a critical strategy for improving the livability of urban areas (Fuller and Gaston 2009). Forests in cities are a type of urban greenspace that can provide beneficial services including cooling rising temperatures (Bowler et al. 2010), offering access to nearby nature in an otherwise built environment (Campbell et al. 2015), and providing habitat for plants and animals (Ives et al. 2016, Pregitzer et al. 2018). As the global trend of urbanization continues to increase, forests in cities are impacted. Forests are a part of the dynamic urban landscape. These places frequently show evidence of prior land use including agriculture, filling and dumping. They are also threatened today by fragmentation from development, introduced species, and overuse that can reduce the impacts that they provide.

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## DEVELOPING THE THEMES

Using a national survey of urban forested natural area practitioners (Pregitzer et al. 2019) we established eight central themes that are both rooted in the basics of forest management but also include cross cutting themes that are especially relevant to the urban context. The themes are; Assessment, Prioritization and Planning, Climate Change Adaptation and Mitigation, Monitoring, Innovations in Restoration and Management, Cross Sector Partnerships, Funding, Organizing and Community Engagement. We invited all cities that participated in the national survey to apply to attend the workshop and propose aspects of their work around these themes they would be interested in highlighting. Twelve cities were selected to attend, each city team comprised of 3-4 individuals that played a different role in the care of forested natural areas, these included municipal government agencies, ecologists, planners, non-profit partners city planners, and academic partners. As a part of the application each team selected their interest and ability to highlight an aspect of their city's work for each of the themes (Figure 1).

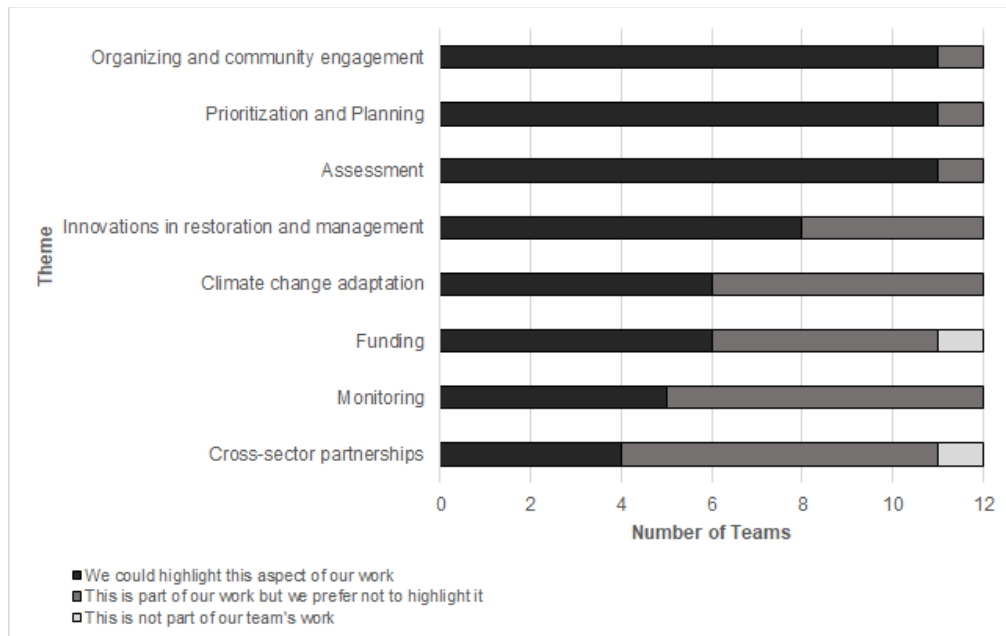


Figure 1. Responses from 12 U.S. city applications to the Forests in Cities Workshop, showing the teams interest and ability to discuss and develop a case study around each proposed workshop theme.

Once the teams were selected, we had an informational discussion with each city team during the summer of 2019 to learn more about the focus of their work and how it could fit into the themes. As a result of these discussions, we added the theme of *land preservation and policy* and enveloped the topic of funding into all of the case studies. We then assigned two themes per city team to develop and write a case study resulting in 25 papers in total and three-four for each theme which were then distributed to all of the participants. At the October, 2019 workshop, we hosted moderated panels where each city presented their case studies and answered questions from the moderator and the larger group. The written versions of these case studies are published here in this special issue and are organized by these 8 themes.

## THEME DESCRIPTIONS AND OVERVIEW

Below is a brief description of each theme and a catalogue of the case studies written about each theme. We acknowledge that these themes are inherently interconnected and are difficult to discuss in isolation. For example, it's very difficult to monitor a forest resource if you haven't yet conducted an assessment. We embrace the overlapping nature of these themes and encourage the reader to consider the relationships between them.

### Assessment

Assessing the current range of social and ecological conditions present in a system is a key step in effectively understanding and managing natural areas in cities. This theme includes understanding how and what type of baseline data is collected. Assessment was one of the themes about which almost all of the cities (11/12) felt they could develop a case study (Figure 1). We found in our discussions that many of the same types of basic ecological information were being collected in

natural areas assessments. This includes maps of where forested natural areas exist, the types of forest, and the quality of the forest (species composition and structure), such as invasive species measures.

The case studies in the Assessment theme include:

1. [Assessing Houston's Forested Habitat.](#)
2. [Too Precious to Lose: Managing and Protecting the Richmond Pine Rockland Tract in South Florida.](#)
3. [Plant Community Assessment and Management Recommendations for Minneapolis Park Natural Areas.](#)

## **Prioritization and Planning**

Management planning is a key aspect of both the long-term care of forested natural areas and annual work plans. Management plans can communicate the importance of a program or initiative, prioritize where and how to work, articulate budget decisions, and evaluate effectiveness. However, planning where to work and why in the urban context can be a challenge for many cities due to the diverse conditions and needs of forests and limited resources. This theme focuses on approaches, protocols, and tools to strategize, implement and communicate long and short-term goals for forests in cities. Management planning and prioritization was a theme that most city teams (11/12) felt they could highlight their approach (Figure 1). Little information exists at regional, or national scales that provides a structure or framework for including forested natural areas into city sustainability, resilience, climate or strict land management planning.

The case studies in the Prioritization and Planning theme include:

1. [Prioritization and Planning to Improve Urban Tree Health in the Chicago Region.](#)
2. [The Value of Strategic Planning to Prioritize Acquisition and Management of Ecological Coordinators in an Urbanizing County – Hillsborough County \(Tampa\), FL.](#)
3. [Green Seattle Partnership Models Regional Urban Natural Areas Restoration Efforts.](#)

## **Innovations in Restoration and Management**

Effects of urbanization such as the introduction of non-native invasive species, land fragmentation, and a patchwork of different historical land uses directly impact the condition and trajectory of forests in cities. For example, invasive species cause declines in local biodiversity (Lovett et al. 2013) and can inhibit natural tree regeneration (Stinson et al. 2006). Fragmentation and the creation of forest edges can alter plant dispersal patterns (King and With 2002), interfere with species interactions (Chalfoun et al. 2002), and change the growth and carbon sequestration of trees (Reinmann and Hutyra 2017). In order to achieve healthy forests in cities, innovative management strategies are needed to overcome these multiple interacting stressors. Ecologists, practitioners, and decision makers have been testing and improving techniques for protecting, restoring and maintaining these areas to improve their condition. This theme focuses on novel

practices and learned experiences in management interventions to achieve healthy forests in urban environments. In this theme a majority (8/12), but not all were interested in highlighting this aspect of their work.

The case studies in the Innovations in Restoration and Management theme include:

1. [Riparian Cottonwood Forest Restoration along the Yellowstone River: A Featured Natural Area in Billings, Montana.](#)
2. [Use of Vegetation Monitoring and Professional Sharpshooting in White-Tailed Deer \(\*Odocoileus virginianus\*\) Management at Eagle Creek Park in Indianapolis, IN.](#)
3. [Restoration and Management of High-use Urban Missouri Woodlands and Forests.](#)

## Monitoring

Monitoring, or observing and analyzing the change in forest condition over time, is paramount to understanding the successes and failures of management interventions. Monitoring project performance can shed light on management successes and failures to allow for adaptation of methods and a development of best practices over time. Long-term monitoring of forest conditions is essential to understanding the trajectory of the forest, emerging threats, and strategic planning and prioritization of management. Monitoring can detect emergent threats such as pests and pathogens, decline or shifts in species composition, and changes in social perceptions of the forest over time; all of which can contribute to a holistic understanding of forest ecosystems in complex urban environments. Monitoring, however, requires resources that are often scarce, and long-term monitoring requires commitment to funding re-measurement into the future. This theme focuses on approaches to monitoring both short term project success, and long-term forest change over time. Less than half (5/12) of the city teams were interested in highlighting this aspect of their work (Figure 1), which could be an indication that there may be barriers to committing to or competing monitoring in cities.

The case studies in the Monitoring theme include:

1. [Evolution in Natural Area Monitoring at Indianapolis Parks.](#)
2. [Monitoring Forest Restoration Activities in New York City Parks.](#)
3. [Natural Resource Monitoring Progression of St. Louis' Forest Park Forested Natural Areas.](#)

## Climate Change Adaptation

This theme looks at the changing climate in urban forest management. The impacts of climate change have been shown to alter the ecology and trajectories of forests in cities. Increasing temperatures, altered disturbance regimes, and extreme weather events put increased pressure on urban forested natural areas, driving the need for innovative management practices to adapt forests to these new conditions. Furthermore, protecting and managing existing forests, and creating new forests can contribute to the mitigation of the negative impacts of the changing climate. While there are still many unknowns, imminent action is needed and cities. As cities develop resilience and climate action plans, forests can plan a critical role in the solution. Half

(6/12) of all city teams were willing to highlight this aspect of their work (Figure 1), which could be an indication of the uncertainty in approaches and downscaled climate action efforts, but also shows promise in that action is already being taken with opportunities to learn from one another.

The case studies in the Climate Adaptation theme include:

1. [Planning for Climate Change Through Riparian Restoration in Houston, Texas.](#)
2. [Climate Change Vulnerability and Response in Seattle's Urban Natural Areas.](#)
3. [Adaptive Silviculture for Climate Change in the Mississippi National River and Recreation Area, an Urban National Park.](#)

## **Cross-Sector Partnerships**

The fact that forests in cities are proximal to substantial and diverse cultural and economic engines expands the potential and importance of working in partnership across sectors to meet forest management goals. The work of natural areas managers can intersect directly or indirectly with city planning departments, public health organizations, climate resilience offices, public works, utility companies, educational institutions, and transportation organizations. This theme focuses on organizing and coalition building across organizations (i.e. private, public, academic) and scales (i.e. city, region) in order to coordinate landscape-scale planning, funding, support and management to meet the many goals of urban forested natural areas. Less than half (4/12) city teams were interested in highlighting this aspect of their work, a possible indication that there is opportunity to broaden the work of forests in cities across sectors.

The case studies for the Cross-Sector Partnership theme include:

1. [Leveraging a Non-Profit-Public Partnership to Meet the Needs of Austin's Urban Forest.](#)
2. [Cross Sector Partnerships – Development of the Chicago Region Trees Initiative.](#)
3. [Organization and Support of Long-Term Collaborative Relationships Between Private Citizens, Government Institutions, and Universities to Conduct Inventories and Ecological Analyses Across the Tampa Bay watershed; Development of Strategic Plans for Forest.](#)

## **Organizing and Community Engagement**

Managers of urban forested natural areas should work to serve and engage all residents. Engaging and enabling citizens to participate in or take ownership over stewardship, planning, and management of natural areas can help ensure that these areas are cared for and valued by the local community. Diverse constituencies may require different and novel approaches for education and engagement which can help to ensure equitable access and involvement in high quality forests. This theme focuses on organizing and community engagement of residents and partners to care for and steward forests in cities. This was a theme that all city teams could discuss and almost all (11/12) were interested in highlighting this aspect of their work. The fact that all city teams were so actively engaged in stewardship and connecting with local

communities resulted in an exciting discussion and many opportunities for sharing experiences and approaches to work around this theme.

The case studies for the Organizing and Community Engagement theme include:

1. [Leadership Learning Communities, Scientific Sustenance, and Inspiration Feedback Loops in Baltimore.](#)
2. [A River Runs by It: How Embracing a River Created Synergy for a Natural Areas Program and Interagency Environmental Education in Billings.](#)
3. [Aligning New York City Forest Management by Engaging Community Partners.](#)
4. [Engaging Volunteer Stewards Through Shifting Forest Management Goals in New York City's Natural Areas.](#)

### **Urban Land Preservation and Policy**

Urban forested natural areas may not have the same protections as other wild land in the nation and are often subject to complex land ownership and use designations or under threat of development. Thus, the legal and long-term protection of natural areas and its quality in cities can be highly contested and politicized. The acquisition and protection of urban forested natural areas often requires sophisticated legal action, the establishment of local ordinances, and coordination with both public and private actors. This theme focuses on the conservation ethics and legal actions associated with protecting land in cities. This was not one of the original themes, however after discussing the successes and challenges of the work being done in each of the participant cities, the protection of urban forested land emerged as a common and pressing issue for many.

The case studies for the Urban Land Preservation and Policy theme include:

1. [Outcome Oriented Policy: Protecting Austin's Urban Forest Through Tree Preservation and Complementary Land Development Regulations.](#)
2. [Preservation, Regulations, and Policy to Protect and Grow Baltimore's Forests.](#)
3. [Conservation Strategies for a Globally Imperiled and Hyper-Fragmented Ecosystem: Acquisition, Regulations, Incentives, and Outreach in Miami.](#)

### **CONCLUSIONS AND NEXT STEPS**

Through the creation and iteration of the themes during the workshop planning and facilitation, we have come to see these eight themes as a useful tool for understanding the interconnected activities, processes, and challenges that make up the practice of managing forests in cities. While no theme or case study can be understood in isolation of the other themes, we hope that by compartmentalizing these case studies it can offer a way to understand the complex ecological, social, and political landscape of forests in cities. Our hope is that these themes can be explored further to better define the field of urban forested natural area management in order to improve management protocol and action on the ground and advance the consideration of this topic in broader discussions of urban planning, green infrastructure, and conservation. As the urban



footprint expands and cities embark on efforts to protect and manage their forests, it is necessary to recognize local leaders in land management and conservation as contributing to solving complex environmental problems associated with urban living. Advancing the fundamental building blocks of urban forest management and cross cutting emergent themes will be critical to achieving healthy forests within the urban context.

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