Exploring the characteristics of successful volunteer-led urban forest tree committees in Massachusetts

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ABSTRACT

Citizen engagement through urban forest tree committee volunteer service may aid in providing essential experience, ideas, and skills that support municipal tree management. Using semi-structured, research interviews with tree committee (TC) representatives from across the Commonwealth of Massachusetts, this study addresses current knowledge gaps concerning the general composition, processes, and relationships of volunteer-led urban forest tree committees. Our findings indicate that TC representatives are typically motivated, passionate volunteers who generally desire to work cooperatively with the many associations, organizations, and agencies that comprise the local socio-political landscape. Our findings also indicate it is important that TC representatives make a sustained, concerted effort to work collaboratively with their local tree warden to advance the care of their community's urban trees. Furthermore, it is also essential that municipal managers and decision-makers attempt to provide TC volunteers with appropriate training opportunities, resources, as well as demonstrate appreciation, to further encourage and solidify volunteer-engagement in urban forestry at the local level.

1. Introduction

Urbanization and the expansion of the built environment invariably results in the depletion and loss of natural resources including arable land, air and water quality, wildlife habitat, species diversity, and the degradation of natural processes including stormwater abatement, and carbon sequestration (Brown et al., 2005; Nowak et al., 2006; Nowak and Greenfield, 2012; Clapp et al., 2014). These natural processes, however, may actually be preserved and augmented, through the initiation of programs that include the installation of trees and proliferation of urban green spaces. Urban trees may offer a wide number of ecological and economic benefits including carbon sequestration, heat island abatement, air quality improvement, storm water runoff attenuation, wildlife habitat, utility cost savings, and property value enhancement (Nowak and Crane, 2002; Nowak et al., 2006; McPherson et al., 2007; Jim and Chen, 2009; Bocsi et al., 2018). Urban forests and access to urban green space may also offer an array of health-related benefits for residents including improvement of physical well-being, strengthening of social networks, reduction in obesity, reduction in mental fatigue, as well as the reduction of stress and enhancement of stress recovery (Parsons et al., 1998; Kuo and Sullivan, 2001; Westphal, 2003; Bell et al., 2008; van den Berg et al., 2015). Social benefits have also been associated with urban vegetation including a greater sense of community, a heightened sense of safety, and greater social interactions (Kuo, 2003). Lipkis and Lipkis (1990) summarize these sentiments in stating,

> "Tree planting…fosters community spirit and pride, bringing people together for a meaningful purpose that can build the bridges and promote the understanding that brings the neighborhood together. The initial efforts of the tree planters compound themselves as others find in the trees a deeper appreciation of the community as well as natural beauty." (p. viii)

Citizen involvement in urban greening, including urban forest management, is a concept and practice that has been around for many years. Popular citizen interest may be traced to notable celebrations like the inaugural commemoration of "Arbor Day" in Nebraska, U.S., by J. Sterling Morton in 1872 (Jonnes, 2016). The Arbor Day festivities that the former United States Secretary of Agriculture and tree-lover initiated in Nebraska City with the planting of a million trees, would be continued by growing numbers of schools – nationally and internationally – over the ensuing decades (Jonnes, 2016). Volunteer citizen engagement at the community level also manifested in Europe and the U.S. in the late 19th century with the formation of citizen associations

and committees concerning themselves with the management of local parks, public spaces, and urban trees (Johnston, 2015). These included the Commons Preservation Society (1865) and the Metropolitan Public Gardens Association (1882) in the U.K. (Johnston, 2015), and the Brookline Tree Planting Committee (1886) in Massachusetts, that featured notable founding members Charles Sprague Sargent and Frederick Law Olmstead, Jr. (N. Geerdts, Pers. Comm.)

At present, volunteerism in the U.S. is both an important contributor to the American economy, providing an estimated annual value of $172.9 billion USD (McKeever, 2015), as well as an important mechanism through which individuals may contribute their time, energy, knowledge and resources to the community around them (Harrison et al., 2017). It is estimated that 62.6 million individuals, or approximately one in four American adults, is currently engaged in some form of volunteerism (US Bureau of Labor Statistics, 2016). Though volunteers may vary relative to their interest-levels, determination, work habits, and skill-set (Harrison et al., 2017), they are often motivated by a strong sense of contribution, and the opportunity to learn new skills and gather information (Domroese and Johnson, 2017). Volunteers may also be motivated by a sense of affiliation with other like-minded individuals, recognition for their efforts, achievement and the pursuit of excellence, power and influence, and environmental stewardship (Fazio, 2015; D. Bloniarz, Pers. Comm.).

Community members volunteering on tree committees find themselves working at the juncture of interrelated social-ecological systems (SES) where biophysical factors like tree planting and maintenance, interact with other social elements and human interests like policy decision-makers, municipal managers and employees, and property owners (Mincey et al., 2013). Tree committees endeavor to balance the demands of these different groups and to "reflect the will of the community" (Fazio, 2015) in an official capacity on issues pertaining to the management of the urban forest. Though tree committees are typically concerned with the care of trees located in urban streets and parks, they may also find themselves concerned with the management of urban trees found growing on private properties. This is an important consideration since trees growing in yards or on privately-owned landscapes may comprise up to 90% of the urban tree canopy cover of a community (Fazio, 2015).

Tree committees may arise for a variety of reasons. In some instances, they may be hastily conscripted to address the acute loss of urban tree canopy cover due to a rapidly-invading pest of importance, or in the event of a severe storm that has caused widespread damage or loss to the urban tree canopy cover (Town of Monson, 2017). Tree committees may also form, however, out of the need to address more chronic problems that have developed over time, perhaps as a result of a community's aging and declining high-profile tree population (L. Bozzutto, Pers. Comm.). Whatever the reason behind the genesis, the best legal foundation that can support a community tree committee is typically considered to be a local ordinance, defined as legislation enacted by a municipal authority. Fazio (2015) concludes that ordinances are the best way to protect urban trees while balancing the needs of developers and urban planners. A local ordinance that recognizes, empowers, and authorizes a tree committee to carry out its mandate on behalf of urban trees and community residents can be a critical step in engaging residents and citizen volunteers in urban forest management in a positive and constructive manner. In addition to this particular type of local policy formation, tree committee members may be tasked with variety of other functions that range from routine education and advocacy, to management and administration, to advisement and consultation with elected officials and municipal forestry personnel (Fazio, 2015).

Though volunteer urban forest tree committees may have substantial influence on urban forest management and provide a productive avenue for community-wide citizen engagement, they are rarely described in the scientific literature (Greenleaf, 2016). For example, though there is a plethora of formal research concerning volunteer-led

organizations and volunteerism in general, almost none of this information has been contextualized for members of urban forest tree committees, the vast majority of whom are volunteering at the municipal level (Fazio, 2015). Furthermore, the local conditions (challenges, opportunities) under which tree committees must function have been given little, if any, consideration in the research literature. Urban forest tree committee members in New England states, for example, will likely interact with local officers known as "tree wardens" (Ricard, 2005; Harper et al., 2017). Tree wardens are unique to the New England region (i.e., Connecticut, Rhode Island, Massachusetts, Vermont, New Hampshire, Maine) of the U.S. According to Ricard and Dreyer (2005), a tree warden is a critical human component of urban and community forestry, and they posit that a municipality may not have an effective program without the leadership of this individual. As an officer, a tree warden may potentially differ from a city forester in another state or region as they are a mandated position that may work in direct cooperation with local authorities to press charges, halt construction operations, levy fines, and/or declare a tree hazardous and fit for removal (Harper et al., 2017). Little is known about the nature of the relationship between an urban forest tree committee and a tree warden. At present, no studies have been conducted to establish even a baseline understanding of the characteristics of a well-functioning volunteer-led urban forest tree committee and this research seeks to fill that gap. Our broad goal was to understand the general composition, processes, and relationships of tree committees. Specifically, we aimed to determine 1) How tree committees are organized and operate, 2) What successes and challenges tree committees have had and; 3) What relationships exist between tree committees and other urban forestry entities. In this study, we explored various perspectives regarding the characteristics of what a successful volunteer-led urban forest tree committee looked like in the Commonwealth of Massachusetts, with the hope that our findings may offer insights for other urban forest tree committees.

2. Methods

We employed a qualitative data collection and analysis approach, utilizing data generated from semi-structured interviews with representatives from urban forest tree committees in Massachusetts, representing both small communities (i.e., Lanesborough, population approx. 3000) as well as larger cities (i.e., Fall River, population approx. 90,000). Research interviews have been used in many sectors, including the social sciences, to gather detailed knowledge from individuals that are usually recognized experts in their field, concerning a specific topic (Elmendorf and Luloff, 2007). This method has enabled credible, in-depth findings on a wide number of topics (Rubin and Rubin, 2012), including a better understanding about the human experience and how we as individuals and groups interact with the environment around us (Dampier et al., 2014).

2.1. Interview guide and data collection

During the spring of 2017 a 21-question interview instrument (Table 1) was constructed with input from academic and agency urban forestry specialists. Interview candidates were selected in a purposive manner (Dampier et al., 2015; Lemelin et al., 2017), with the objective that the research question would be addressed, and based specifically on the following criteria:

a) Participants would be able to provide general information regarding their urban forest tree committee in Massachusetts,
b) They would be in a position to offer in-depth, first-hand knowledge regarding the operations and functions of their respective urban forest tree committee,
c) They could provide information about the variety of ways in which their urban forest tree committee would interact with local residents and community stakeholders.

Table 1
Interview Questions and Predetermined Themes. TC = Tree Committee.

Question	Pre-determined Theme
1) Briefly tell us about your local TC and your involvement	'TC Attributes & Volunteer Involvement'
2) Briefly outline your background and your motivations for participating on your local TC	'Volunteer Background & Motivations'
3) When was the TC formed?	'TC Formation'
4) Does your TC have a charter?	'TC Charter'
5) Does your TC have a mission?	'TC Mission'
6) Is the TC advisory only, or is there an authority (regulatory) component?	'TC Role'
7) Please outline the number of members on your TC and the typical term length?	'Members & Term Length'
8) How is an individual ratified (formalized) as a TC member?	'Membership Ratification'
9) When does your TC meet?	'Meeting Frequency'
10) How are meetings run and how are they evaluated?	'Meeting Functions, Evaluation'
11) What sort of operational guidance (i.e., annual plan of work, budget) does your TC have?	'Operational Guidance'
12) Briefly identify key programs or initiatives your TC carries out?	'Programs, Initiatives'
13) Briefly identify some key collaborating groups – why have these partnerships been successful?	'Successful Collaborators'
14) Briefly identify some examples of some unsuccessful collaborations. Why?	'Unsuccessful Collaborators'
15) Is there a means of evaluating a program's or an initiative's success?	'Program Evaluation Methods'
16) How does your TC interact with the public (i.e., Facebook page, town meetings, etc.)	'Public Interaction'
17) Identify the steps taken by your TC to maintain volunteers & recruit new participants?	'Volunteer Retention, Recruitment'
18) Briefly describe the nature of your TC's interaction with the local Tree Warden	'TC & Tree Warden Interaction'
19) Briefly describe the nature of your TC's interaction with local municipal officials (i.e., mayor's office, select board, councilors)	'TC Relationship w/ Local Officials'
20) Briefly describe the nature of your TC's interaction with local (municipal) agencies, organizations and/or associations?	'TC Interaction w/ Local Agencies, Organizations'
21) Has your TC helped to develop, shape or implement policy in your community – how?	'Policy Development'

d) They were accessible and responsive to being interviewed.

The total number of interviews to be conducted was determined by the point at which "no new analytical insights" were "forthcoming" (Ritchie and Lewis, 2003), and the point at which a suitable sampling of urban forest tree committee representatives had been obtained from across Massachusetts. Based on local data (MA DCR, unpublished) and a further searching of listed contacts and municipal websites, it was broadly estimated that there are no less than 40 active, volunteer-based urban tree committees in Massachusetts; hence, it was surmised that data saturation requirements would likely be satisfied after obtaining between 10–15 interviews with urban forest tree committee representatives.

During the summer of 2017, interviews with a total of 13 volunteer representatives (typically the Chair) from 13 distinct urban forest tree committees across Massachusetts were carried out (Table 2). Appointments with the first author (RH) were scheduled with the respective volunteer, and a single interview took usually 15–30 min to complete, over the phone.

2.2. Analysis

Questions posed to participants from the semi-structured interview tool were categorized into three groups: "Introductory" (questions 1–8), "Operational" (questions 9–12), "Community Relationships" (questions

Table 2
Urban forest tree committee representatives from the following Massachusetts communities participated in semi-structured interviews.

Municipality	Population
Fall River	88,712
Brookline	58,732
Arlington	42,844
Chelsea	38,861
Amherst	37,819
Saugus	26,628
Greenfield	17,456
Newburyport	17,450
Lynnfield	11,596
Great Barrington	7104
Mattapoisett	6045
Marion	4907
Lanesborough	3,091

13–21) (Table 1). As part of the interview process, interviewer impressions (i.e., notes) were also taken. Interviews were audio-recorded, generating nearly 4.5 h of recorded data. All 13 interviews were transcribed over a period of 30 h.

After the initial transcription, interview data were imported into the Computer Assisted Qualitative Data Analysis Software (CAQDAS), NVivo Version 11 (2015) (QSR International; Melbourne, AUS).

Interview questions were developed around predetermined themes of interest, as described by Gillies et al. (2014), with the participation of agency urban foresters and urban forestry academics who reviewed and commented on the interview instrument before it was used (Table 1). The significance and meaning of the participant responses that related to each of these predetermined themes (i.e., interview questions) was emergent and coded to generate a thematic framework.

Coding was performed in a systematic manner where a nested node (i.e., initial "parent" nodes, followed by "child" nodes) structure (Dampier et al., 2014) was generated based on interview data, pursuant to the predetermined themes from the interview instrument. New, emergent themes that were attached to the predetermined themes from the interview instrument were corroborated with the second author (EH) and the research team to ensure that coding and content analysis was valid and replicable. In accordance with Berg and Lune (2012), emerging themes were considered potentially valid when they appeared at least three times (n = 3) among different interviewees. If a theme occurred on one occasion (n = 1) it may have been an "accident"; a theme that occurred twice (n = 2) was considered to have been a "coincidence" (Berg and Lune, 2012). A sub-sample of interview data was tested with 5 social science researchers as an inter-rater reliability test, with a resulting agreement of 89% and a kappa value of 0.79, both considered sufficient to form inter-rater agreement (Fleiss and Cohen, 1973).

3. Results

3.1. Introductory questions, tree committee structure

Introductory questions 1–8 from the interview tool (Table 1), were coded as the following pre-determined themes: (i) 'TC (Tree Committee) Attributes & Volunteer Involvement', (ii) 'Volunteer Background & Motivations', (iii) 'TC Formation', (iv) 'TC Charter', (v) 'TC Mission', (vi) 'TC Role', (vii) 'Members & Term Length', (viii) 'Membership Ratification'.

The pre-determined theme, 'TC Attributes & Volunteer Involvement', derived from the initial "grand tour" question that was designed to initiate the interview, but was not anticipated to generate data necessarily relevant to the interview question. During this commencement phase of the interview process, interviewees (or sources) introduced themselves by identifying their 'position' (n = 10 sources) and/or their 'duration' (n = 6) on their urban forest tree committee, and by discussing the local 'history' (n = 8) and origins of their tree committee:

> "The tree committee was started by the board of selectmen in 2011. At that time, they were doing a whole renovation on Main street and there were…beautiful, beautiful pear trees planted along Main street. They had gone in around 40 years ago and in May they would be in bloom and they just made the town look quite majestic. But they were old and they were breaking and they were becoming quite a hazard and they were growing into wires. So the board of Selectmen decided to get a resolution to form a tree committee to be advisory…to come up with a new tree design for Main street." (Great Barrington Tree Committee)

Emergent themes relative to volunteer motivations indicated that members served due to a deep 'personal interest in trees and greening' (n = 10). The participant from the Amherst Tree Committee summed up this sentiment well, in stating simply:

> "I've loved trees my whole life."

The emergence of 'professional affiliation, interest' was also a prominently associated theme among interviewees (n = 5), as many of them indicated their motivation to volunteer was due to the fact that they were formally credentialed and/or professionally experienced in fields related to urban forestry like 'horticulture', 'forestry', 'landscape

architecture/design', 'planning' or as a 'naturalist'.

Emergent themes also indicated that the 'origin' (n = 13) of the local tree committees spanned ranges from '0–10 years' (n = 4), '11–20 years' (n = 4), '21–30 years' (n = 3). Interview data indicated that 'yes' nearly all tree committees (n = 10) featured a 'charter' as well as a 'mission statement' (n = 10), respectively. According to the chair of the Fall River Street Tree Planting Program,

> "Yes, we do have a mission, to try to plant trees in the Fall River area and to reach out to the public and inform them of the benefit of trees in a community."

The vast majority of interviewees indicated their urban forest tree committee played an 'advisory, educational' (n = 11) role and often worked in a cooperative, consulting manner with municipal staff on issues relevant to urban forest management:

> "We're an advisory committee so we advise the tree warden. We do vote on issues…that come before the committee…there is a committee vote, but it's always advisory to the tree warden" (Brookline Tree Planting Committee)
> "[We are] advisory…all final decisions are made by the tree warden" (Newburyport Tree Commission)

Interviewees indicated that urban forest tree committees featured a membership size of '4–6' (n = 3) or '7–9' (n = 3) individuals, who are most likely serving a '3-year' (n = 6) term limit, though some committees had 'undefined' (n = 4) term limits. Emergent themes indicated that successful candidacy for an urban forest tree committee in Massachusetts may be a multi-step process involving some combination where an individual would receive a 'personal invitation' (n = 3), would be the subject of a screening 'interview' (n = 3), complete an 'application' (n = 4), participate in an 'initial meeting' (n = 3) and then be formally placed onto the committee through an 'election' (n = 5) by committee members and/or formal 'appointment' (n = 9) by the municipality.

3.2. Operations

Operational questions 9–12 from the interview tool, were coded as the following pre-determined themes: (ix) 'Meeting Frequency', (x) 'Meeting Functions, Evaluation', (xi) 'Operational Guidance', (xii) 'Programs, Initiatives'. The frequency of urban forest tree committee meetings was often on a 'monthly' (n = 10) basis. Meetings themselves may be run by a 'chair' (n = 3), almost always follow an 'agenda' (n = 12), may feature a 'member reports' (n = 3) segment, and typically document meeting 'minutes' (n = 11). In relation to 'Operational Guidance', interview data identified that a substantive number of the urban forest tree committees indicated "yes" (n = 5) they have a municipal budget, while nearly just as many indicated "no" (n = 4) they did not. Interview data also indicated that urban forest tree committees may have some form of a 'plan of work' (n = 4) guiding their activities.

Interview data revealed a number of prominent themes in relation to specific programs or initiatives that urban forest tree committees might engage the community with, including 'Arbor Day' (n = 6) activities:

> "Every year we have an Arbor Day get-together and this year was planting four trees at the children's museum…the mayor actually has to sign the official form and preside over that [ceremony]." (Fall River Street Tree Planting Program)
> "…we have a very nice Arbor Day celebration which we happen to celebrate in May because April in the Berkshires is way too cold. We work with the third-grade class up at the Lanesborough Elementary…they do tree art, they write tree poems, and we go up and have a day of tree education with them" (Lanesborough Tree & Forest Committee).

Urban forest tree committees may also be engaged in assisting with

a local 'urban forest inventory' (n = 3), 'urban tree planting' (n = 7), and/or some form of direct 'outreach, education' (n = 6) like staffing an 'events booth, display' (n = 3), or generating 'printed media' (n = 3):

> "We put out a newsletter, now it's only once a year, we used to do it twice a year, but it's a thing called "Tree Talk" and we include it in the spring tax bill so that we try to reach many homeowners with as much tree information as we can, and there are a lot of people who comment on that quite often that they…like to get that and they learn new things…" (Lynnfield Tree Commission).

Only one committee indicated that they interacted with the public via a blog.

3.3. Community relationships

Questions 13–21 from the interview tool that were categorized broadly under the heading 'Community Relationships', were coded as the following pre-determined themes: (xiii) 'Successful Collaborators', (xiv) 'Unsuccessful Collaborators', (xv) 'Program Evaluation Methods', (xvi) 'Public Interaction', (xvii) 'Volunteer Retention & Recruitment', (xviii) 'TC & Tree Warden Interaction', (xix) 'TC Relationship with Local Officials', (xx) 'TC Interaction with Local Agencies, Organizations', (xxi) 'Policy Development'.

Interview data indicated that there were a variety of important and successful collaborators including the municipal 'DPW' (n = 6), and 'town committees, commissions' (n = 6) that included the 'conservation commission' (n = 3) and the 'town planning board-committee' (n = 3). A majority of the urban tree committee representatives also reported that a variety of NGO's (n = 8) were important collaborators including local 'garden clubs' (n = 3) and 'environmental groups' (n = 3).

Overall, the interview data revealed that nearly all of the urban tree committees identified 'unsuccessful collaborators' (n = 12), however since a minimum of at least three interview sources didn't identify a single, specific organization, emergent themes were less discernible, with 'neighborhood groups, citizens' (n = 2) and the local 'cemetery commission' (n = 2) each appearing on two – potentially coincidental – occasions.

Evaluation of urban tree committee programs generated some interesting responses from interviewees, and while a clear theme emerged relative to the fact that 'no' (n = 6) members often did not perform a formal program evaluation, 'informal' (n = 9) discussion-based evaluation of initiatives did take place:

> "…there's no formal means of evaluating. I mean, because we meet every month, within the committee we evaluate projects as they're going and certainly feedback from the tree warden and the director of the DPW. I would say there's certainly not a lack of resident feedback when we…do something…not formal but a monthly check-in, certainly." (Arlington Tree Committee)

The manners in which urban tree committees carried out public interaction included 'in-person interaction' (n = 7) which could include at a 'table or booth' (n = 3) display. The theme 'print media' (n = 6) was prominently emergent among committees, however, and nearly all interviewees (n = 11) indicated they employed some form of 'electronic, social media' to interact with the public.

Emergent themes relative to the recruiting and maintenance of volunteers included that urban tree committees employed 'electronic recruiting' (n = 4) that included 'email' (n = 2), 'Facebook' (n = 1), and a 'website' (n = 1). They also indicated that they felt there was an ongoing 'need for volunteers' (n = 4) and that they attempted to 'foster camaraderie & interest' (n = 5) to maintain the volunteers they have.

In describing the relationship with the community tree warden, urban tree committees reported that they generally had a 'positive relationship' (n = 7) and that there was 'regular communication' (n = 6) between the two parties.

> "…if any of us have a question, we either email or call him [the tree warden] and he's incredibly responsive and always able to give us an update…" (Brookline Tree Planting Committee)
>
> "We love him. He's awesome. Engineer from – spent ten years in Cambridge…good guidance there. He has a great attitude…so the relationship has been super positive from day one." (Newburyport Tree Committee)
>
> "I recruited a fellow – another landscaper to become tree warden whom I worked with previously, so he's now in that position. So, we have a good relationship and we discuss all aspects and all work." (Marion Tree Committee)

Responses from three other committee's relative to their relationship to the tree warden, however, were coded as 'limited interaction, uncertain'.

In regards to the relationship between urban forest tree committees and their local officials, interviewees typically described the relationship as being 'positive' (n = 10) and indicated that there was 'regular interaction' (n = 7) between themselves and community decision makers.

Local agencies and organizations that urban forest tree committee representatives identified as being important included local 'committees, commissions, administration' (n = 4), 'municipal departments' (n = 7) and 'NGOs' (n = 5). Among these emerged more detailed sub-themes that included 'planning department-board' (n = 4), along with less prominent (n = 2) mentions of 'parks and recreation department', 'DPW' and 'garden clubs'.

In response to the final pre-determined interview theme concerning 'Policy Development', some urban forest tree committees reported 'no' (n = 3), they were not involved in local policy formation. A more prominent theme (n = 8) emerged, however, indicating that 'yes' urban forest tree committees in Massachusetts are actively involved in policy development related to 'local tree by-laws' (n = 4) and 'local tree ordinances' (n = 4).

4. Discussion

4.1. Introductory interview phase

While it was not surprising that individuals regularly indicated that they serve on an urban forest tree committee because they take great personal interest – and are indeed passionate – about matters concerning urban trees, it was noteworthy to see professional interests and backgrounds represented in this volunteer capacity as well. The ability of a committee to leverage professional expertise is an important asset in deepening its capacity to respond to change, as urban forest needs shift in accordance with community priorities. In the event that professional foresters, horticulturists, and/or landscape architects/designers are serving as urban forest tree committee volunteers, they will likely be able to provide in-house expertise regarding a practice or initiative such as proper tree planting; yet, if the community wished to expand activities and commence a citizen pruners initiative, those same professionals should be able to provide some degree of guidance and training in that capacity as well. It also speaks to the importance of attracting a diversity of individuals that represent that community as a whole, and can communicate successfully within their spheres of influence regarding municipal urban forest management activities and practices (Locke and Grove, 2016).

Initially, it appeared that urban forest tree committees are highly structured, with well-placed systems in working order, ready to integrate new members from the community. The inherently disparate nature of volunteer committees, however, is that some groups are high-functioning while others are not (Harrison et al., 2017). So, while many committees featured a step-by-step system where community residents may get involved, others may be less clear in their procedures, as indicated by their 'undefined' term lengths for committee members in

some towns.

Finally, with the exception of the Brookline Tree Planting Committee, all other Massachusetts urban forest tree committees were formed in the last 30 years. Though there are aforementioned examples of volunteer citizen engagement in municipal parks and urban forest management from periods in the late 19th century, this information speaks to the relative recency of urban forestry as a recognized profession in Massachusetts.

4.2. Operations

Urban forest tree committees were essentially split on the issue of municipal budgets with 5 sources indicating they had access to formally allocated funds, while 4 sources indicated they did not. This issue was raised between the Chair of the Newburyport Tree Committee and Newburyport community leaders:

> "When I joined, the tree commission never received any money. And I went to the mayor and I said "why?" And she said "show me a plan and I'll show you the money.""

This interaction may be an important one, as it illustrates the impact of a grassroots, volunteer-led initiative that has the capacity to put together a cohesive plan of work, including how municipal dollars would be spent. Though data revealed that urban forest tree committees in Massachusetts may compose some form of a plan of work (n = 4), a closer look reveals that in one of these instances it is essentially a legacy work cycle. Hence, it may be possible that strengthening this activity among more urban forest tree committees may result in a more favorable response from local decision-makers relative to providing financial support.

Prominently emerging themes concerning urban forest tree committee activities like participating in Arbor Day festivities and urban tree planting were not surprising. These activities may be well-suited to volunteer-led urban forest tree committees due to the popular nature of both Arbor Day (Jonnes, 2016) and tree planting (Harper et al., 2017) efforts.

4.3. Community relationships

That there were a variety of important and successful collaborators identified by interviewees was not a surprise; responses were so disparate when urban tree committee representatives were asked to identify unsuccessful collaborators. According to the Lanesborough tree & forest committee, the fact that a volunteer urban forest tree committee plays a very specific role in the community may decrease the chances of an unsuccessful collaboration:

> "You know, I guess our span of interest is narrow enough that I don't know that I would say there were any unsuccessful collaborations. I'm not trying to say we do everything right. I guess I'm trying to say we haven't pushed the envelope too far."

It is also possible that interviewees consider the divulgence of an unsuccessful collaboration somewhat sensitive, and individuals generally may not be as forthcoming with this sort of information in a research environment (Cartwright, 1988).

The fact that so many (n = 11) urban forest tree committees indicated they employed some form of 'electronic, social media' to interact with the public was of interest. Upon further exploration of this theme, however, a prominent number of interviewees indicated this method is through 'Facebook', and nearly all sources indicated this form of interaction is through a website – typically a municipally-housed website. In fact, some individuals highlighted the need to engage their community by increasing their urban forest tree committee's capacity in the realm of social media:

> "…we're working – starting to work with social media. We have a

Facebook page and a website. And we have a new woman who just joined the committee who is younger and much more cognizant of social media than I am and she's going to take that sort of thing on…" (Amherst Public Shade Tree Committee)

> "We don't do a website because we don't have anyone young enough right now to be that savvy. And I am not a web person. That'd be a good reminder that the world does not travel on paper anymore. It travels on websites and Facebook 'likes' and we have to figure out how to do that (Lanesborough Tree & Forest Committee)

The fact that the ongoing 'need for volunteers' (n = 4) was an emergent theme may be concerning for individuals who find themselves on the front lines of volunteering in any sector, including on urban forest tree committees. Across the U.S. and in other developed nations, membership in civic organizations and volunteerism in specific sectors, as well as generally, appears to be on a downward trajectory (Putnam, 1996; Grande and Armstrong, 2008; Reuter et al., 2013; Green and Haines, 2016). Just as volunteerism itself has positive ramifications that extend beyond the individual and impact the economy and viability of organizations, a shrinking volunteer base may impact – and be indicative of – a range of segments of society from graduation rates, to participation in the democratic process (Green and Haines, 2016).

Emergent themes relative to relationships between the urban forest tree committee and their local (New England) tree warden were of interest. Though most committees enthusiastically indicated they had a positive relationship (n = 7), not all committees (n = 3) felt this way. Though details about the workings of this relationship are largely absent from the research literature, according to Harper et al. (2017), the nature of the position of a successful tree warden requires effective communication and interaction with a wide number of groups, including urban forest tree committees. Though Fazio (2015) does not mention tree wardens by name, he does posit that tree boards must work closely with city foresters. For an effective urban forest tree committee, it is critical that this same sentiment of cooperation and partnership can be readily extended to other audiences and important stakeholders including local officials, agencies and organizations.

5. Conclusions

Volunteer involvement in urban forestry, including service on an urban forest tree committee, may help to provide essential experience, new ideas and perspectives and offer critical skills towards the furtherance of urban tree management at the local level (Westphal and Childs, 1994). Volunteers may also enable access to new audiences and advocates through networks and contacts (Nichnadowicz, 2000). Urban foresters routinely identify a lack of available resources (i.e., funding) as a key limiting factor (Stobbart and Johnston, 2012) in their urban forest management program, hence the potentially-reduced costs associated with garnering volunteer-based support to aid or carry out initiatives, may also be another welcomed benefit in relation to volunteer involvement in urban forestry (Bloniarz and Ryan, 1996; M. Welch, pers. comm.). Though typically not paid, volunteers and volunteer-based initiatives do require investment, however, including in equipment, training, and care (i.e., food and water, first aid and safety equipment) (Fazio, 2015). Volunteer-related expenditures might also include small-scale celebrations after a significant task is carried out (i.e., a larger-scale urban tree planting or urban tree inventory), like an appreciation dinner. This may bolster morale, and if volunteers know they are valued and feel their efforts are acknowledged, they can connect more fully with the organization and each other, resulting in an increased sense of belonging and involvement (Moran and Mallia, 2015). This can act as a positive "loop" since increased involvement can motivate volunteers to continue their relationship and deepen their service commitment with the association (Lammers, 1991; Moran and Mallia, 2015). Another means of strengthening the effectiveness of urban forest tree committees could be to provide members with

program evaluation materials and training. Though informal program and meeting evaluation in the form of member discussions often appeared to take place, formal programmatic participant survey tools would aid in the effort of specifying areas where program delivery may be improved upon and strengthened, and also provide a forum to document new program ideas and suggestions for new subject matter.

Urban forest tree committee volunteers in Massachusetts are typically passionate, committed individuals who love trees and wish to see this important urban resource managed with care and stewardship in mind. To ensure viability in this sector of volunteerism, committee members could be equipped with resources related to the use of social media as well as strategies to engage and broaden the base of individuals potentially willing to serve on their urban forest tree committee. Successful volunteers serving on an urban forest tree committee would benefit from having the ability to work constructively and cooperatively with a wide number of stakeholders, decision makers and audience members, with special attention being given to the community tree warden. Since this individual is pivotal to the urban forest operations in a given municipality (Harper et al., 2017), urban forest tree committee members in Massachusetts – and other states with this position – can make a concerted, sustained effort to foster a cooperative, productive relationship with their tree warden.

As with any exploratory research, this effort has generated many questions worthy of follow-up and further research. The accuracy of information on urban forest tree committee presence and activity across the 351 communities of the Commonwealth of Massachusetts is uncertain. To address this, a census of urban forest tree committees might be performed in cooperation with state agencies and associations. Also, since many urban forest tree committees are actively involved in local policy formation (i.e., tree ordinances, by-laws), research could further explore the need and efficacy of legal training for committee volunteers. These, and other important topics, are worthy of continued examination as we strive to better understand the nature of volunteer-led urban forest tree committees.

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References

Bell, J.F., Wilson, J.S., Liu, G.C., 2008. Neighborhood greenness and 2-year changes in body mass index of children and youth. Am. J. Prev. Med. 35, 547–553.

Berg, B.L., Lune, H., 2012. Qualitative Research Methods for the Social Sciences. Pearson, Upper Saddle River.

Bloniarz, D.V., Ryan, H.D.P., 1996. The use of volunteer initiatives in conducting urban forest resource inventories. J. Arboricult. 22, 75–82.

Bocsi, T., Warren, P.S., Harper, R.W., DeStefano, S., 2018. Wildlife habitat management on college and university campuses. Cities Environ. (CATE) 11, 1–16.

Brown, D.G., Johnson, K.M., Loveland, T.R., Theobald, D.M., 2005. Rural land-use trends in the conterminous United States, 1950–2000. Ecol. Soc. Am. 15, 1851–1863.

Cartwright, A., 1988. Interview or postal questionnaires? Comparisons of data about women's experiences with maternity services. Milbank Quart. 66, 172–189.

Clapp, J.C., Ryan, I.I.I.H.D.P., Harper, R.W., Bloniarz, D.V., 2014. Rationale for the increased use of conifers as functional green infrastructure. Arboricult. J. 36, 161–178.

Dampier, J.E., Lemelin, R.H., Shahi, C., Luckai, N., 2014. Small town identity and history's contribution to a response in policy change: a case study of transition from coal to biomass energy conversion. Energy Sustain. Soc. 4, 1–14.

Dampier, J.E.E., Harper, R.W., Schwartzberg, L., Lemelin, R.H., 2015. A comparison of Arborists' and Horticulturists' preferences of *Tsuga chinensis* to *T. canadensis* in the urban landscape. Arboricult. Urban Forest. 41, 41–48.

Domroese, M.C., Johnson, E.A., 2017. Why watch bees? Motivations of citizen science volunteers in the great pollinator project. Bio. Cons. 208, 40–47.

Elmendorf, W.F., Luloff, A.E., 2007. Using key informant interviews to better understand Open space conservation in a developing watershed. J. Arboricult. 32, 54–61.

Fazio, J.R., 2015. Tree Board Handbook. Arbor Day Foundation, Lincoln, NE.

Fleiss, J.L., Cohen, J., 1973. The equivalence of weighted kappa and the intraclass correlation coefficient as measures of reliability. Educ. Psych. Measure 33 (3), 613–619.

Gillies, K., Skea, Z.C., Campbell, M.K., 2014. Decision aids for randomized controlled trials: a qualitative exploration of stakeholders' views. BMJ Open 4, 1–13.

Grande, D., Armstrong, K., 2008. Community volunteerism of U.S. physicians. J. Gen. Intern. Med. 12. https://doi.org/10.1007/s11606-008-0811-x.

Green, G.P., Haines, A., 2016. Asset Building and Community Development, 4th ed. Sage Publications, Inc., Thousand Oaks, CA.

Greenleaf, S., 2016. Understanding Citizen Advisory Boards: A National census of Tree Boards. MS Thesis. Department of ForestEcosystems and Society, Oregon State University, Corvallis, OR.

Harper, R.W., Bloniarz, D.V., DeStefano, S., Nicolson, C.R., 2017. Urban forest management in New England: towards a contemporary understanding of tree wardens in Massachusetts communities. Arboricult. J. 39, 1–17.

Harrison, V.S., Xiao, A., Ott, H.K., Bortree, D., 2017. Calling all volunteers: the role of stewardship and involvement in volunteer-organization relationships. Public Rel. Rev. 43, 872–881.

Jim, C.Y., Chen, W., 2009. Ecosystem services and valuation of urban forests in China. Urban For. Urban Green. 26, 187–194.

Johnston, M., 2015. Trees in Towns and Cities: A History of British Urban Arboriculture. Oxbow Books, Oxford.

Jonnes, J., 2016. Urban Forests: A Natural History of Trees and People in the American Cityscape. Viking, New York, NY.

Kuo, F.E., 2003. The role of arboriculture in a healthy social ecology. J. Arboricult. 29, 148–155.

Kuo, F.E., Sullivan, W., 2001. Environment and crime in the inner city: does vegetation reduce crime? Environ. Behav. 33, 343–367.

Lammers, J.C., 1991. Attitudes, motives and demographic predictors of volunteer commitment and service duration. J. Soc. Serv. Res. 14, 125–140.

Lemelin, R.H., Dampier, J.E., Harper, R.W., Balika, D., Bowles, R., 2017. Perceptions of insects: a visual analysis. Soc. Anim. https://doi.org/10.1163/15685306-12341469.

Lipkis, A., Lipkis, K., 1990. The Simple Act of Planting a Tree: A Citizen Foresters Guide to Healing Your Neighbourhood, Your City, and Your World. Tree People, Los Angeles, CA 236 pp.

Locke, D.H., Grove, J.M., 2016. Doing the hard work where it's easiest? Examining the relationships between urban greening programs and social and ecological characteristics. Appl. Spatial Analys. 9, 77–96.

McKeever, B., 2015. The Nonprofit Sector in Brief 2015: Public Charities, Giving, and Volunteering. Retrieved from:. http://www.urban.org/research/publication/nonprofit-sector-brief-2015-public-charities-giving-and-volunteering.

McPherson, E.G., Simpson, J.R., Peper, P.J., Gardener, S.L., Vargas, K.E., Xiao, Q., 2007. Northeast Community Tree Guide: Benefits, Costs, and Strategic Planting. USDA Forest Service, Pacific Southwest Research Station.

Mincey, S.K., Hutten, M., Fischer, B.C., Evans, T.P., Stewart, S.I., Vogt, J.M., 2013. Structuring institutional analysis for urban ecosystems: a key to sustainable urban forest management. Urban Ecosyst. 16, 553.

Moran, K., Mallia, T., 2015. Wholly engaged: integrating volunteer and donor programs. In: Rosenthal, R.J. (Ed.), Volunteer Engagement 2.0: Ideas and Insights Changing the World. John Wiley & Sons, Hoboken, NJ.

Nichnadowicz, J., 2000. Community involvement in urban forestry programs. In: Kuser, J.E. (Ed.), Handbook of Urban and Community Forestry in the Northeast. Kluwer Academic/Plenum, New York, NY.

Nowak, D., Crane, D., 2002. Carbon storage and sequestration by urban trees in the USA. Environ. Pollut. 116, 381–389.

Nowak, D.J., Greenfield, E.J., 2012. Tree and impervious cover change in U.S. Cities. Urban For. Urban Green. 11, 21–30.

Nowak, D.J., Crane, D., Stevens, J.C., 2006. Air pollution removal by urban trees and shrubs in the United States. Urban For. Urban Green. 4, 115–123.

Parsons, R., Tassinary, L.G., Ulrich, R.S., Hebl, M.R., Grossman-Alexander, M., 1998. The view from the road: implications for stress recovery and immunization. J. Environ. Psychol. 18, 113–140.

Putnam, R., 1996. The strange disappearance of civic America. Policy: J. Public Policy Ideas 12, 3–15.

Reuter, C., Heger, O., Pipek, V., 2013. Combining real and virtual volunteers through social media. In: Proceedings of 10th International ISRAM Conference. Baden-Baden, Germany. May 20013.

Ricard, R.M., 2005. Shade trees and tree wardens: revising the history of urban forestry. North. J. Forest. 103, 230–233.

Ricard, R.M., Dreyer, G.D., 2005. Greening Connecticut Cities and Towns: Managing Public Trees and Community Forests. University of Connecticut. College of Agriculture and Natural Resources, Storrs, CT.

Ritchie, J., Lewis, J., 2003. Qualitative Research Practice: A Guide for Social Science Students and Researchers. Sage Publications, Inc., London, U.K.

Rubin, H.J., Rubin, I.S., 2012. Qualitative Interviewing: The Art of Hearing Data, 3rd ed. Sage Publications, Inc., London, U.K.

Stobbart, M., Johnston, M., 2012. A survey of urban tree management in New Zealand. Arboricult. Urban For. 38, 247–254.

Town of Monson, Massachusetts, 2017. Replanting Monson Tree Committee. https://www.monson-ma.gov/replanting-monson-tree-committee.

US Bureau of Labor Statistics, 2016. Volunteering in the United States. Retrieved from. http://www.bls.gov/news.release/volun.nr0.htm.

van den Berg, M., Wendel-Vos, W., van Poppel, M., Kemper, H., van Mechelen, W., Maas, J., 2015. Health benefits of green spaces in the living environment: a systematic review of epidemiological studies. Urban Forest. Urban Green. https://doi.org/10.1016/j.ufug.2015.07.008.

Westphal, L.M., 2003. Urban greening and social benefits: a study of empowerment. J. Arboricult. 29, 137–147.

Westphal, L.M., Childs, G., 1994. Overcoming obstacles creating volunteer partnerships. J. Arboricult. 92, 28–32.