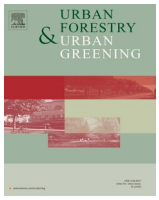
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Original article



Small decisions as social and ecological leverage points for cities to meet sustainability goals: A synthesis for urban forestry research and practice

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ABSTRACT

While urban forest management is increasingly held up as a nature-based solution to myriad urban challenges, major gaps exist in research and practice in the links between decision-making at different scales and their impacts on different dimensions of sustainability. Where are the key levers to change the future of urban forests, and set cities on more sustainable pathways? Using street trees as a generalizable, focal unit of analysis, the Street Tree Futures research project explored urban foresters' influence on strategic goals, particularly goals to increase ecosystem services. In the context of the United States and Canada, we explored how urban foresters are able to effect change through *direct* tree-level management (i.e. decisions which physically affect trees), as a necessary precursor to improving *indirect* management (e.g. policies, education, outreach). This article is a synthesis of a series of studies examining these issues from multiple dimensions and culminating in a focus group of cross-sector urban forestry experts. Overall, we establish that often undervalued small, site-level, decisions are not only necessary for urban tree survival and growth but are also key points of influence where urban foresters' expert knowledge contribute to large-scale strategic sustainability goals. Overlooking site-level decisions leads to missed opportunities to foster interdisciplinary collaboration, and most importantly, advance towards multiple critical sustainability goals.

1. Introduction

After decades of building momentum from advancements in research and practice, there are many signs that the field of urban forestry is entering into a new era. Urban forestry is creating a space for itself among broader, more established, disciplines operating in urban areas—from urban planning to ecology to public health. The increased recognition of the essential services urban forests provide to society is resulting in increased demands on the professionals who manage them, and triggering much needed advances in professionalization (O'Herrin et al., 2023). Research and technology to aid in the management and assessment of urban forests is rapidly advancing (Nitoslawski et al., 2019) paired with advances in understandings of the relationships between urban forests and multiple dimensions of human and ecosystem well-being (Barron et al., 2019; Pataki et al., 2021). The social dimension of urban forestry is likewise becoming more prominent in research and practice, especially in the understanding of how historic tree management practices have resulted in environmental inequities (Locke and Grove, 2016) and how current and future work can serve to remedy injustices (Nesbitt et al., 2018). At the same time, related fields of study, including on the concept of ecosystem services (Daily and Ruckelshaus, 2022; Díaz et al., 2018) and paradigms and definitions of urban sustainability (Frantzeskaki et al., 2021; Wu, 2014) have rapidly advanced; how these advances will affect urban forestry and its role in cities remains to be seen. In their seminal 1997 article on sustainable urban forest management, Clark et al., stated "while we may be able to describe the desired functions of a sustainable urban forest, we cannot yet design the forest to optimize them" (Clark et al., 1997). Much progress towards this goal of linking human action and subsequent urban forest function has been made since then, and the research in this article builds upon that body of work. Using street trees as the connecting element to explore how changing the management of one system of interest can affect the future sustainability of not just urban forests, but cities, we take a critical look at the current paradigms of urban forest management in the United States and Canada and ask how paradigms could be changed to further urban sustainability.

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The foundation to all of this momentum fueling the growth in the science and practice of urban forestry are the paired, evidence-based, expectations that (1) trees do and will continue to provide essential benefits to cities (Dobbs et al., 2014; Roy et al., 2012) and (2) professionals can increase such benefits through skilled management (O'Herrin et al., 2023; Ordóñez et al., 2020; Östberg et al., 2013). Nonetheless, to fulfill these expectations, there are major gaps in understanding which types of management align with which goals. There is also a dearth of evidence to support professionals in aligning their decision making with sustainability goals, related to critical issues like climate change adaptation or biodiversity conservation (Hutt-Taylor et al., 2024), which urban forests are both impacted by and serve as a potential solution (Ordóñez and Duinker, 2014). In response, we initiated the Street Tree Futures project, a series of studies to investigate the nexus between urban ecosystem management and benefit provision, specifically focusing on how to operationalize site-level decisions in urban forestry in service of sustainability goals. In doing so, we identified current paradigms in urban forestry practice and advanced understanding on the role of site-level decision making and decision makers in urban ecosystem management. Each component study, and the project as a whole, was deliberately situated to contribute to broader discussions of ecosystem services and environmental management decisions. In this study, we brought the findings from these components to a group of interdisciplinary urban forestry researchers and practitioners from Canada and the US. The goal was to transparently synthesize the implications of the full project for research and practice.

During the course of this work, two major initiatives arose which provide unprecedented funding for urban forestry in the US and Canada, amplifying the need for timely and relevant evidence to inform practice. In the US, the Inflation Reduction Act allocated US$1.5 billion for urban and community forestry over ten years (USDA, 2023). In Canada, the 2 Billion Trees program was announced to fund tree planting on rural, suburban, and urban land through afforestation and restoration (Government of Canada, 2020). These "once in a generation" resources were directed towards the planting of millions of trees and management actions which could significantly shape urban forests for the next century, and beyond. While urban foresters often cite budget constraints as a top barrier to improving their programs (Ordóñez et al., 2019), recipients of these new funds were given the chance to tackle ambitious plans and apply advanced procedures in service of their goals. In this context, understanding the impacts of urban forest management decisions is incredibly critical to make the best use of these opportunities and ensure they lead to improved urban conditions.

Chan et al., 2020 defined "leverage points" as *where* in social-ecological systems to intervene to effect change for sustainability and "levers" as the *interventions* which could realize these changes. Bringing this framing to urban forestry, in this synthesis article resulting from the Street Tree Futures project, we ask: where are the key leverage points in urban forest management to fulfill the promise of urban forests as solutions to specific sustainability goals? More broadly, we place urban forest management, and the professionals who hold urban forestry expertise (i.e. urban foresters), within the context of urban ecosystem management as a whole and how they can be better operationalized, or serve as "levers", for urban sustainability.

2. Methods

2.1. Framework of Street Tree Futures

Street Tree Futures was guided by an overarching research question: "How do direct, site-level urban forest management actions advance strategic-level urban sustainability goals?" Or, more simply put, "how do small decisions in urban forestry impact big city goals?" Street trees were chosen as the focal unit of analysis, as the most generalizable and comparable unit across cities in Canada, the US, and beyond, while also representing the urban forest component that is typically managed the most intensively, though connections are made to urban forest management issues as a whole. From the outset, committees of interdisciplinary urban forestry researchers and cross-sector urban forestry professionals were established to inform and advise the project. Three components were designed to address different dimensions of this question, followed by a fourth component (this article) to synthesize the previous components (Fig. 1).

The first component addressed sub-question (1) "Why are site-level decisions important to achieving strategic-level sustainability goals, in the context of implementing urban nature-based solutions to achieve city goals?" This perspective piece framed the main themes of the project and described the role of small decisions in achieving urban sustainability goals (Bassett et al., 2025). The economic concept of the tyranny of small decisions was used as a foil. Instead of framing small decisions only for their potential to undermine sustainability goals (Kahn, 1966; Odum, 1982), we use the concept to show the power of small decisions and those who make them, and the untapped potential of ecological stewards to harness these decisions towards urban sustainability. Using urban forestry initiatives as a case study, the article illustrated the potential of small decision makers to drive widespread change and argued for a more integrative approach that empowers local specialist expertise to more effectively achieve sustainability goals.

The second component addressed sub-question (2) "What are the current challenges to, and best practices for, aligning street-level urban forest management actions to contribute to sustainability goals that are framed as ecosystem services?" (Bassett et al., 2025). This study explored and established the current state of how urban foresters in the US and Canada conceptualize the alignment between their street tree management decisions and the strategic sustainability plans adopted by their cities. Urban foresters in cities with sustainability goals framed as ecosystem services, though able to articulate management tradeoffs for specific ecosystem services, were found to not use these goals in day-to-day decision-making about street trees. Instead, their priority was on goals related to biophysical structure, such as increasing canopy cover or reducing risk of tree failure. This was predicated on the widely accepted paradigm that managing for "more, bigger trees" results in more ecosystem services overall, which we posit is a good proxy for certain goals but misses opportunities for others.

The third component addressed sub-question (3) "How can urban foresters align their street tree management actions with specific urban sustainability goals?" (Bassett et al., 2024). This study explored which direct street tree management actions could influence five urban sustainability goals (related to canopy cover and tree risk, heat mitigation, people-nature relationships, wildlife habitat, and stormwater management) through a structured expert elicitation in Vancouver, Canada, and Honolulu, and Washington, D.C., US. In the elicitation, participants were asked to imagine themselves as having complete control over street tree management decisions within a hypothetical streetscape scenario and assume "mostly perfect world" conditions (e.g., no vandalism or destruction, all trees would be watered through establishment, and others). They were asked which of a suite of forty actions throughout the street tree life cycle were needed, and which presented the greatest opportunities, to advance these five goals over twenty years. Opportunities to advance specific goals were identified, particularly through actions in the pre-planting phase such as site and species selection. These results established not only that site-level management actions can be linked with specific goals, but that these actions are needed and present key opportunities to deliver such goals.

This article represents the fourth study component (4) and aims to synthesize main insights from Street Tree Futures and envision implementation strategies for research and practice of urban forestry. To launch this synthesis process, we share reflections from a semi-structured focus group discussion conducted as part of Street Tree Futures to reflect on findings of the earlier components. Then, we describe key contributions and significance to the research and practice of urban forestry, strengths and limitations, and final conclusions.

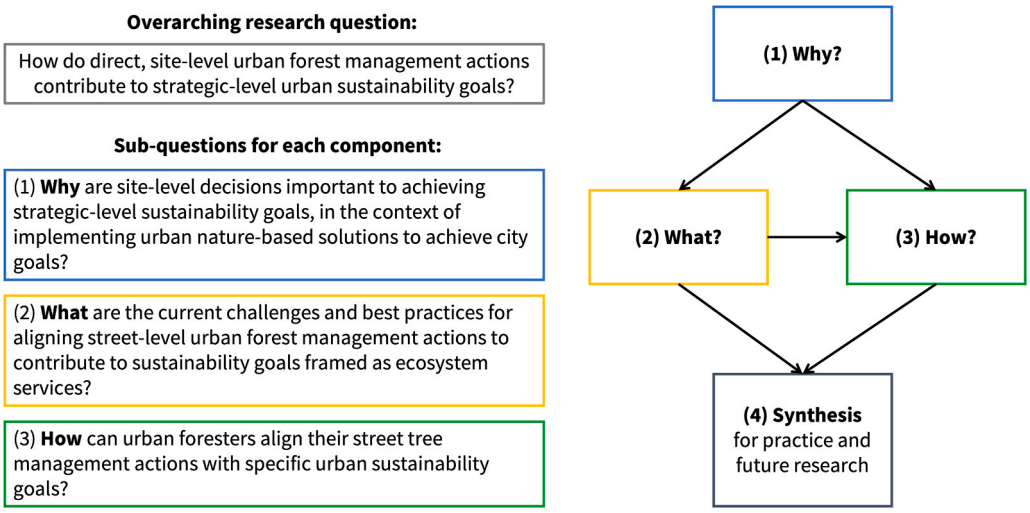


Fig. 1. Conceptual framework of the components of the Street Tree Futures research project.

2.2. Research synthesis process

Research synthesis is the "process of reviewing, assessing, and synthesizing existent literature or data to produce a series of outputs" (Wyborn et al., 2018). Synthesis processes entail selecting and distilling the "information overload" posed by original research studies and translating findings into information matching the needs or context of decision makers (Dicks et al., 2014). Synthesis methodologies can range from systematic or scoping literature reviews, to structured decision-making processes, to focus groups and expert consultation, all of which range in time and resources required to execute as well as credibility of created outputs (Dicks et al., 2017). In the process of synthesis, the new outputs can be greater than the sum of its original parts, as the inter- and trans-disciplinary teams of subject matter experts who typically conduct synthesis activities (and are considered to be best poised for these tasks) can have a strong hand in shaping outputs based on their own expertise, pointing to the need for transparency (Dicks et al., 2017). Who is considered an "expert" necessarily shapes the outcomes of research synthesis through the inclusion and exclusion of different types of knowledge (Burgman et al., 2011). In our synthesis, we included representation from the university, government, private industry, and non-profit sectors - the most prominent leaders in urban forestry. We brought these members of our research and professional advisory committees together in a semi-structured focus group discussion, conducted at the end of the project (coined the Street Tree Futures Research-Practice Summit), to gather the diverse and expert perspectives of our team and to provide a process for generating the foundations for our synthesis.

The Research-Practice Summit was held in-person in Washington DC, in October 2023, after completion of data collection and analysis of the prior project components, to synthesize overall findings and discuss implications for future research and practice. An intentional and structured approach was taken, using a semi-structured focus group discussion (Onwuegbuzie et al., 2009; O.Nyumba et al., 2018). The participants were three members of the Street Tree Futures research committee, two members of the professional advisory committee, one facilitator (the project leader), and one notetaker. First, the problem statement of apparent disconnect between small decisions and strategic goals was presented and framed (as described in (Bassett et al., 2025)). This was followed by three facilitated discussions. The topics for the three discussions were (1) findings of (Bassett et al., 2025), semi-structured interviews with urban foresters, (2) findings of (Bassett et al., 2024), expert elicitation, and (3) synthesis and implications of findings for research and practice of urban forestry. The reflection prompt for discussions (1) and (2) was "From these results, what is one thing that you think is very significant? What is one thing that you think that is missing?" and the final reflection prompt for discussion (3) was "Please share one future direction or application of these results for research in urban forest management and the practice of urban forest management." Each discussion took the structure of a short presentation of previous findings, independent reflection in response to open-ended question prompts, sharing of reflections in randomized order, followed by open discussion, and final written reflections by participants on collected note cards. Beginning discussions with independent, private, reflection and directing discussions to begin in a randomized order are strategies to overcome biases common to open discussions, such as "anchoring bias" wherein group-based decision-making tends to be overly influenced by the first idea or information presented (Furnham and Boo, 2011). To summarize themes and findings of the focus group, the participants' written reflections (each reflection was typically one to two sentences) were copied into a spreadsheet. The primary themes of each discussion were summarized, augmented with detailed notes taken during the focus group, and reviewed with the notetaker.

3. Results

3.1. Reflections from the Street Tree Futures Research-Practice Summit

Two dominant reflections emerged from the focus group:

(i) "Us vs. them": gaps between urban forestry and allied fields

Research-Practice Summit participants were most struck by the disconnects between urban forest management and city ecosystem service goals that municipal urban foresters expressed (Bassett et al., 2025). These were summed up by an "us vs. them" or "my goals vs. their goals" mentality and the recurrent themes of needing to overcome departmental silos and increase collaboration. Some summit participants were disappointed, but not too surprised, with one participant reflecting "I feel as if not much progress has been made on the idea that the person in charge of trees operates in a vacuum." There was agreement on the need to understand ways to connect urban foresters with so-called "other sustainability goals," and not just tree-focused goals (Fig. 2). In theory, such goals can be connected conceptually by demonstrating the ecosystem services, however in practice, responsibility for strategic goals are often assigned along disciplinary lines. Participants suggested that such connections could be fostered by exploring governance arrangement processes to include urban forestry within planning processes from other disciplines/departments and having mechanisms for goal accountability. Future research could also consider the impact of



Fig. 2. Urban forest goals are often isolated from other urban sustainability goals, and from the professionals charged with managing them.

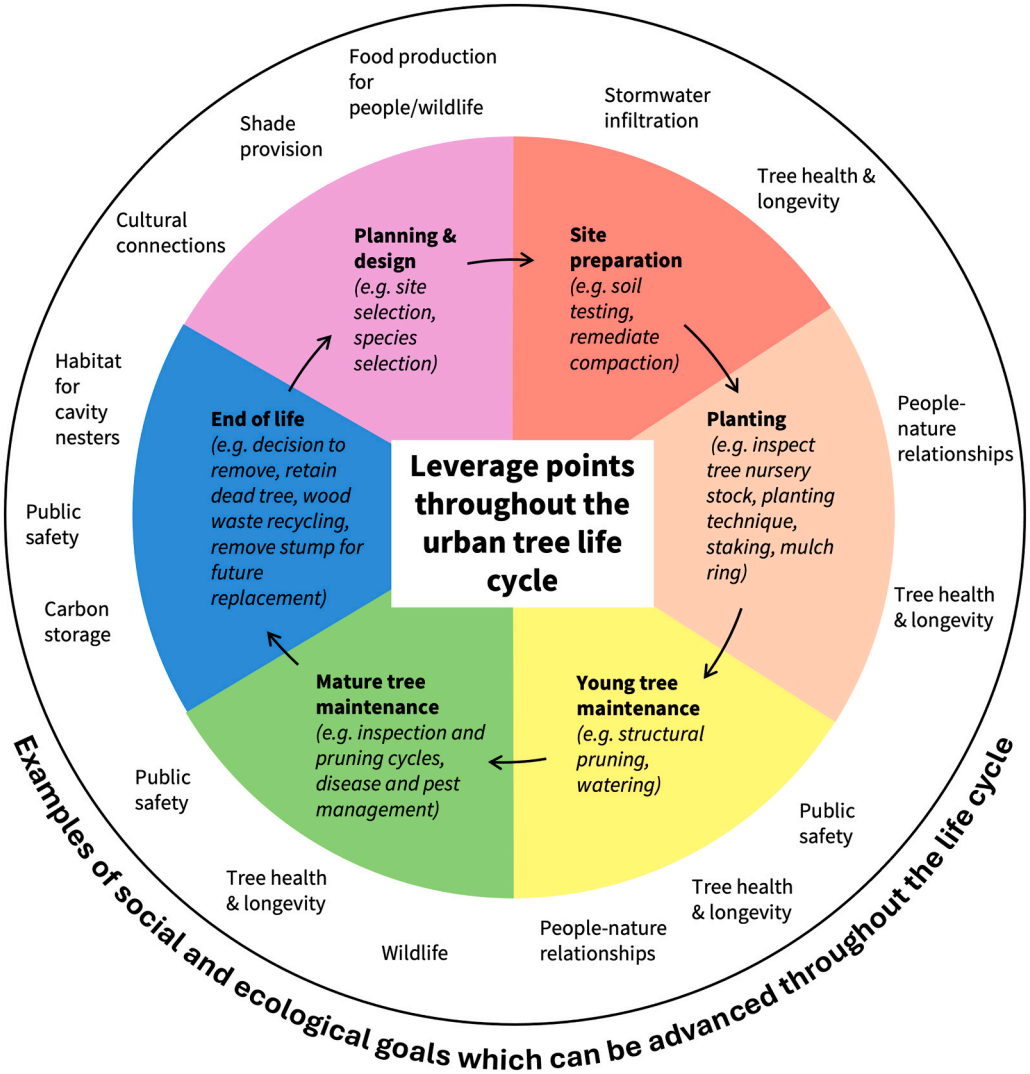


Fig. 3. Examples of leverage points throughout the urban tree life cycle to advance social and ecological sustainability goals. Certain phases present opportunities to target one goal more than another, while other phases present opportunities to increase tree health and longevity overall.

the type and structure of municipal plans and degree to which urban forestry is integrated in such plans. Sharing success stories, such as cases where urban foresters were given a seat at the table in the planning process and how that affected outcomes for urban forest management and city ecosystem goals, was an idea for inspiring future action.

(ii) Management actions can be linked with specific ecosystem service goals

The findings of the expert elicitation study (Bassett et al., 2024) were overall perceived to have high application for urban forestry practice and as foundations for future research. As one summit participant wrote, the identification that "some actions clearly serve multiple services, and other actions are more specific" was a key finding. Identifying actions as fundamental to tree health and longevity (e.g., structural pruning for young trees), or as needed to advance specific services (e.g., retaining dead trees for wildlife habitat), could aid in evaluation of tradeoffs and synergies of ecosystem services presented by management (Fig. 3). Such identification can also aid in identifying strategies to link urban forest management with sustainability goals typically controlled by other disciplines. However, because of the "mostly perfect world" assumptions in the expert elicitation scenarios, there were questions as to how the findings would fit in real world situations, where there are major constraints from conflicts with built infrastructure, budget constraints, and limited and/or poor-quality soils. Some links found were thought to be more novel and represent a shift in thinking among urban forest professionals, especially the potential of a range of mature tree maintenance actions to support people-nature relationships and potential alignment between actions to support wildlife habitat and people-nature relationships.

Summit participants commented both on the difference in how expert elicitation participants responded to the hypothetical scenario and in the results of the elicitation themselves. For example, the expert elicitation results present strong evidence that urban foresters can link specific actions with specific ecosystem services, while the results of the interviews showed that urban foresters can do this to a degree, but preferred a focus on structural goals, such as canopy cover. Summit participants observed alignment in the results of the two studies in that expert elicitation participants were more confident their actions could advance a canopy cover and tree risk reduction goal than they were in advancing other ecosystem service goals.

3.2. Implications for research and practice

The summit finished with a discussion of the overall findings of the project and their implications for the research and practice of urban forest management. Barriers to using results from Street Tree Futures to improve alignment of urban forest management with city-wide sustainability goals included needing additional information to (1) translate generalized findings to specific social and ecological contexts and (2) understand the local governance arrangements in different cities. For example, participants discussed that it was likely that city plans imbued with more authority, monitoring, incentives, or enforcement mechanisms, or plans created through deeper professional and community stakeholder engagement processes, could have more alignment between urban forest management and specific goals. The challenges to alignment identified in the practitioner interviews study (Bassett et al., 2025), such as departmental silos and need for decision-support tools, were brought up as key areas to focus on in future research and practice. Most participants believed the linkages between actions in goals identified in the expert elicitation study (Bassett et al., 2024) represented a substantial synthesis of knowledge which could significantly advance practice. However, because of the many assumptions in the hypothetical scenarios used in this study (especially the removal of typical barriers such as budget constraints and infrastructure conflicts) Research-Practice Summit participants wondered how results could be applied in real world scenarios. They also saw a need to consider other ecosystem services or disservices, such as those related to human health, like reducing allergens or trapping particulate matter, which are critical wellbeing challenges in cities.

Overall, participants suggested new avenues for academic research that could build from the results of Street Tree Futures, which we synthesized into a list of future research questions (Table 1). These were primarily related to understanding and quantifying the impacts of site-level management on sustainability outcomes, and the relationships between managing for tree health and enabling community tree stewardship. In the near term, results could inform outreach and education efforts, such as increasing awareness on which actions impact which ecosystem services and supporting communication between urban forestry and other departments, institutions, and professions, working towards urban sustainability goals. Using results to serve as foundations for best practices or decision-support tools, combined with locally relevant information, could provide a path to substantially improve urban forest management decision-making.

4. Discussion

Aligning site-level management decisions with strategic level sustainability goals would present a paradigm shift for urban forestry in Canada and the US, and potentially also elsewhere. Our studies open up new avenues for further research to consider how various actions throughout the street tree management life cycle can serve as leverage points for sustainability. Most current research is typically focused on "what to plant and where," furthering the neglect of other phases of management also needed to achieve strategic goals (Bodnaruk et al., 2017; Farrell et al., 2022). Furthermore, this research contributes to understanding of the purpose of urban forestry and how management paradigms can support this purpose. Typical narratives inside the professional and research communities often describe understandings of the benefits of trees as ways to advocate for further tree preservation and planting (Bassett et al., 2025). Through a structured expert elicitation, we found managing for increased canopy cover to require similar suites of actions as the other goals, and to be a close proxy for urban heat and stormwater mitigation especially (Bassett et al., 2024). We also identified actions that this goal does not incentivize, such as the planting of native or fruit bearing species. Our findings also suggest that the framing of strategic goals—whether intended to change ecosystem structure (e.g., a canopy cover goal), increase provision of an ecosystem service (e.g., heat regulation or stormwater interception), or foster people-nature relationships (e.g. encourage bonds between residents and trees)—resulted in different management strategies. These complement literature finding that the framing of goals can significantly impact subsequent management (Biddle and Koontz, 2014) and that engaging with relational values can elicit different sets of viewpoints and actions (Chapman et al., 2019; Eyster et al., 2023).

This endeavor as a whole has identified key points of influence, or, leverage points, in the street tree management life cycle where specific sustainability goals should be considered as a part of decision-making (such as through intentional species selection prior to planting, and mature tree management decisions later in the cycle to enable longevity) (Fig. 3). All together, these key points could present new pathways to overcome the disciplinary silos through articulating strategies to align urban forest management with strategic sustainability goals usually thought of as belonging to other disciplines, such as stormwater management or wildlife conservation. These pathways to align actions with specific goals build off of research that already supports this work, such as through more intentional site and species selection in new plantings (Bodnaruk et al., 2017). However, to truly value what interviewees referred to as "other goals" at their city, i.e., ecosystem service goals including climate change mitigation and urban heat reduction, a shift in thinking is needed. It is imperative to see trees as more than a natural asset managed in a vacuum, and instead as part of the social-ecological system of cities which support and improve the wellbeing of human and non-human residents (Keeler et al., 2019; Vogt, 2024).

Table 1
Proposed research questions on small decisions in urban forest management as leverage points for sustainability, synthesized from results of the Street Tree Futures project.

Research questions
1. How do other stakeholders (e.g., private residents, government agencies, institutional landowners) align their direct urban forest decision-making with specific urban sustainability goals?
2. Which actions lead to the most benefits, particularly in resource constrained environments?
3. How much impact could be made on a given goal by aligning site-level actions?
4. What are the primary barriers to aligning actions with specific sustainability goals (e.g., governance, measurability)?
5. What is the relationship between tree health and specific sustainability goals?
6. How do current arboricultural tree management best management practices align with different sustainability goals?
7. Given these findings, how should professionals adapt practices to align with sustainability goals in their cities?
8. Does increasing the visibility of tree maintenance to the public impact human relationships with trees?
9. How does communicating the impact of urban forest management actions on specific goals change the perception of urban forestry by allied fields (e.g., planning, civil engineering, landscape architecture)?

We propose working across sectors and disciplines as a lever (per Chan et al., 2020) to connect urban forest management with specific sustainability goals. However, the ability for professionals leading urban forestry to work with other disciplines, even so-called "allied" professions like urban planning or landscape architecture, is still limited not only by the capacity and willingness of urban foresters, but by the capacity and willingness of other disciplines to engage with urban foresters. Even lack of a basic awareness of the existence of urban forestry and its potential to be mobilized in service of other objectives can be a major barrier. Including a variety of public stakeholders, especially neighborhood tree groups or citizen science initiatives, could be a way to bring other professionals of other disciplines to the table (Roman et al., 2018) and implement lasting initiatives, such as successful local tree policies or urban plans which support urban forests (Frantzeskaki et al., 2025). Though changing, nature as a whole is still often completely forgotten or overlooked in discourses on urban resilience and sustainability (which can be focused on topics like energy and resource use), disconnects which were encountered in our study and related literature (Ordóñez, 2021; Vogt, 2018).

Nonetheless, the identified gaps in research and practice between site-level actions and strategic-level goals must be bridged for the benefit of urban sustainability. The consequences of failing to integrate nature into urban sustainability planning will not only include irreversible losses of urban ecosystems to commercial or residential development, but to "green" forms of development from bike lanes to renewable energy installations—especially considering the many definitions of terms like "greening" and "green infrastructure" (Grabowski et al., 2022; Quinton et al., 2022). The rise of concepts such as ecosystem services (and more recently, the concepts of green infrastructure and nature-based solutions) have substantially moved the needle on "telling the story" of how urban forests contribute to cities and support the wellbeing of residents and progress towards sustainability (Escobedo et al., 2019). As awareness increases of not just the ecology *in* and *of* cities, but of the need for ecology *for* cities (Pickett et al., 2016), and *with* cities (Byrne, 2022), urban foresters, as key agents of change within urban ecosystems, need to be prepared to likewise adapt their management to target the present and future needs of cities, and to collaborate with new partners and sectors. Recent new funding sources, such as the Inflation Reduction Act and Bipartisan Infrastructure Law in the US, and the 2 Billion Trees Initiative in Canada, have presented opportunities not just to advance the scale and sophistication of new urban forestry programs, but to raise the profile of, and attract attention to, the field. Theoretical advances in understanding the benefits of nature to people are likewise rapidly expanding in other fields, such as evolutions of the concept of ecosystem services to better include cultural values, and the introduction of the umbrella concept of nature's contribution to people (Díaz et al., 2018), which remain underexplored in urban forestry. Unfortunately, the interdisciplinary nature of urban forestry research can pose challenges to finding the significant funding required for long term research—leading some academics to describe their work as stuck in a "permanent 'pilot study' mode" (Sustainable Urban Forests Coalition, 2023). Overall, although there is overwhelming evidence substantiating the myriad benefits urban forests provide to society, to truly operationalize urban forestry in service of sustainability goals, research is needed to inform evidence-based frameworks to aid professionals in simplifying the complexity of the real world and aligning actions with goals. Our research specifically contributes to this aim by showing the power of site-level decisions to achieve or undermine strategic goals (Bassett et al., 2025), establishing the main barriers to aligning street tree management with ecosystem service goals (Bassett et al., 2025), and providing a qualitative assessment of the key points of influence for different goals throughout the street tree management life cycle (Bassett et al., 2024).

Our project was strengthened by a diversity of cases, incorporating perspectives from cities of varying sizes and diverse social and ecological contexts across the United States and Canada, including cities underrepresented in the literature such as Honolulu, Hawai'i, in the expert elicitation study, and many small and medium sized cities in the practitioner interviews study. This broad scope enhances the generalizability of the findings to urban areas within these countries. An important limitation is that results are rooted in the assumption that urban foresters possess reliable knowledge on the connection between their actions and the provision of a multitude of ecosystem services. Researchers may find the expertise of urban foresters to be behind the state of the science concerning the specific mechanism of provision of certain benefits. The data we gathered also does not include perspectives and knowledge of broader stakeholders, including allied professionals or community members. The scope of this research was also limited in focus on direct management, and while appropriate to the questions being asked, could not thoroughly consider the significant influence of the social and governance contexts of such actions (Johnson et al., 2019). The focus on street trees also aided in comparability between cities, but limits applications of results to other components of the urban forests with different management regimes e.g. parks or urban natural forests (Pregitzer et al., 2019).

We also acknowledge the limitations inherent in the synthesis process of this article, which requires making selective choices about which findings to emphasize and thus is subject to the inherent biases of our author team and other study participants. Finally, while the papers contribute valuable insights applicable to the US and Canada, the transferability of these findings to other countries may be more constrained, due to differences such as local governance arrangements and bioregion.

5. Conclusions: small decisions as leverage points for change

We have drawn on diverse bodies of literature and perspectives of many experts, and our synthesis has sought to develop generalizable findings which can be operationalized in service of real societal needs. The Summit's synthesis process contributed three main

recommendations for research and practice.

1. Advance research to characterize and quantify the relationships between management actions and urban sustainability goals (such as through investigations of the questions in Table 1);
2. Break down "us vs them" barriers to integrate urban forests into holistic management of ecosystems and landscapes, and advancement towards strategic sustainability goals; and
3. Look to other fields, such as advances in the science of ecosystem services, to advance pluralistic understandings of the benefits of urban trees and the people-nature relationships that underpin and propel stewardship decisions.

Ecosystem management decisions, such as those arising in urban forestry, are nearly always necessarily made with insufficient information. While an idealized pathway for evidence-supported decision making may rest upon systematic review of all available evidence, it is also common for single studies, or selections of studies, to have outsized impact on decisions or official guidelines (Dicks et al., 2014; Haynes, 2001). We recommend that if seeking to apply these results, for example, in tailoring actions for a specific sustainability goal, that any direct findings be applied in combination with local and expert knowledge, especially subject matter experts. It is not realistic or possible for every urban forester to become an expert on the complex mechanisms of benefit provision for the many possible benefits that city residents need, nor is it possible for experts in subjects as diverse as hydrology, microclimate regulation, wildlife ecology, and sociology to understand the complexities of urban forest management. Therefore, coalitions with diverse knowledge bases are perhaps the only feasible pathways to integrate scientific evidence with local conditions to support the decision-making we need, especially under resource constraints. To conclude, we emphasize that small decisions present opportunities to be a leverage point for sustainability, not just of urban forests, but of cities. A renewed focus on the actions needed to reach the goals we need, and on those who make them, can help propel us where we need to go. In the words of one interviewee:

> *"I'm aware of all this stuff, but I can be very cynical when it comes to [city] plans and things because, again, it's not what they say. It's what they do." (P10)*

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Declaration of Competing Interest

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