

AN ABSTRACT OF THE THESIS OF

Sarah Greenleaf for the degree of Master of Science in Forest Ecosystems and Society
presented on December 13, 2016.

Title: Understanding Citizen Advisory Boards: A National Census of Tree Boards.

Abstract approved: _____

Paul D. Ries

Effective management of urban forests is vital to society due to the numerous ecological, economic, and social benefits they provide. In many cities, management efforts are commonly supported by citizen advisory groups, which are often generically referred to as “tree boards” within the urban forestry context. Very little is known about tree boards and the volunteers who serve on them; consequently this study addresses this knowledge gap by investigating a sample of urban forestry tree boards that were part of the Arbor Day Foundation Tree City USA program. Surveys distributed to Tree City USA tree boards inquired about basic structure of the boards, demographics of the individuals who serve on them, and their motivations to serve.

Results provided insights into what Tree City USA tree boards looked like and offered a profile of their typical board member. Compared to national demographic data, board member composition was considerably less diverse in race and ethnicity, indicating that these citizen advisory groups may not accurately represent the communities impacted by their decision-making. Survey responses indicated that the majority of tree board

members were motivated to volunteer on their respective board because they were interested in the management of their urban forest. Additional analysis revealed that certified arborists and individuals in the natural resources profession were most likely to volunteer in order to gain career-related experience and opportunities when compared to non-certified arborists and individuals in different professions.

Study findings provide the first-ever description of Tree City USA tree boards on a national level. Findings also suggest that volunteer motivations can be used to direct member recruitment, thereby improving effectiveness of community input in urban forest management. An improved management process would likely result in healthier, more abundant urban forests.

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Understanding Citizen Advisory Boards: A National Census of Tree Boards

by
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A THESIS

submitted to

Oregon State University

in partial fulfillment of
the requirements for the
degree of

Master of Science

Presented December 13, 2016
Commencement June 2017

Master of Science thesis of Sarah Greenleaf presented on December 13, 2016.

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I understand that my thesis will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my thesis to any reader upon request.

Sarah Greenleaf, Author

ACKNOWLEDGEMENTS

I would like to thank Paul Ries for his continued support throughout my experience in graduate school.

I would also like to thank the Arbor Day Foundation for helping to facilitate this project.

I would also like to thank Barb Lachenbruch, Dave Shaw, and Ryan Contreras for their support on my committee.

I would also like to thank Mark Needham for his patience and assistance with my statistical analysis.

I would also like to thank Jessica Bagley for her constant help and kindness throughout my graduate experience.

I would also like to thank Jerry Mohr, Joshua Petit, Katie Williams, Erin Abernethy, and Elise Heffernan for their thesis support.

I would also like to thank Randi Shaw and Jamie Mosel for their dedication to friendship and equality.

I would especially like to thank my family, Susan Maleno Greenleaf, David Greenleaf, and Greta Greenleaf for their constant love, encouragement, visits from Boston, care packages, and belief in me.

Lastly, I would like to thank my greatest inspiration and love, my twin brother, Jonathan Greenleaf. I owe this success to him and am eternally grateful for the 30 wonderful years we spent together. I dedicate this thesis, along with all of the goals I will ever set and crush, to my best friend and other half, Jonathan.

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CHAPTER 1

Introduction

Urban forest management is based on a mutually beneficial relationship between a city's social and natural resources. The trees that make up an urban forest are an important commodity that provides numerous social, economic, and ecological benefits. The people that reap those benefits are a dynamic component in maintaining the forest resource. Mincey et al. (2013) described an urban ecosystem as an example of coupled social-ecological systems (SES) that depend on biophysical and social interactions. SES studies demand an equally diverse approach from both social scientists and urban ecologists. The biophysical side of urban forest management combines natural resource practices with arboriculture to maintain healthy, thriving tree populations. The social side depends on human involvement on many levels, from community members to mayors, and property owners to city planners.

In the urban forestry context, the social component of SES also includes citizen advisory boards, which are volunteer groups that serve as platforms for community members to provide input in management decisions. There are a variety of names for these groups, including commissions, councils, committees, and boards. Though these terms are not identical by definition, they are often used synonymously because they share the similar principle of appointment by a legislative body or organization for the purpose of performing an advisory duty (Merriam-Webster, 2016). Here, the term "tree board" refers to all citizen advisory groups that are appointed by authoritative bodies charged with managing urban forests (i.e., urban forest department, parks department) and that function

to assist these authoritative bodies with management decisions. In many instances where communities are small in size and/or resources are limited, a tree board may constitute the entirety of its community's urban forestry program. The authoritative body that the board reports to may be a broad branch of its local government and the tree board would combine citizen volunteers with city officials to make and implement management decisions.

Tree boards are tasked with offering the collective community perspective and with making well-founded management recommendations. This type of public contribution is critical to effective decision-making (NRC, 1996) and a fundamental component of all government programs (NEPA, 1994). Research has demonstrated that citizen groups can affect positive change in environmental management. For example, Daley (2007) demonstrated how local advisory groups directly contributed to more effective outcomes in several of the Environmental Protection Agency's Superfund remediation sites. In these situations, citizen advisors promoted an increase in utilization of methods that protect human health and consequently, these methods were approved by the Superfund program. In another study, Berry, Portney, and Thomson (1993) showed that neighborhood boards in five different cities effectively increased community trust in local officials and confidence in the local political system. Extending this reasoning, urban forestry tree boards (UFTBs) serve to assist in achieving effective outcomes in urban forest management and impact smoother policy implementation.

Trees provide countless benefits to the ecological, economic, and social systems in urban environments, and, considering that 80% of the US population lives in urban areas

(Nowak et al., 2010), it is imperative that these forests are effectively managed in order to maintain these benefits. Although it is unknown what percent of urban forest management programs in the US include tree boards (they are not a requirement; rather, an additional management tool), the use of these boards is not uncommon (Hauer & Peterson, 2016) and holds important implications for managing healthy urban ecosystems.

However, there is very little known about UFTBs in the US and a significant lack of understanding as to who serves on them. It is critical to know more about these boards and the individuals who constitute them because of their important role, as outlined above. Though these members are appointed, which implies that some kind of discretion is exercised when determining who joins a tree board, there is no knowledge base as to what qualities board members might be screened for or what the demographics of the advisory groups are. It is important to inquire about the individuals who are charged with advisory authority in order to better inform management efforts, such as board member recruitment. To address this knowledge gap and to present information that could help steer urban forest management programs in the most effective direction, the present research study asks, how can the basic structure of UFTBs be described and what are the demographics of the individuals who serve on them? Furthermore, in attempting to better understand these individuals, what motivates them to serve on tree boards? For the first time, an investigation at the national scale has addressed these questions and breached a previously unexplored topic.

Literature review

The process of understanding the individuals who serve on tree boards begins with a review of the theory from which tree boards originate, participatory democracy. The literature review also addresses research tools that were used in this study.

Participatory democracy

Santos and Chess (2003) suggested that community decision-making is based on a general theory of fairness, which extends to the theory of participatory democracy.

Kaufman (1969) originally proposed that participatory democracy can make important contributions to human thought and action. Hilmer (2010) stated that political activists later solidified this notion into the theoretical basis that inclusive and cooperative democracy is preferable to the traditional, more authoritative approach. Moote, McClaran and Chickering (1997) indicated that this theory translates directly into actions, establishing a democratic process with active participation among many parties.

Past criticisms about the lack of public involvement in land management have led to an increase in the use of participatory democracy (Moote et al., 1997). Knopp and Caldbeck (1990) confirmed that public opinions differ from those of natural resource management, a disconnect that can be addressed with participatory democracy. Blahna and Yonts-Shepard (1989) defined participatory democracy in natural resource management as an approach that involves several individuals at every point in a decision-making process whom effectively provide a broad range of perspectives and interests.

A further justification for the use of participatory democracy in natural resource management is that citizens are “quasi-owners” of the resource and should therefore play a role in deciding how it is managed (Ananda, 2006). Tipple and Wellman (1989) argued that the demand for agency accountability to the public necessitates direct public participation in administrative decision-making. Many additional authors agreed on the important role of participatory democracy in management. Drawing from Kemmis (1990), Shannon (1992), and Wondolleck (1988), Moote et al. (1997) indicated participatory democracy “suggests that administrative decisions will be more acceptable to the citizenry if they are made through a collaborative process that builds community and shared understanding, and therefore overcomes societal divisiveness and polarization” (p. 878).

Citizen advisory boards

A powerful contemporary voice in decision-making and a clear application of participatory democracy is the increasingly used citizen advisory board (CAB). In the US, CABs are one of the most common formalized structures for organizing community involvement in local government (Lynn & Kartez, 1995). An administrative or management organization with a specific interest (i.e., an urban forestry department) sponsors this group of citizens to commune regularly, deliberate related issues, and offer management recommendations (Applegate, 1998).

CABs play an important role in democratic decision-making because they represent the community perspective. Schaller (1964) asserted that they “act as a counterforce against the growing void between the government and the governed” (p. 177). In addition

to providing this important perspective, CABs educate citizens about proposed actions and increase the likelihood of their community accepting those actions (Lynn & Karetz, 1995). These groups serve as a direct avenue for citizen engagement on issues that impact their daily lives (Rebori, 2011).

In a comprehensive review of CABs in environmental decision-making, Applegate (1998) described the structure of the group: they are limited in size in order to ensure “open discussion rather than formal presentations” (p. 936) and are led by a chair who facilitates the members’ participation. The author also listed cooperation, leadership, commitment, and transparency as central values that an advisory group operates around (Applegate, 1998). Lastly, Applegate (1998) acknowledged that CABs need to have a well-defined mission that focuses the efforts of members in order for efficient time management, as their participation is completely voluntary.

It is widely agreed that the use of CABs is beneficial in local government. One perspective that supports this, though dated, is that CABS would not have gained widespread use and popularity unless they had some merit and value (Schaller, 1964). This likely still holds, as the remainder of literature in this review presents a contemporary demand for participatory democracy and community perspective in decision-making. On the other hand, Rebori (2011) highlighted that there have been few attempts to measure CAB outcomes, challenging the ability to confirm their contribution to local government, and this dilemma is addressed in the Discussion section.

Citizen advisory boards and their sponsoring agency

An agency or other entity whose actions are of issue invests funding, time, educational resources, and other leadership services in its CAB (Applegate, 1998). In return, the CAB offers carefully deliberated recommendations that incorporate the citizen perspective. Additionally, the CAB aids their sponsoring agency in promoting a greater community acceptance of difficult choices the agency may have to make (Applegate, 1998). Participatory democracy theory supports this CAB effect as a pragmatic application of the theory in that it leads to smooth policy implementation (Ananda, 2006).

While CABs empower the citizen voice, they are advisory in nature; members must understand their advice is valued but that they do not have decision-making authority (Applegate, 1998). Additionally, Arnstein (1969) noted that the sponsoring agency is not obligated to accept the board's recommendations as it has the final judgment call on the feasibility of the advice. On the contrary, Moote et al. (1997) suggested that in participatory democracy, administrators forfeit some discretion so that they can share decision-making authority with board members. As with many aspects of management, a balance of strategies may be the most effective.

Citizen advisory board members

A review of related literature resulted in a few connections between demographic characteristics and citizen involvement in local government. A logical starting point is that the membership of CABs should reflect the demographics of the affected communities

(Applegate, 1998). Rebori (2011) stated that education is the best predictor of citizen participation in that well-educated individuals are most likely to serve. Burns, Schlozman, and Verba (2001) suggested that more men than women serve on local boards that are aimed at solving problems.

Not much additional information about who serves on CABs is available. Literature has, however, made a few suggestions to the kind of qualities the members must possess. Verba, Schlozman, and Brady (1995) stated that serving as a member in a local board requires a significant time investment and a great deal of effort and skill. In an assessment of democratic foundations of society, Thomson (2001) offered the following reasons people might serve on CABs: to solve a problem, provide a service, learn about their community, have political influence, and fulfill a sense of responsibility. The present exploratory study sought to determine which of these and other possible reasons motivate individuals to serve on UFTBs.

Tree boards

Tree boards can exist on several levels of management. For example, the US Secretary of Agriculture has a National Urban and Community Forestry Advisory Council that advises on nationwide urban forestry issues (USDA, n.d.). This study looks at a lower level of management: local UFTBs that represent a city or town within the US.

Though there exists a general knowledge base of UFTBs, almost no research has been conducted that would aid in better understanding of their role, effectiveness, or who serves on them. Hill, Dorfman, and Kramer (2010) offered one of the few instances in which

the term “tree board” is mentioned in a peer-reviewed journal article. A city’s percent tree canopy cover is one way to measure a healthy urban forest. Augmenting canopy cover is also one of the most common goals in urban forestry management. The authors stated that tree ordinances often establish a community tree board and that they are found to have a positive effect on canopy cover (Hill et al., 2010). Therefore, this bridges a plausible connection between the positive effects of tree boards on urban forest management. This concept is reviewed in more detail in the Discussion section.

Hauer and Peterson (2016) conducted a 2014 census of tree activities among municipal forestry programs and it was the fifth edition of similar reports that began over 40 years ago. The results presented a baseline description of the most common management and operation processes urban forest programs engaged in. The authors reported that 71% of respondents indicated a city council or community board was commonly used to set policy and that the likelihood of having one of these groups increased with city size (Hauer & Peterson, 2016). It is unclear what percent of that figure represents tree boards; nonetheless, it implies that UFTBs are not uncommon among urban forestry programs.

Census

The present study used a population census to assess demographics among UFTB members. This statistical tool provides a full and reliable account of a certain population and its characteristics (Daskalovski, 2013). Many nations around the globe have

historically used this method to track their populace and it has been used in the United States since the establishment of the country (US Bureau of the Census, 1989).

A census has several applications and Daskalovski (2013) noted it is particularly useful for mapping trends that become apparent through analysis of demographic, economic and infrastructure data. More specifically, they are the basis for estimating the effects and results of public policies and indicate the needs of future public policies (Daskalovski, 2013). The majority of available literature on census taking almost explicitly reflects a nation's process of counting their residents, rather than more specific populations of interest, as is the application in the present study.

Motivation to volunteer

Serving on a UFTB is a voluntary, unpaid position. Shye (2010) described volunteerism as a phenomenon where people willingly give away personal resources, such as time and energy. MacNeela (2008) agreed with this definition and indicated that volunteering is costly to those that partake. The fact that there is a cost naturally begets the question, why do people choose to volunteer? This study examines a specific example of volunteerism and poses the question, what motivates individuals to serve on UFTBs?

Original exploration into volunteer motivation took on a bipartite approach. Frisch and Gerard (1981) described individuals' incentives as either egoistic (focused on one's own self-interest) or altruistic (focused on the welfare of others). Gidron (1978) further developed this idea by looking at the factors that drive individuals' actions and whether

they are extrinsic (i.e., volunteering to keep up with social norms) or intrinsic (i.e., volunteering because it feels good).

Many researchers explored motivations to understand the associated rewards from the volunteer action. Horton-Smith (1981) stated that those who act out of altruism are concerned with intangible rewards and those who act out of egoism are concerned with tangible rewards. From a study looking at motivations of volunteers at healthcare clinics, MacNeela (2008) reported that people discussed the benefits they achieved more often than their initial motivations.

The “functionalist approach,” which inspired the motivation scale used in the present research study, considers both motivations and rewards. As Clary and Snyder (1999) described, “The guiding functionalist principle is that the decisions and behaviors depend on the match of an individual’s motivations to the opportunities afforded by the volunteering environment,” (pp. 157-158). The differences in why people volunteer can be defined by motives, needs met, and goals reached (Clary et al., 1992). Additionally, this approach recognizes that people performing the same volunteer task may do it for entirely different reasons that expand well beyond the initial altruistic-egoistic duality proposed by early researchers (Clary & Snyder, 1999; Shye, 2010).

Van Til (1988) supported the notion that people volunteer for many different reasons, emphasizing that people may have more than one reason to volunteer; he coined this phenomenon “motivational multiplicity.” Adding multiple variables further complicates the process of determining motives and rewards. Shye (2010) pointed out the limitations of the “short-circuit” problem, which refers to the process of volunteers

choosing motivations from an incomplete list, causing them to settle on a motivation that may not be truly representative.

To avoid the short-circuit problem, Clary and Snyder (1999) created a survey that asks volunteers to agree or disagree with multiple statements about why they volunteer. The results indicate six primary functions (i.e., rewards or received benefits) that motivate them to volunteer. The specific reason or reasons a person volunteers is likely explained by one of these six latent concepts. Instead of searching for the precise reason for volunteering, Clary and Snyder (1999) explored motivations through a broad understanding of the earned personal and social rewards.

Clary and Snyder (1999) created the Volunteer Functions Inventory (VFI) to explain six possible functions individuals receive from their volunteering experience (Table 1.1). Using the VFI as a theoretical basis, the present study explored the *motivations* for volunteerism among UFTBs by determining the *functions* presented by volunteering.

Table 1.1. Volunteer Functions Inventory (Clary et al., 1998); summary of functions.

Function	Description
Social	Fosters the importance of relationships and interactions with others. Provides opportunity to engage in an activity viewed favorably by important others.
Career	Increases or enriches career opportunities and career-related skills.
Understanding	Exercises and enhances knowledge, skills, and abilities that might otherwise go unpracticed.
Enhancement	Focuses on the ego's growth and development and involves striving to enhance positive effect. Builds self-esteem.
Values	Emphasizes altruism and allows individuals to act out of humanitarian concerns for others.
Protective	Eliminates negative aspects surrounding the ego. Reduces guilt.

Tree City USA

UFTBs are influential in urban forestry but rarely described in the literature. The lack of previous research helps to explain the absence of an existing reliable database or method to identify and survey UFTB members. In order to acquire the desired demographic and motivation information, a group that represents a portion of the UFTB population was assessed. This group is part of the Arbor Day Foundation (ADF) Tree City USA program. ADF awards the designation of Tree City USA to communities that demonstrate sound urban forestry management. To qualify, communities must maintain the following four entities: a tree board or department, a tree care ordinance, a community forestry program with an annual budget of at least \$2 per capita, and an Arbor Day observance (ADF, 2015). There are currently over 3,400 communities in the program with a maximum estimate of approximately 23,800 tree board members, assuming an average of seven members per tree board (ADF, 2015).

The purpose of this exploratory research study was to address the existing UFTB knowledge gap by means of analyzing census data for Tree City USA tree boards (TCTBs). Specifically, the research questions were: what demographic information describes TCTB members? What motivates them to volunteer on a tree board? What is a baseline description of the structure of these tree boards? Lastly, are there any connections between member demographics and motivations to serve?

CHAPTER 2

Methods

Survey distribution

The survey was created using Qualtrics and was distributed by means of an email containing an html link. The Urban Forestry Manager for ADF, Pete Smith, facilitated the distribution of the survey link to TCTB members via email. ADF maintains one contact representing each community, but does not have a record of each tree board member for the Tree City USA communities. Pete Smith requested that each of these contacts forward the survey link to the members of their community's tree board. The survey link was initially sent out to 3,131 Tree City USA contacts, and ADF confirmed that 1,389 of those emails were opened. The total amount of subsequent tree board members that received it is unknown, as the Tree City USA contacts were not asked to report how many board members they forwarded the survey link to.

Survey design

The survey, "Understanding Citizen Advisory Boards: A National Census of Tree Boards," contained four sections with a total of 46 response items. The survey was approved by the OSU Institutional Review Board (IRB) in order to uphold ethical considerations of research and the survey began with a detailed notice of consent that participants had to agree with in order to take the survey (Appendix A).

TCTB member demographics

This section of the survey contained questions seeking descriptive information about survey respondents. The questions included common demographic information that the US Bureau of the Census regularly inquires of individuals in the US (sex, age, highest level of education completed, and race; US Bureau of the Census, 2016). Based on contemporary trends in social science survey methods, ethnicity was added to the race category to include six response items and an “other” option (M. Needham, personal communication, April 26, 2016; Appendix A).

To report their profession, respondents were offered 27 options to categorize their profession, and if they felt it did not fit in any of the provided responses, they could choose a 28th option, “other”. These options were derived from a template offered by Georgia Institute of Technology’s website based on their comprehensive yet succinct categories (GVU, 1998). For the remainder of this article, “retired,” “unemployed,” and “other” are considered examples of a profession.

To increase power in analysis, the 28 profession options were divided into seven professional groups (Table 2.1). The social/public category combined jobs that provide or consume a service within the public or social sector (i.e. homemaker, education, health care & social assistance). An information category was created for jobs that provide services that are more oriented towards handling data and communication. The blue-collar category included professions that involve physical labor. Lastly, the natural resources category contained jobs that are most likely to involve an aspect of urban forestry. “Other,” “retired,” and “unemployed” remained stand-alone categories.

Table 2.1. Profession responses recoded into categories. Each profession listed as a response option in the survey was recoded into one of seven categories for analysis.

Profession	Profession recode
Homemaker	Social/public
Arts, entertainment, or broadcasting	
Education	
Government and public administration	
Health care and social assistance	
Hotel and food services	
Religious	
Retail or wholesale	
Real estate, rental, or leasing	
Legal services	
Student	
Finance and insurance	Information
Information – services, data, or other	
Publishing	
Scientific or technical services	
Software	
Telecommunications	
Military	Blue collar
Construction	
Mining	
Utilities	
Manufacturing – computer, electronics, or other	
Agriculture, fishing, or hunting	Natural resources
Forestry	
Land management	
Unemployed	Unemployed
Retired	Retired
Other	Other

Finally, this survey section inquired about International Society of Arboriculture (ISA) certification status. The ISA is an organization that, “Through research, technology, and education... promotes the professional practice of arboriculture and fosters a greater worldwide awareness of the benefits of trees” (ISA, 2016). It is responsible for awarding arborists with six possible credentials that indicate a trusted level of professionalism in the urban forestry community, among others. At the minimum, individuals with an ISA certification have demonstrated their arboriculture (the practice and study of the care of trees and other woody plants) comprehension through a written examination. Though there is no available statistic for percentage of ISA arborists on tree boards, it is commonly understood that several urban forestry departments across the country require an ISA certified staff member and this may perhaps be reflected in respective tree boards.

TCTB structure

Respondents were asked to report details about the tree board they served on. Questions included the name of the community their tree board represented, number of people on the board, frequency of board meetings, amount of time in a month dedicated to tree board activities, and the materials/resources used for training and continuing education purposes. A third section used a Likert-type scale with 1 (strongly agree) to 7 (strongly disagree) in order to assess perceptions regarding TCTBs. Respondents were asked to indicate how they felt about their contribution to the tree board, the tree board’s effect on their community’s urban forest, and how they perceived the community to feel about the tree board’s management of its urban forest.

Motivation to volunteer

The remaining section of the survey assessed functions of volunteerism by using 30 statements to which respondents were asked to react using the same 7-point scale from above. It also included one direct inquiry question which asked respondents to choose one of five possible reasons they volunteered. The direct inquiry was straight forward in its approach, whereas the tool to assess volunteer functions was considerably involved.

Developing the Refined Volunteer Functions Inventory

The VFI has been widely used to research functions of volunteering among many groups of people (Clary, Snyder, & Stuckas, 1996; Clary & Snyder, 1999; Okun, Barr, & Herzog, 1998), where functions refer to rewards or benefits received from the act of volunteering. The results of this analytical tool have been consistent over time and the individual scales of the VFI possess a high degree of internal consistency (Clary & Snyder, 1999). Additionally, reliability assessment of the index supports that the six functions of the VFI each contain five highly related items (Cronbach's alphas for "career" = .90, "social" = .81, "values" = .71, "understanding" = .80, "enhancement" = .85, and "protective" = .82; Appendix B). Although the VFI is proven to be effective and reliable for assessing volunteer function for some sample populations, it was prudent to determine whether the VFI could reliably predict volunteer functions for the specific sample population at hand. An exploratory factor analysis (EFA) was conducted to refine the VFI so that it could be a more representative tool for assessing volunteer functions for TCTB members.

EFA results were consistent with Clary and Snyder's VFI for the "career" (Cronbach's $\alpha = .90$) and "social" (Cronbach's $\alpha = .81$) functions. The remaining four functions, however, were inconsistent with the VFI. Several items cross-loaded into more than one function and the "enhancement" and "protective" functions combined into one factor, reducing the overall number of functions to five (Table 2.2).

Table 2.2. Exploratory factor analysis of volunteer functions for survey respondents.

	Factor loadings ¹				
	Factor 1: Career	Factor 2: Enhance- ment	Factor 3: Underst- anding	Factor 4: Values	Factor 5: Social
Respondent feelings about volunteering.					
"I can make new contacts that might help my business career."	.83				
"Volunteering will help me succeed in my chosen profession."	.82				
"Volunteering allows me to explore different career options."	.77				
"Volunteering experience will look good on my resume."	.76				
"Volunteering on my tree board can help me get a foot in the door at a place I would like to work."	.76				
"By volunteering, I feel less lonely."		.75			
"Volunteering is a good escape from my own troubles."		.69			
"Volunteering increases my self-esteem."		.69	.44		
"Volunteering makes me feel needed."		.65	.49		
"Volunteering helps me work through my own personal problems."	.44	.63			
"Doing volunteer work relieves me of some of the guilt over being more fortunate than others."		.61			
"Volunteering makes me feel better about myself."		.61	.55		
"Volunteering makes me feel important."		.58			
"I can explore my own strengths."			.74		
"Volunteering allows me to gain a new perspective on things."			.73		

Table 2.2. Exploratory factor analysis of volunteer functions for survey respondents (Continued).

"I can learn how to deal with a variety of people."					.66
"Volunteering lets me learn through direct, hands on experience."					.65
"Volunteering is a way to make new friends."					.60
"No matter how bad I am feeling, volunteering helps me feel more positive."	.43				.52
"I am concerned about the proper management of trees in my community."					.77
"I feel it is important to help others manage urban forests."					.76
"I can do something for a cause that is important to me."					.67
"I feel frustrated by poorly managed urban forests."					.61
"I am genuinely concerned about the particular group I am serving."					.56
"I can learn more about urban forest management."					.55
"Others with whom I am close place a high value on community service."					.76
"Volunteering is an important activity to the people I know best."					.71
"People I know share an interest in community service."					.71
"People I am close to want me to volunteer."					.68
"My friends volunteer."					.64
Eigenvalue	9.58	3.86	2.03	1.72	1.27
Percent (%) of total variance explained ²	14.24	14.02	13.64	9.83	9.78

¹ Principal components factor analysis with Varimax rotation. Only factors with eigenvalues greater than 1 and items with factor loadings greater than .40 were retained in the final factor structure (Tabachnick & Fidell, 1996). Items coded on 7-point scales of 1 "strongly agree" (individual serves on tree board because of indicated motivation) to 7 "strongly disagree" (individual does not serve on tree board because of indicated motivation).

² Total cumulative percent (%) variance explained = 61.5%.

The EFA resulted in five variables cross-loading into two functions (“understanding” and “enhancement”), indicating the variables could describe either function. Four of these items (“volunteering increases my self-esteem,” “volunteering makes me feel needed,” “volunteering helps me work through my own personal problems,” and “volunteering makes me feel better about myself”) were placed into the “enhancement” function due to their higher factor-loadings and face value meaning of the question items.

The fifth variable, “no matter how bad I am feeling, volunteering makes me feel more positive,” was less straight forward because the EFA gave it a higher loading in “understanding” but the face value meaning clearly indicated it should be in the “enhancement” motivation. Reliability analysis indicated a higher Cronbach’s alpha when the item was placed in “enhancement” rather than the “understanding” function, so its placement in the “enhancement” function was justified.

The item, “I feel frustrated by poorly managed urban forests,” was removed because its corrected item-total correlation was 0.39, which was lower than the acceptable 0.40 cut-off (Tabachnick & Fidell, 1996), and because removing it would increase the Cronbach’s alpha from 0.74 to 0.75. These conflicting results were not entirely surprising because the item had been reworded from the original VFI statement (“I feel compassion toward people in need”) in order to be more applicable to the audience.

It was decided to keep the function name “enhancement” for the new factor that combined both “enhancement” and “protective.” Clary and Snyder (1999) explained “enhancement” as a function that serves individuals seeking to grow and develop psychologically through volunteering. Reducing negative feelings and addressing personal

problems, as Clary and Snyder (1999) defined the “protective” function, is arguably an element of psychological growth. It was therefore justifiable to keep the “enhancement” title and redefine the factor as one that promotes psychological and emotional development, while protecting and enhancing the ego.

In this new 5-factor index, the Cronbach’s alphas for each factor were the same or higher than those in the VFI (Appendix B). This justifies the implementation of the newly refined VFI (RVFI) to measure functions of volunteering among TCTB members (Table 2.3).

Table 2.3. Reliability analysis of volunteer functions from results of Exploratory Factor Analysis.

	Item Total Correlation	Alpha If Item Deleted	Cronbach Alpha
Career			.90
“Volunteering on my tree board can help me get a foot in the door at a place I would like to work.”	.65	.90	
“I can make new contacts that might help my business career.”	.81	.86	
“Volunteering allows me to explore different career options.”	.76	.87	
“Volunteering will help me succeed in my chosen profession.”	.78	.87	
“Volunteering experience will look good on my resume.”	.75	.88	
Social			.81
“My friends volunteer.”	.54	.80	
“People I am close to want me to volunteer.”	.54	.80	
“People I know share an interest in community service.”	.58	.79	
“Others with whom I am close place a high value on community service.”	.69	.75	
“Volunteering is an important activity to the people I know best.”	.68	.76	
Values			.75
“I am concerned about the proper management of trees in my community.”	.55	.70	
“I am genuinely concerned about the particular group I am serving.”	.44	.74	
“I feel it is important to help others manage urban forests.”	.57	.68	
“I can do something for a cause that is important to me.”	.57	.69	

Table 2.3. Reliability analysis of volunteer functions from results of Exploratory Factor Analysis (Continued).

"I can learn more about urban forest management."	.46	.72	
Understanding			.84
"Volunteering is a way to make new friends."	.63	.81	
"Volunteering allows me to gain a new perspective on things."	.61	.82	
"Volunteering lets me learn through direct, hands on experience."	.60	.82	
"I can learn how to deal with a variety of people."	.65	.80	
"I can explore my own strengths."	.73	.78	
Enhancement			.89
"Volunteering makes me feel important."	.61	.89	
"Volunteering increases my self-esteem."	.72	.88	
"Volunteering makes me feel needed."	.73	.88	
"Volunteering makes me feel better about myself."	.67	.88	
"No matter how bad I am feeling, volunteering helps me feel more positive."	.55	.89	
"By volunteering, I feel less lonely."	.69	.88	
"Doing volunteer work relieves me of some of the guilt over being more fortunate than others."	.56	.89	
"Volunteering helps me work through my own personal problems."	.65	.88	
"Volunteering is a good escape from my own troubles."	.69	.88	

Responses to the 30 scaled statements about volunteer function were assessed and yielded mean values for the five RVFI functions, provided that respondents answered at least half of the items used for each function.

Direct inquiry

In order to assess volunteer motivation in a manner that was more specifically geared toward UFTBs and less toward volunteering in general, a question of direct inquiry was presented in the survey. With input from noted urban forestry specialist, Paul Ries, four response items were developed that represented what were deemed to be the most

plausible reasons one might volunteer on a UFTB, with a fifth option of “other.” These reasons were: interest in local government, interest in management of urban forest, interest in arboriculture, and interest in volunteerism in general.

Statistical analysis

The statistical analysis program SPSS was used to organize data, assess descriptive statistics for all survey responses, and explore relationships among data. The two methods of assessing motivation to volunteer - direct inquiry and the RVFI - used separate tests. Crosstabs and chi-square tests were used for the direct inquiry responses where the five possible reasons for volunteering on a tree board were compared among all the different demographic populations (as distinguished by sex, race, or profession, for instance). For significant results ($p < 0.05$), visual comparison of means determined how the difference was interpreted in the relationship between variables (i.e., which one had a greater mean). ANOVA tests were used to compare the demographic populations against the five groups of the RVFI, indicating whether significant differences in functional benefit existed between independent variables.

CHAPTER 3

Results

Survey response

The survey was open for responses for two months from May 22 to July 22, 2016. Qualtrics indicated that 1,603 surveys were initiated by recipients of the html link that the Tree City USA contacts had distributed. The majority of people who initiated the survey completed 80%, but only 35 respondents completed 90% of the survey. All survey takers skipped at least one question, and there was a dropout rate of 29.8% after the first question in which respondents acknowledged consent. After filtering out initiated surveys where respondents failed to answer at least one of the four sections and where respondents indicated in open comments that they did not serve on a tree board, there were 1,025 valid responses.

New Jersey had the most responses with 100 board members completing surveys representing 47 tree boards. Ohio had the second most responses with 78 survey responses representing 42 tree boards; followed by Pennsylvania with 55 responses representing 35 tree boards. Louisiana, Maine, Vermont, and Massachusetts had one response each and New Hampshire was the only state not to complete any surveys. Some of the total response amounts reflected actual numbers of Tree City USA communities in each state. As of June, 2016, Ohio had the most communities in the program (241) and the five lowest state responses listed above all had under 20 Tree City USA communities (ADF, 2016). New Jersey, however, fell mid-range of communities per state so it had a surprisingly high total amount of responses (ADF, 2016; Appendix C).

TCTB member demographics

Ages were categorized into one of six age classes: 14-29, 30-39, 40-49, 50-59, 60-69, 70-79, and 80-89. The 60-69 age class contained the most respondents (31.3%), whereas the 14-29 age class contained the fewest (2.9%). The minimum and maximum ages observed were 14 and 89, respectively. Survey respondents from four communities indicated in an open comment section that their board included participation from high school students, explaining the low minimum age of 14. The second most populated age class was 50-59. Collectively, respondents between the ages of 50 and 69 made up 57.9% of all responses, with 58 as the average age (Figure 3.1).

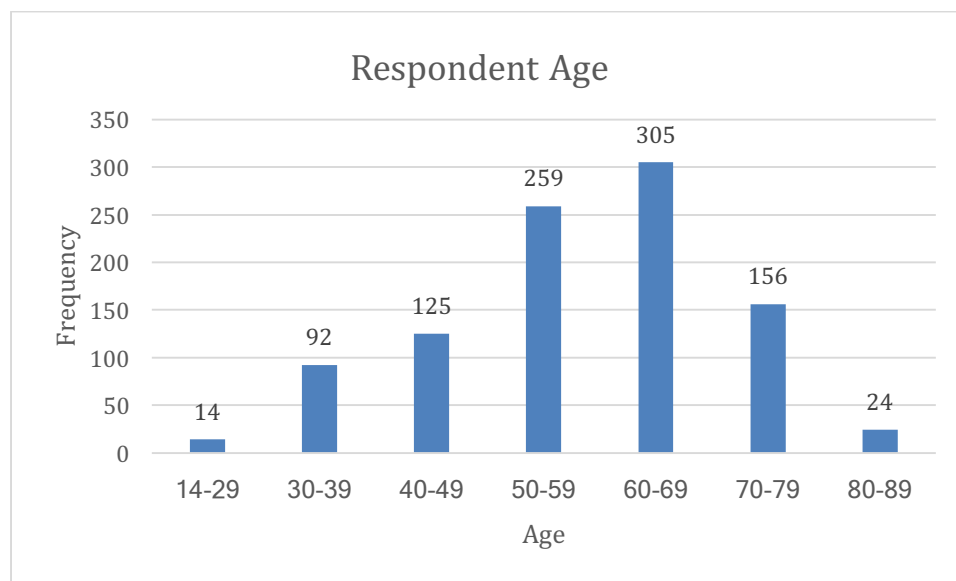


Figure 3.1. Age classes of survey respondents. Avg: 58, min: 14, max: 89.

The breakdown of sex of the respondents supports the original hypothesis that men make up the majority of tree board members, but it was more evenly distributed than

anticipated. Fifty three percent were male, 45.5% were female, and 1.5% preferred not to respond.

As anticipated, the majority of respondents identified as white/Caucasian (92.5%). Black/African American respondents were the second most populated group (2.1%). The remaining responses for racial/ethnic heritage were mixed race (1.8%), other (1.6%), Hispanic/Spanish/Latino (1.2%), Asian (0.4%), American Indian or Alaskan Native (0.2%), and Native Hawaiian or other Pacific Islander (0.2%). The total non-white respondents equaled 7.5%.

Seventy-six percent of respondents earned at least a 4-year college degree, and 37% of respondents earned an additional advanced degree, e.g., a doctorate or PhD. Respondents whose highest level of education was a 2-year associates degree or high school/GED made up 12 and 11% of responses, respectively. Fewer than one percent of respondents received less than a high school diploma (Figure 3.2).

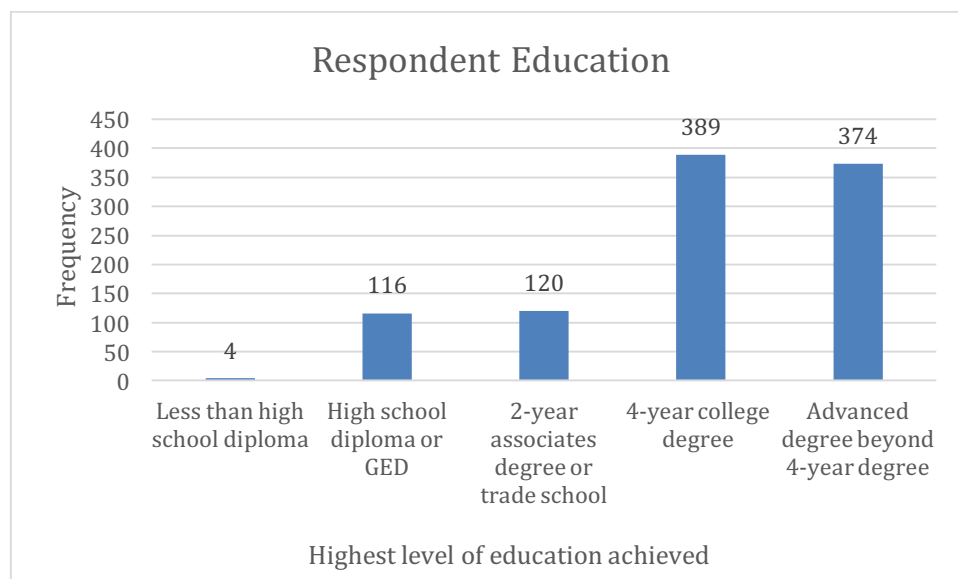


Figure 3.2. Highest level of education achieved by survey respondents. Seventy-six percent of respondents had at least a 4-year college degree.

The most frequent response for profession was “retired” (29.5%). Following that was “government and public administration” (14.6%) and “other” (10.3%). After the number of the 28 professional categories had been reduced to seven (see Table 2.1 in Methods), “social/public” became the largest (35.7%) and “retired” the second largest category (29.5%). Following those were “natural resources” (11.3%), “other” (10.3%), “information” (7.3%), “blue-collar” (5.6%), and “unemployed” (0.3%; Figure 3.3).

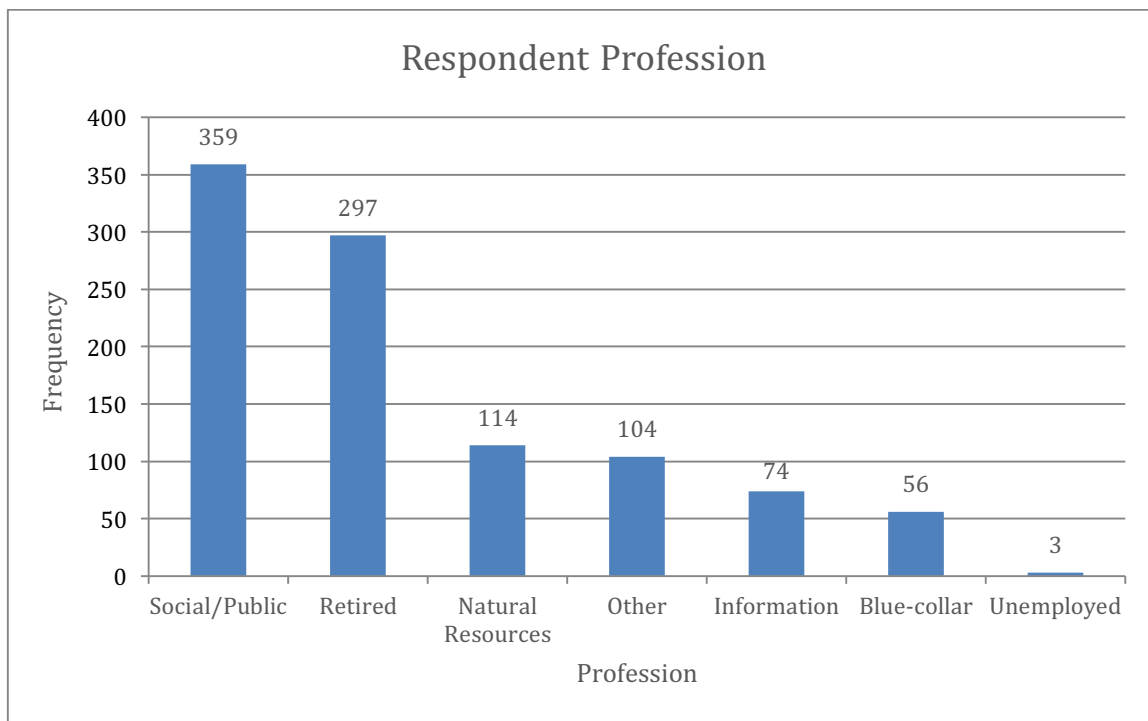


Figure 3.3. Professions of survey respondents. Each category on the x-axis was determined by the professional recode summarized in Table 2.1.

In summary of descriptive demographic results, the average respondent was a white, well educated, 58 year-old, retired male who did not hold an arborist certification (only 9.8% of respondents were arborists).

TCTB structure

Though the bulk of the survey inquired about demographics and motivations to volunteer, respondents were also asked to provide a few details about the tree board itself. Results indicated that the average number of members who serve on tree boards was approximately seven (mean=6.9). These tree boards met an average of nine times a year

(mean=8.7), and each board member committed an average of 6.9 hours per month to tree board activities.

Respondents were asked what kind of training and continuing education resources they used for their tree board (Tables 3.1 and 3.2). Although these resources were quite varied, almost half of respondents indicated they received informal orientation from existing board members (44.7%). Results also indicated that 14.5% of respondents did not use any training materials. Upon examination of the demographic data, there were no trends to indicate who was more likely to forgo training materials. The one exception was individuals who had received at least a 4-year college degree; these respondents were less likely to occur in the group who did not use training materials.

Table 3.1. Training materials/resources used by survey respondents.

Training Material	Frequency	Percentage
Informal orientation from existing board members	617	44.7%
None	200	14.5%
Orientation manual	177	12.8%
Other	177	12.8%
Formal orientation session from city staff	173	12.6%
Attended the online Tree Board University	36	2.6%
Total	1380	100%

Table 3.2. Continuing education materials/resources used by survey respondents.

Continuing Education Materials	Frequency	Percentage
Tree City USA bulletins	569	21.2%
State forestry agency educational training/resources	470	17.5%
Arbor Day Foundation website	453	16.9%
University Extension service materials or courses (e.g., Master Gardener)	333	12.4%
Arbor Day Foundation Tree Board Handbook	273	10.2%
International Society of Arboriculture publications or courses	181	6.8%
Other	160	6.0%
None	146	5.5%
Tree Board University publications or courses	94	3.5%
Total	2679	100%

Respondents were asked to agree or disagree with three statements about individual and community perception of their tree board. Individuals moderately to strongly agreed that they made positive contributions to their tree board (mean = 1.72), and that their tree board made a positive contribution to their community's urban forest (mean = 1.61). Respondents slightly to moderately agreed that the community perceived their tree board as a positive contribution to the management of its urban forest (mean = 2.26).

Motivation to volunteer

RVFI

The RVFI determined primary functions for volunteering, such as serving to benefit emotional health or reducing feelings of guilt. Respondents were the least motivated by the

“career” function (mean = 5.06) and the most motivated by the “values” function (mean = 1.96). Respondents, on average, felt neutral about the “enhancement” function (mean = 4.42) and were slightly motivated by the “social” (mean = 3.65) and “understanding” (mean = 2.97) functions (Table 3.3).

Table 3.3. Mean functional benefit of volunteering¹.

	Career	Enhancement	Understanding	Values	Social
All respondents	5.06	4.42	2.97	1.96	3.65

¹Means on scales of 1 “strongly agree” (individual serves on tree board because of indicated motivation) to 7 “strongly disagree” (individual does not serve on tree board because of indicated motivation).

An ANOVA test compared mean volunteer functions from the RVFI in order to address the following research question: is there a connection between the profession and motivations to serve of individuals on TCTBs? (Table 3.4). Results yielded significant differences in the “career” function between respondents with “other” as their profession, respondents working in natural resources, and those who were retired. In particular, respondents with “other” as their profession received less functional benefit from the “career” motivation than respondents working in natural resources, but they received more functional benefit than retired volunteers ($p < 0.001$, $F = 23.43$). The associated effect size ($\eta^2 = 0.35$) indicated that this difference can be interpreted as substantial (Vaske, 2008).

Table 3.4. Motivation to enhance career among professions¹.

	Profession							<i>F</i> -value	<i>p</i> -value	ETA (η) effect size
	Social/ public	Information	Blue- collar	Unemployed	Retired	Other	Natural resources			
Motivation to enhance career	4.85 ^a	5.09 ^a	4.50 ^{ad}	4.27 ^{aef}	5.81 ^{be}	4.86 ^a	4.14 ^{cdf}	23.43	<0.001	0.35

¹Means on scales of 1 “strongly agree” (individual serves on tree board because of indicated motivation) to 7 “strongly disagree” (individual does not serve on tree board because of indicated motivation). Means with different letter superscripts in each row are significant at $p < 0.05$ based on Scheffe’s post-hoc tests for equal variances.

For the “career” function, respondents in natural resources had a mean response of 4.14. Though this value roughly corresponds to feeling neutral about functional benefit from career enhancement, it was the lowest mean response of all professional groups, which indicated that individuals working in natural resources were more likely to volunteer to benefit their career than other respondents ($p < 0.001$, $F = 23.43$). This is confirmed by the substantial effect size (Eta = 0.35; Vaske, 2008).

Analysis using the RVFI indicated a difference between respondents of either ISA certification status: arborists (mean = 3.77) agreed that enhancing their career motivated them to volunteer, and non-arborists (mean = 5.18) disagreed with this functional benefit ($p < 0.001$, $F = 77.81$). The associated effect size (Eta = 0.27) indicated that this difference can be interpreted as typical (Vaske, 2008). The “enhancement” function also yielded a significant difference between these two groups, though much less substantial (Vaske, 2008). Arborists (mean = 4.08) were more likely than non-arborists (mean = 4.45) to volunteer in order to grow psychologically ($p = 0.006$, $F = 7.67$; Table 3.5).

Table 3.5. Motivation to volunteer among arborists and non-arborists¹.

Motivation to volunteer	Arborist		F-value	p-value	ETA (η) effect size
	Yes	No			
Career (motivation to benefit career)	3.77 ^a	5.18 ^b	77.81	<0.001	0.27
Enhancement (motivation to grow psychologically)	4.08 ^a	4.45 ^b	7.67	0.006	0.09

¹Means on scales of 1 “strongly agree” (individual serves on tree board because of indicated motivation) to 7 “strongly disagree” (individual does not serve on tree board because of indicated motivation). Means with different letter superscripts in each row are significant at $p < 0.05$.

Males and females differed in the amount of perceived benefit they received from the “understanding” function ($p < 0.001$, $F = 8.23$). Female respondents (mean = 4.46) were more apt to volunteer in order to gain learning experiences than males (mean = 5.26), though the associated effect size (Eta = 0.128) indicated that this is a minimal difference (Vaske, 2008; Table 3.6). Differences between sex for the other four functions were negligible.

Table 3.6. Motivation to volunteer across sex¹.

Motivation to volunteer	Sex			F-value	p-value	ETA (η) effect size
	Male	Female	Prefer not to respond			
Understanding (motivation to learn & exercise knowledge/skills)	5.26 ^a	4.46 ^b	4.1 ^{ab}	8.23	<0.001	0.128

¹Means on scales of 1 “strongly agree” (individual serves on tree board because of indicated motivation) to 7 “strongly disagree” (individual does not serve on tree board because of indicated motivation). Means with different letter superscripts in each row are significant at $p < 0.05$ based on Scheffe’s post-hoc test for equal variances.

Age played a role in whether or not respondents received functional benefit from the “career” function ($p < 0.001$, $F = 35.7$; Table 3.7). Younger respondents (ages 14-49) were

more likely to volunteer to receive functional “career” benefit than older respondents (ages ≥ 60). The 50-59 age class received less “career” benefit than those in the 30-39 age class but received more than respondents ages 60-79. The associated effect size ($\text{ETA} = 0.18$) indicated that this difference can be interpreted as between minimal and typical (Vaske, 2008). All age classes indicated they volunteered out of altruism and concern for humanity (“values” function). In particular, the 70-79 age class was more motivated by “values” than the 30-39 age class ($p < 0.006$, $F = 3.03$), though the associated effect size ($\text{ETA} = 0.02$) indicated that this difference is minimal (Vaske, 2008).

Table 3.7. Motivation to volunteer among age groups¹.

Motivation to volunteer	Age group							<i>F</i> -value	<i>p</i> -value	ETA (η) effect size
	14-29	30-39	40-49	50-59	60-69	70-79	80-89			
Career (motivation to benefit career) ²	3.50 ^a	3.90 ^a	4.35 ^{ab}	4.81 ^b	5.47 ^c	5.9 ^d	5.90 ^{cde}	35.07	<0.001	0.18
Values (motivation to act out of altruism) ³	2.20 ^{ab}	2.23 ^b	1.99 ^{ab}	1.97 ^{ab}	1.89 ^{ab}	1.84 ^a	1.77 ^{ab}	3.03	0.006	0.02

¹Means on scales of 1 “strongly agree” (individual serves on tree board because of indicated motivation) to 7 “strongly disagree” (individual does not serve on tree board because of indicated motivation).

²Means with different letter superscripts in each row are significant at $p < 0.05$ based on Tamhane’s T2 post-hoc test for unequal variances.

³Means with different letter superscripts in each row are significant at $p < 0.05$ based on Scheffe’s post-hoc test for equal variances.

Lastly, the RVFI yielded significant results among respondents with different levels of education ($p < 0.001$, $F = 10.04$). The trend was for individuals with less education to be more likely to act out of desire to enhance their career (Table 3.8). Specifically, respondents whose highest degree was a high school diploma/GED or a 4-year college degree were more likely to volunteer in order to receive “career” benefit than those with an

advanced degree beyond a 4-year education. The associated effect size ($\eta^2 = 0.20$) indicated that this difference is typical (Vaske, 2008).

Table 3.8. Motivation to volunteer across education¹.

Motivation to volunteer	Education					<i>F</i> -value	<i>p</i> -value	ETA (η) effect size
	Less than high school diploma	High school diploma or GED	2-yr associates degree or trade school	4-yr college degree	Advanced degree beyond 4-yr degree			
Career (Motivation to benefit career)	4.25 ^{ac}	4.74 ^a	4.95 ^{ac}	4.81 ^a	5.44 ^{bc}	10.04	<0.001	0.20

¹Means on scales of 1 “strongly agree” (individual serves on tree board because of indicated motivation) to 7 “strongly disagree” (individual does not serve on tree board because of indicated motivation). Means with different letter superscripts in each row are significant at $p < 0.05$ based on Scheffe’s post-hoc test for equal variances.

Direct inquiry

When directly asked about volunteer motivation, almost half of the respondents indicated they volunteered because they were interested in the management of their local forest (47.1%). Fewer respondents volunteered due to an interest in arboriculture (19.8%), interest in local government (18.8%), or interest in volunteer work in general (9.8%; Figure 3.4). About 4.5% of respondents chose “other” and those reasons are listed in Table 3.9, combined with additional reasons provided by individuals who chose one of the four provided reasons.

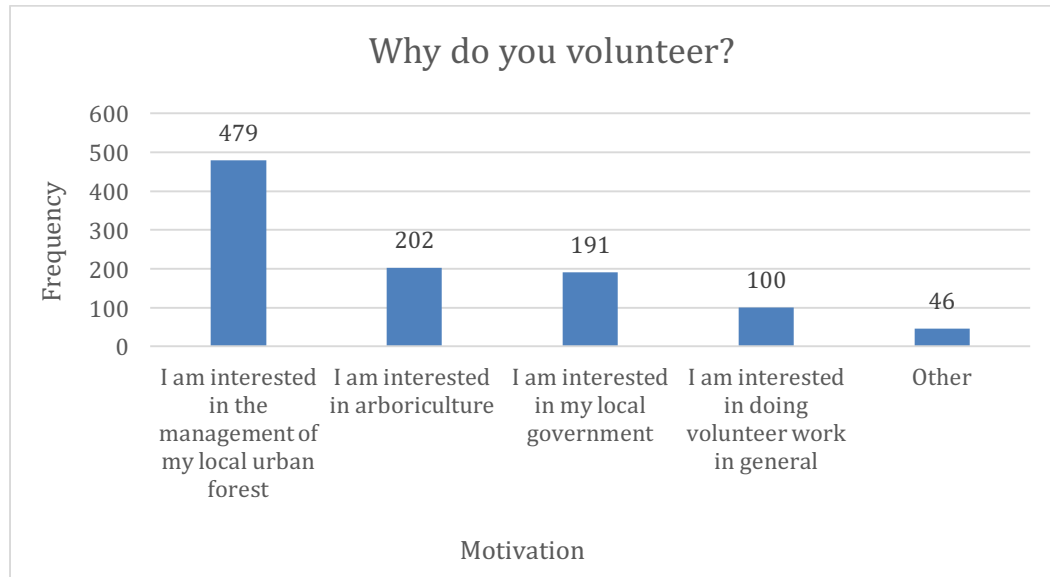


Figure 3.4. Survey respondent motivation to volunteer from direct inquiry. TCTB members were overwhelmingly interested in the management of their urban forest (47.1%).

Table 3.9. “Other” responses for volunteer motivation.

Response	Frequency
Not a volunteer, rather serving on the tree board as a duty of their job	15
Asked to be on the board	4
Interested in the environment/nature	3
Combination – respondent volunteers for more than one of the suggested reasons	3
Has specific concerns about trees in their community	3
Serves in conjunction with serving on another board (i.e., serving on tree board is also a duty of serving on the parks & rec board)	3
Has desire to learn more	2
Enjoys educating others	2
Feels connection to city the board serves and wants to give back to it	1
Enjoys working with others	1

Motivations to volunteer varied between arborists and non-arborists ($\chi^2 = 53.1$, $p < 0.001$; Table 3.10). Arborists were less interested in local government and volunteer work in general but more interested in arboriculture than non-arborists. The associated effect size ($V = 0.21$) indicated that this difference can be interpreted as typical (Vaske, 2008).

Table 3.10. Motivation to volunteer among arborists and non-arborists.

Motivation to volunteer	Arborist ¹		Total	χ^2 value	p -value	Cramer's V effect size
	Yes	No				
"I am interested in my local government."	2	20	19	53.1	<0.001	0.21
"I am interested in the management of my local urban forest."	49	47	47			
"I am interested in arboriculture (the practice and study of the care of trees and other woody plants)."	39	18	20			
"I am interested in doing volunteer work in general."	2	11	10			
Other	8	4	4			

¹Cell entries are percentages (%) of volunteers who are arborists and non-arborists.

Motivations to volunteer varied among professions ($\chi^2 = 74.6$, $p < 0.001$; Table 3.11). The associated effect size ($V = 0.13$) indicated that this difference can be interpreted as minimal (Vaske, 2008). The clearest differences existed between individuals who worked in natural resources and those who did not. Natural resource workers were much less interested in local government than individuals in the social/public and information

sectors. They were also the most interested in the management of their urban forest and, along with blue-collar workers, were the most interested in arboriculture.

Table 3.11. Motivation to volunteer across professions.

Motivation to volunteer	Profession ¹							Total	χ^2 value	<i>p</i> - value	Cramer's <i>V</i> effect size
	Social/ public	Information	Blue- collar	Unemployed	Retired	Other	Natural resources				
"I am interested in my local government."	26	26	15	0	14	18	4	19	74.6	<0.001	0.13
"I am interested in the management of my local urban forest."	40	45	47	34	52	45	61	47			
"I am interested in arboriculture."	18	16	29	34	19	21	27	20			
"I am interested in doing volunteer work in general."	10	12	7	33	11	12	2	10			
Other	6	1	2	0	3	4	6	4			

¹Cell entries are percentages (%) of volunteers across professions.

CHAPTER 4

Discussion

Though it is unknown exactly how many individuals serve on TCTBs in the United States, the maximum estimate is 23,800. Findings, therefore, represent a small fraction of the total possible number of TCTB members. While the investigation fell short of attaining a census, it yielded a sample of the actual population, allowing for inferential statistics and comparison to conclusions from other bodies of research. Nevertheless, the final sample size of 1,025 survey responses has offered a solid basis for beginning to understand a group of individuals whom very little is known about.

TCTB member demographics

Survey results indicated the average tree board member serving in a Tree City USA community was male (53%). Previous research on community advisory boards confirmed that most volunteers are, indeed, male (Burns et al., 2001; Rebori, 2011). Additionally, a 2015 survey of individuals who completed the Tree Board University online course that provides training to tree board members reported 64.7% of respondents were male (Ries, 2015). Interestingly, it appears that the number of women serving on tree boards is heading in a direction that is more representative of the actual US population. An observed 10% rise in female tree board members since the 2015 study by Ries indicates an improved reflection of the percent of women in the United States (50.8%; US Bureau of the Census, 2016). Granted, these samples represented different populations (TCTB members and Tree Board University users), but presented the only available comparison due to lack of previous research. Nonetheless, a representation of 45.5% women in TCTBs is certainly

strong, considering that the fields of forestry and arboriculture have typically been male dominated.

Most volunteers on CABS are well educated (Burns et al., 2001; Rebori, 2011) and Ries (2015) confirmed that 60% of Tree Board University survey respondents held at least a Bachelor's degree, supporting the considerably high average (76%) of Tree City USA survey respondents that held at least a Bachelor's degree. Since the average percent of Americans who hold at least a Bachelor's degree is 29.3% (US Bureau of the Census, 2016), it can be concluded that volunteerism on TCTBs attracts particularly well educated individuals.

Almost a third of TCTB respondents were retirees. Although there was no current estimate of the percent of retirees in the US, 14.9% of people living in the country were age 65 and older and with the average age of retirement at 63, it could be deduced that the percentage reflected a rough estimate of retirees in the American population (US Bureau of the Census, 2015). Understandably, being age 65 or older does not necessarily equate with being retired; some people certainly retire younger than age 65 and others work well past that age. For the purpose of generalizing the specific group of survey respondents to the US population, however, it is assumed that "retirement" is roughly representative of the amount of Americans who were 65 and older at the time of this study.

Clearly, the high proportion of retired survey respondents (29.5%) was unique to the TCTB population and did not reflect the nation's statistics (14.9%; US Bureau of the Census, 2015). One might argue that retirees were the most common TCTB members because they had more free time for volunteering. This trend was not accurate, however,

because in 2015, the 65 and older population was one of the most infrequent groups of volunteers in the country (US Bureau of the Census, 2015).

Retired survey respondents indicated “values” as their dominant functional motivation for volunteering (mean = 1.85); in fact, this group had the strongest alignment with “values” out of any other profession. This trend suggests that retirees were highly motivated by altruism and that serving on a TCTB satisfied their need to address humanitarian concerns. Retirement may have been the most popular professional group of survey respondents because of the “values” opportunities afforded by volunteering on a TCTB.

TCTB member ages were disproportionately represented in the survey results; about half of board members were age 60 or older and only 10 percent were under 40 years old. Considering that the average lifespan of people in the United States is 79 years (World Bank, 2016), about half of all board members were at 75% or more of their expected lifespan. This poses a few potential issues for TCTBs. First, management decisions pertaining to the environment often have long-lasting effects; the full benefits and associated drawbacks may not be observed until long after the decisions are implemented. One could argue that there needs to be an increase in participation among younger individuals because they are the ones most likely to feel a fuller extent of the effects of environmental decision-making. Along the lines of representative democracy, decisions should be made by those who are impacted by them the most. Second, younger individuals may have the advantage of being primed with modern innovations and practices, where retired individuals may be less exposed to advancements made in relevant industries.

Lastly, almost half of survey respondents indicated they relied on existing board members to train and orientate new board members. Accordingly, research findings suggest that training and orientation largely come from an older perspective, meaning that out-of-date practices may be perpetuated in TCTBs as new members come on board. An increase in younger members could instill a more contemporary and perhaps relevant perspective in tree boards.

Survey responses indicated that if TCTB members were not retired, they were most likely to work in the social/public sector (35.7%), which, as defined earlier in the Results section, included jobs in retail (Table 2.1). This was supported by the fact that the most populated job in the United States in 2015 was retail salesperson (4.6 million jobs in 2015; US Bureau of Labor Statistics, 2015).

The number of respondents who were ISA certified arborists represented a small percentage of the total respondent population (9.8%), suggesting that not all UFTBs require and/or have this type of credential among its membership. The actual percent of certified nationwide arborists is negligible. A more relevant comparison was against data from a study of urban forestry activities in the US; Hauer and Peterson (2016) found that 26% of survey respondents indicated their urban forestry department required an ISA arborist to perform public tree work. However, departments are certainly different than UFTBs. Additionally, ISA certified arborists have many roles, including hands-on tree work and consulting (the latter of which is extremely relevant in a UFTB), suggesting that urban forestry departments and UFTBs could have considerably different member compositions. Quite possibly, the question of whether a respondent was an ISA certified arborist is more

relevant to the structure and function of a UFTB (i.e., does the tree board require an arborist?) than to member demographics, as it is certainly a very uncommon descriptor of the general US population.

Of particular interest is whether or not the demographics of tree board members were representative of the communities they served. Fair representation is an important concept to tree boards because it is a central tenet to participatory democracy. The present study was limited to comparing results against national data, but there is certainly considerable value in future exploration of matching regional demographics to those of tree board members.

For example, individuals of different races are not equally distributed throughout the United States. A 2010 US census found that 60% of the country's black people lived in 10 states and that rural and small towns had less racial diversity than cities (US Bureau of the Census, 2016). This disparity might describe why Tree City USA demographics differed from national data. Compared to a 2015 census of demographics, the tree board survey respondents had 15.4% more whites, 11.2% fewer blacks, 15.5% fewer Hispanic/Latinos, and 5.2% fewer Asians (US Bureau of the Census, 2016). Clearly, tree board racial demographics were not representative based on national statistics and a more detailed regional study is needed to determine actual representation. Survey results were much more consistent with Ries' 2015 study where each race category differed by only a couple of percentage points (Ries, 2015) from the survey used in the present study, indicating consistency between study results.

TCTB structure

In addition to gaining an understanding of the people that serve on TCTBs, this survey offers what is likely to be the first description of what constitutes the average tree board in Tree City USA communities. One descriptor had previously been reported from Hauer and Peterson's 2014 study of urban forestry activities in the US. Eighty percent of their survey respondents indicated they were on tree boards that met four or more times a year (Hauer & Peterson, 2016). This Tree City USA survey indicated 13.7% of boards met at least four times a year. The difference may be explained by the sample sizes (667 in the Hauer & Peterson study versus 1,025 here) and that the surveys came from different populations (all municipal tree boards versus TCTBs).

Information learned about TCTBs in the structure section of the survey (regarding tree board size, training materials, etc.) will ideally assist urban forestry tree boards and organizations like Arbor Day Foundation in decision-making and other activities that further the development of urban forest management.

Motivation to volunteer

RVFI and direct inquiry

Although two different methods were used to assess volunteer motivation (the RVFI determined functions provided by volunteering where the direct inquiry determined reasons that motivate volunteering), both relied on the assumption that all respondents were willing volunteers. But, as seen in Table 3.9 in the Results section, 19 respondents

indicated they serve on their tree board as a function of their job or because they were asked to do so. By definition, volunteerism requires that the helper seek out the opportunity to help (Clary & Snyder, 1999) and that acting out of prior obligation is antithetical to volunteering (Snyder & Omoto, 2000). However, these 19 individuals may not have been serving on their tree board solely due to vocational means. It is unknown whether their reasons to serve on the tree board actually differed from those of the volunteers. For example, a city arborist may have been required to serve on their community's tree board by virtue of their job but was motivated by means similar to those of volunteers. An arborist could be interested in the management of their community's urban forest, regardless of their professional requirement. In other words, motivations to serve may be independent from whether they are vocational or a-vocational, which may explain why there were no substantive effects on motivation analysis of the RVFI or direct inquiry when the 19 cases were excluded. All results were therefore retained.

Direct inquiry of volunteer motivation indicated the average survey respondent volunteered on their tree board because they were interested in the management of their local urban forest. The RVFI indicated that they volunteer for the opportunity to express altruistic values. This "values" function typically extends to humanitarian situations where volunteers are concerned for, and therefore motivated to help others (Anderson & Moore, 1978). It is important to remember that an urban ecosystem is a social-ecological system and that volunteering on a tree board does not just affect the trees within a city, but also the community. Urban forestry has significant influence on social systems because it manages the relationship people have with trees by means of maximizing the benefits of

trees. In other words, urban forestry improves lives. This people-centric reasoning explains why survey respondents aligned with the “values” function and indicated interest in urban forest management as the main motivation to volunteer. Tree board members volunteered out of altruism for their urban forest and the people within it.

TCTB function and urban forestry outcomes

In addition to assessing TCTB member demographics and motivations, the survey inquired about individual and community perceptions of tree boards, presenting a glimpse into the success of tree boards and their members. In general, survey respondents felt they made a positive contribution to their tree board (mean = 1.72). Where this response was limited to TCTB members’ level of confidence in their personal performance, other survey results initiated a broader conversation about how tree boards might contribute to the urban forest.

There was a moderate level of agreement that community members perceived TCTBs as a positive contribution to the management of their community’s urban forest (mean = 2.26), but a strong sense of agreement that TCTB members perceived the effect on their community’s urban forest as a positive contribution (mean = 1.61). These results beget two important questions: how does one measure both the positive contribution (or rather, success) of an urban forest and its management? The former part of the question implies that metrics exist for measuring effective and healthy urban forests, whereas the latter part implies a connection between those metrics and management practices. An “Urban Forest Assessment Resource Guide” developed by the nonprofit, American Forests, suggested that the method of measuring the success of an urban forest is through

understanding the benefits it produces (i.e., ecosystem services, increased property value, or social benefits like green public meeting places), and that assessment is becoming easier because tools have advanced these measurable metrics over the years (American Forests, n.d.).

UFTB members are directly involved in urban forestry management processes, so in order to understand the connection between tree boards and successful urban forests, a careful analysis of management is needed. This would result in quantifiable measures that can describe management programs. The process of connecting tree boards to urban forest benefits would address a concern in related literature that there have traditionally been few attempts to measure CAB outcomes (Rebori, 2011).

A myriad of urban forestry management standards exists across multiple resources. Some examples include systematic (planned) tree management, defining authority, establishing tree ordinances, developing a written management plan, setting goals for community involvement, and risk management (Macie, Kidd, Mitchell, & Hartel, 2016; Nowak et al., 2010; USDA Forest Service, 2014; Hauer & Peterson, 2016). A recent study of urban forestry activities in the US identified the most important contemporary metrics in urban forest management by means of determining the most common activities indicated by survey responses from 667 communities. Among the most popular standards were establishing best management practices, emphasizing industry standards, and developing a management plan that sets goals for species diversity, tree condition, tree canopy, and stormwater management (Hauer & Peterson, 2016).

In order to have a streamlined manner of assessing effective urban forest management, a system needs to be developed that uses metrics, like those listed above, that would translate into a rating for individual communities, thereby quantifying outcomes of urban forest management. A rating system would enable a greater understanding of the basis for TCTB members' decisions regarding their tree board's contribution to their community's urban forest. Having a straightforward method of assessing urban forest management would not only give UFTB members goals to work towards, but would ultimately help steer individual communities' path to achieving healthy urban forests.

Recruitment

Study findings determined what the general social and demographic structure of a TCTB in the United States looked like. Besides establishing a knowledge base that had not previously existed, the information resulting from the survey is important because of its potential application in creating and promoting future tree boards. Clary and Snyder (1999) found that a volunteer's motivations need to match the opportunities afforded by the volunteer experience. In other words, if a tree board wants to recruit a certain type of volunteer, it needs to know what offer it can make that would appeal to the intended audience. Analysis results have offered a few opportunities for TCTBs, or their corresponding parent organizations, to promote certain benefits of becoming a board member. For example, to augment general membership, they should emphasize the opportunity for prospective members to satisfy their interest in urban forest management, as indicated by direct inquiry results (Figure 3.4). How the concept of promoting member

benefits would manifest is certainly variable; perhaps by means of personal communication to desired candidates or a city website announcing a tree board position opening.

Before launching into member benefits promotion, TCTBs need to first establish their target audience. The basis for determining desirable tree board candidates would come from future research intended to inform urban forestry managers about the type of individuals that create the most effective tree board. Using the aforementioned rating for urban forest outcomes, a relationship needs to be established that correlates type of tree board member with positive ratings. Once this knowledge base is defined, urban forestry departments will know the type of individual (i.e., arborist, student) that should be recruited to join its tree board in order to help improve the board's overall performance.

Regardless of whether future research can link demographics to effective urban forest management, advisory groups should be representative of the community that they serve (Applegate, 1998). Statistical analysis of this dataset showed either no differences in motivation to serve, or negligible effect sizes, in the categories of age, sex, and race. The knowledge gained from these categories is limited to a description of their general composition in TCTBs and provided no indication of how these individuals could be recruited to improve community representation. However, volunteer motivation analysis did yield implications for recruitment strategies in two demographics.

Analysis of individuals who worked in natural resources and who were ISA certified arborists yielded significant differences with sufficient effect sizes when compared against individuals with different professions and without arborist certification. Before these

results are discussed, however, results with contrasting implications should be noted. A third demographic also yielded a significant difference with a sufficient effect size: highest level of education. Specifically, this result indicates that individuals with a Bachelor's degree or less were more motivated to gain career-enhancing experience than individuals with an advanced degree. Though certainly logical, it is not readily apparent how these findings would benefit TCTBs. One could argue that recruiting individuals with less education would be counterproductive to the efficacy of TCTBs. Therefore, the major implications resulting from motivation analysis of TCTB members lay in results indicating motivation for natural resource workers and ISA certified arborists.

Tree board members with experience and knowledge in natural resources and arboriculture offer a specific perspective that is logically beneficial to urban forest management. Work in natural resources involves management across a variety of landscapes and forestry can certainly be an important focus. Arboriculture is the primary science urban forestry depends on. Consequently, individuals representing one of these trades are likely to provide input that is highly relevant to urban forest management decisions. Therefore, it is practical for TCTBs to seek out representatives from these demographics and study findings present insight into how that could be accomplished.

Motivation analyses revealed that natural resource workers and ISA certified arborists volunteered on TCTBs with the intention of acquiring career related experience and opportunities (Tables 3.4 & 3.5). Effort to recruit these demographics would therefore include promoting the functional career benefits these individuals would receive if they joined. Recruitment should also promote the opportunity for members to demonstrate and

incorporate their interest in arboriculture, which, unsurprisingly, was a significant difference in motivations between ISA certified arborists and non-arborists (Table 3.10). In sum, TCTBs should promote career-enhancing opportunities as a means of recruiting individuals with practical, urban forestry related knowledge and skillsets.

CHAPTER 5

Conclusion

Significance

In a world impacted by changing climates, population growth, and urbanization, it is critical to support affective and informed policy that protects the earth's vulnerable natural resource base. For the first time, information has been collected and analyzed that describes citizen advisors influential in the management of much of the country's urban forest resource. Opening the door to increased awareness of this group of individuals contributes to the progressively important mission of protecting natural resources.

Study findings have offered a baseline description of the demographics and motivations of TCTB members and will ideally assist urban forestry managers in understanding and recruiting volunteers to serve on tree boards. Considering that the average TCTB member was age 58, it would behoove current recruitment efforts to focus on individuals representing younger generations. As with the majority of environmental concerns, management decisions made now will have lasting effects on ecological, social, and economic systems for many generations to come. The gravity of consequences suggests a range of perspectives is needed to ensure that the most educated decisions are made. One could argue that an increase in membership of younger individuals among TCTBs might provide more innovative and contemporary input, therefore more accurately representing a constantly modernizing society.

Age is just one example of how demographics play an important role in TCTBs; varying demographics may be attached to unique and diverse perspectives, which is

certainly a valuable tool in decision-making. Blahna and Yonts-Shepard (1989) confirmed that participatory democracy in natural resource management should provide a broad range of perspectives and interests. Considering that motivations are largely derived from interests, understanding an individual's reasons to volunteer on a TCTB could contribute to the pursuit of attaining diverse citizen advisory boards. Furthermore, study results demonstrated considerable differences between TCTB members and nation-wide demographics in the categories of race, education, and retirement, emphasizing the need to steer TCTBs towards establishing more representative populations.

Research applications

As previously discussed, there are multiple ways to evaluate urban forestry programs. These methods provide opportunity for researchers and industry leaders to develop a more streamlined rating system that recognizes the value of different qualities within programs. For example, Hauer and Peterson (2016) summarized the percent of programs that incorporated industry standards into tree management procedures, as well as the number of decision-making levels that existed between the top person in community government and the person that performed the tree care activities. Once management programs are more easily characterized using categories like these, they can be linked to effective urban forest outcomes, like high percent canopy cover or low number of hazard trees. This will allow exploration into how management processes and tools, like tree boards, can directly influence the state of urban forests.

Future research that includes a broader, more representative sample of all US tree boards (i.e., not just TCTBs) would offer a greater understanding of UFTB member

populations. It is unclear what percent of UFTBs is comprised of TCTBs; nevertheless, expanding the research population would certainly provide a more comprehensive understanding of tree board members. Additionally, looking at case studies of tree boards in urban forestry programs would allow for interesting comparisons among cities based on population size or US region.

Conducting future studies based on this project's objectives would strengthen the general understanding of tree board members and allow for longitudinal analysis to observe changes in demographics over time. It may benefit ADF to consider repeating this study on a regular basis, perhaps every five or ten years, so that it can gain stronger insight into the individuals that represent the communities in Tree City USA programs.

Study limitations

ADF urban forest manager Pete Smith noted that the initial survey recruitment email was sent out to any community that submitted a Tree City USA application for 2015 and that the recipient population did include "some communities that did not get approved for some reason or another (mostly, they didn't complete all the standards)" (P. Smith, personal communication, May 24, 2016). Though the sample population was intended to represent communities with the Tree City USA certification, a few communities were included that did not meet that prerequisite and it is unknown which ones or how many there were. However, recruitment emails and survey instructions did clearly state that individuals should only take the survey if they served on a tree board, so the results do reflect US tree boards.

The central motivation behind this research was to break ground in understanding baseline characteristics of tree boards in the US. But the sample population was necessarily limited to 2015 Tree City USA applicants. There are likely many other tree boards in the country from cities that are not part of the Tree City USA program due to any number of reasons, including allowing certification to lapse by not reapplying annually, failure to meet the qualifying criteria, or lack of administrative initiative. An absence of Tree City USA certification certainly does not imply that a community's urban forestry program is not as official or substantial as certified communities, nor does it mean the city does not have a tree board. A broader, more inclusive sample of all tree boards in the country, regardless of Tree City USA status, would have more accurately achieved the project's main objective. However, because no comprehensive reliable database exists, this scope was not possible. Therefore, the discussion of results from this study is limited to the TCTB population and cannot be inferred to other UFTBs.

As previously mentioned, there is no known research that has specifically investigated UFTBs. Not only does this inhibit any longitudinal analysis of tree board demographics, but it means this project had little direction for establishing research questions other than ones designed to discover baseline demographics. Fortunately, tree boards are an extension of volunteerism, so previous research and literature allowed for the application of an established tool to measure volunteer motivation.

Survey responses disproportionally represented the 50 states (Appendix C). The four states with the most responses comprised 21.9% of the sample population and all were located in eastern US. It is unknown if US region could have affected responses. For

example, there is a longer history of forest management in the eastern part of the country because it was established before western regions. The fact that eastern regions have had an additional component of time could have complicated results. Ideally, a more representative sample would have included equal representation of states, as determined by the ratio of respondents per state to that state's population.

An oversight before releasing the survey resulted in the 7-point Likert scale being reverse coded. These scales typically present the disagree option at the lower end (1) and the agree option the higher end (7). This study however, inadvertently used the opposite scale; consequently low scores corresponded with high functional benefit. Though all results were interpreted appropriately, future researchers are presented with an additional step of reverse coding if they want to compare their resulting 7-point scores to those presented here.

ADF was asked to distribute the survey because it was the only available option to reach an established population of US tree boards. This may have presented a potential response bias because they are the authoritative body that awards the Tree City USA certification, something that communities have to work toward earning. It is possible that this factor could have swayed respondents to report what they thought ADF would perceive as more favorable responses (i.e., an augmented number of tree board meetings per year). This could have been avoided by informing survey takers that ADF would not be given any information other than this final document.

Retrospective insights

In the history of studying volunteer motivation, researchers have sought to create a more efficient method of determining motivation; thus, tools like the VFI were developed. This is in contrast to the alternate option - direct inquiry. This method is arguably less efficient because it necessitates open survey responses and therefore, a considerable amount of time to code them for analysis. Additionally, as Shye (2010) pointed out, people may not actually know why they volunteer. This left me all the more intrigued about direct inquiry in an interview format. If I had access to more time and resources, I would have liked to conduct qualitative interviews to compliment my quantitative findings. Not only would this have given me the opportunity to meet in-person tree board members, but I could also inquire about their reasons for volunteering and perhaps gain a clearer understanding of motivation to volunteer on tree boards. I would be interested to see how easily people's answers could fall into the functionalist reasoning that yielded the VFI. Additionally, I could assess what individuals considered to be the most pertinent issues related to both tree board structure and urban forestry management. These benefits would have strengthened the findings and suggestions for future research.

I would also have liked to ask a question in the survey that inquired about the inclusion of ISA certified arborists on each tree board. Whether or not the respondent identified as such, to know if their tree board included (or even required) a certified arborist would further add to the limited body of understanding about the structure of tree boards. Building on the ideas I suggested in the Discussion section, I could propose that certified arborists on tree boards might possibly influence the efficacy of urban forest

management. This is particularly relevant to me because I hold an ISA arborist certification and it would be meaningful to know that it is more than just a professional title that I work to maintain; but rather, a skillset that actually affects positive change in a topic that concerns me deeply – managing healthy urban forests.

Summary

The study at hand investigated what the average TCTB looks like by examining basic structural components of the boards and demographic information of the individuals who serve on them. Findings have presented a profile of the average tree board in the Tree City USA program and an indication of what other UFTBs in the US could look like. By doing so, an opportunity has arisen for social and political scientists to expand general understanding of an influential group of individuals that apply participatory democracy and play an important role in the scheme of government decision-making. Additionally, a noteworthy discussion about fair community representation has been presented and urges future analysis that would emphasize the need for citizen advisory groups to work towards more accurate representation.

Finally, an assessment of motivations to volunteer has offered reasons that people choose to serve on TCTBs and the functions provided by their volunteer experience, thereby enhancing the knowledge base of urban forestry decision-makers involved at the citizen level. Additionally, these findings may contribute to the study and practice of urban forest management by suggesting means for more effective member recruitment based on the particular motivations of different member demographics.

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APPENDICES

Appendix A. Understanding Citizen Advisory Boards: A National Census of Tree Boards; *Qualtrics survey*.



**Understanding Citizen Advisory Boards:
A National Census of Tree Boards
CONSENT NOTICE**

Welcome.
With the help of the Arbor Day Foundation, you have been identified as a current member serving on a citizen advisory board, sometimes called a tree board, for a Tree City USA community. A research study at Oregon State University is conducting a census and would like to learn a few things about you. The purpose of this study is to better understand the social structure of tree boards and how they can influence urban forest management. After reading and agreeing to this consent notice, please provide responses to the following questions.

Confidentiality.
Your participation in this study is completely voluntary and confidential. There are no risks to you involved and while there are no direct benefits for completing the survey, your participation is important and will contribute to the field of urban forest management. The survey will take about 10-15 minutes to complete.

Study contacts.
If you have any questions about this research project, please contact researcher Sarah Greenleaf at sarah.greenleaf@oregonstate.edu. If you have questions about your rights or welfare as a participant, please contact the Oregon State University Institutional Review Board (IRB) Office at (541) 737-8008 or by email at IRB@oregonstate.edu.

☐ I have read, understand, and agree to the terms in this consent notice.



**Understanding Citizen Advisory Boards:
A National Census of Tree Boards**

Thanks for your willingness to participate in this first ever tree board census. This survey is designed to collect information about citizen advisory bodies that help manage urban forests. In your city or town, that group might be called a tree board, urban forestry commission, parks committee, or some other title. For the purpose of this study we use "tree board" as a generic term to describe these types of groups.

This survey has 4 parts consisting of 15 questions. Please answer all the questions to the best of your ability.

Part 1. First, we would like to know about your tree board.

What is the name of the town/city your tree board represents? Please write in response (town/city and state).

How many people serve on your tree board? Please write in response.

How many times in the last 12 months has your tree board held a meeting? Please write in response.

How many hours per month do you devote to activities involving your tree board, including meetings, meeting preparation, and urban forestry activities such as tree planting projects or educational events? Please write in response.

Volunteering increases my self-esteem.	☐	☐	☐	☐	☐	☐	☐
Volunteering allows me to gain a new perspective on things.	☐	☐	☐	☐	☐	☐	☐
Volunteering allows me to explore different career options.	☐	☐	☐	☐	☐	☐	☐
I feel frustrated by poorly managed urban forests.	☐	☐	☐	☐	☐	☐	☐
Others with whom I am close place a high value on community service.	☐	☐	☐	☐	☐	☐	☐
Volunteering lets me learn through direct "hands on" experience.	☐	☐	☐	☐	☐	☐	☐
I feel it is important to help others manage urban forests.	☐	☐	☐	☐	☐	☐	☐
Volunteering helps me work through my own personal problems.	☐	☐	☐	☐	☐	☐	☐
Volunteering will help me succeed in my chosen profession.	☐	☐	☐	☐	☐	☐	☐
I can do something for a cause that is important to me.	☐	☐	☐	☐	☐	☐	☐
Volunteering is an important activity to the people I know best.	☐	☐	☐	☐	☐	☐	☐
Volunteering is a good escape from my own troubles.	☐	☐	☐	☐	☐	☐	☐
I can learn how to deal with a variety of people.	☐	☐	☐	☐	☐	☐	☐
Volunteering makes me feel needed.	☐	☐	☐	☐	☐	☐	☐
Volunteering makes me feel better about myself.	☐	☐	☐	☐	☐	☐	☐
Volunteering experience will look good on my resume.	☐	☐	☐	☐	☐	☐	☐
Volunteering is a way to make new friends.	☐	☐	☐	☐	☐	☐	☐
I can explore my own strengths.	☐	☐	☐	☐	☐	☐	☐

Which statement best describes why you volunteer on your local tree board? Please choose one.

- ☐ I am interested in my local government.
☐ I am interested in the management of my local urban forest.
☐ I am interested in arboriculture (the practice and study of the care of trees and other woody plants).
☐ I am interested in doing volunteer work in general.
☐ Other

Part 3. Next, we would like to know how you feel about your volunteer work and your tree board.

Please choose the response that best describes how you feel about the following statements.

	Strongly agree 1	Moderately agree 2	Slightly agree 3	Neutral 4	Slightly disagree 5	Moderately disagree 6	Strongly disagree 7
I make a positive contribution to my tree board.	☐	☐	☐	☐	☐	☐	☐
My tree board makes a positive contribution to my community's urban forest.	☐	☐	☐	☐	☐	☐	☐
My community perceives the tree board as a positive contribution to the management of its urban forest.	☐	☐	☐	☐	☐	☐	☐

Part 4. Lastly, we would like to know some general information about you.

What is your age? Please write in response.

Are you: (choose one)

- ☐ Male
- ☐ Female
- ☐ I prefer not to respond

What is the highest educational degree you have completed?

- ☐ Less than high school diploma
- ☐ High school diploma or GED
- ☐ 2-year associates degree or trade school
- ☐ 4-year college degree (e.g., bachelors degree)
- ☐ Advanced degree beyond 4-year degree (e.g., masters, doctorate, medical doctor, law degree)

Which of the following best represents your racial or ethnic heritage? Choose all that apply.

- ☐ White / caucasian
- ☐ Black / African American
- ☐ Hispanic / Spanish / Latino
- ☐ Asian
- ☐ American Indian or Alaska Native
- ☐ Native Hawaiian or Other Pacific Islander
- ☐ Other:
-

Are you a certified arborist with the International Society of Arboriculture?

- ☐ Yes
- ☐ No

Please select the following category that best describes your profession.

- ☐ Homemaker
- ☐ Retired
- ☐ Student
- ☐ Military
- ☐ Unemployed
- ☐ Agriculture, fishing or hunting
- ☐ Arts, entertainment, or broadcasting
- ☐ Construction
- ☐ Education
- ☐ Finance and insurance
- ☐ Forestry
- ☐ Government and public administration
- ☐ Health care and social assistance
- ☐ Hotel and food services
- ☐ Information – services, data, or other
- ☐ Land management
- ☐ Legal services
- ☐ Manufacturing – computer, electronics, or other
- ☐ Mining
- ☐ Publishing
- ☐ Real estate, rental or leasing
- ☐ Religious
- ☐ Retail or wholesale
- ☐ Scientific or technical services
- ☐ Software
- ☐ Telecommunications
- ☐ Utilities
- ☐ Other



Thank you for completing the survey!

Appendix B. Table of statistical reliability of the VFI used in previous volunteer motivation research.

Statistical reliability of the VFI (Clary & Snyder, 1998)

	Item Total Correlation	Alpha If Item Deleted	Cronbach Alpha
Career			0.90
"Volunteering on my tree board can help me get a foot in the door at a place I would like to work."	0.65	0.90	
"I can make new contacts that might help my business career."	0.81	0.86	
"Volunteering allows me to explore different career options."	0.76	0.87	
"Volunteering will help me succeed in my chosen profession."	0.78	0.87	
"Volunteering experience will look good on my resume."	0.75	0.88	
Social			0.81
"My friends volunteer."	0.54	0.80	
"People I am close to want me to volunteer."	0.54	0.80	
"People I know share an interest in community service."	0.58	0.79	
"Others with whom I am close place a high value on community service."	0.69	0.75	
"Volunteering is an important activity to the people I know best."	0.68	0.76	
Values			.071
"I am concerned about the proper management of trees in my community."	0.52	0.65	
"I am genuinely concerned about the particular group I am serving."	0.38	0.70	
"I feel frustrated by poorly managed urban forests."	0.40	0.72	
"I feel it is important to help others manage urban forests."	0.62	0.61	
"I can do something for a cause that is important to me."	0.54	0.64	
Understanding			0.80
"I can learn more about urban forest management."	0.40	0.81	
"Volunteering allows me to gain a new perspective on things."	0.63	0.75	
"Volunteering lets me learn through direct, hands on experience."	0.66	0.74	
"I can learn how to deal with a variety of people."	0.60	0.76	
"I can explore my own strengths."	0.65	0.74	
Enhancement			0.85
"Volunteering makes me feel important."	0.59	0.84	
"Volunteering increases my self-esteem."	0.72	0.81	
"Volunteering makes me feel needed."	0.76	0.80	
"Volunteering makes me feel better about myself."	0.72	0.81	
"Volunteering is a way to make new friends."	0.53	0.85	
Protective			0.82
"No matter how bad I am feeling, volunteering helps me feel more positive."	0.39	0.85	
"By volunteering, I feel less lonely."	0.68	0.77	
"Doing volunteer work relieves me of some of the guilt over being more fortunate than others."	0.58	0.80	
"Volunteering helps me work through my own personal problems."	0.71	0.76	
"Volunteering is a good escape from my own troubles."	0.74	0.75	

Appendix C. Survey response rate by state.

Order	State	Frequency	Percent (%)
1	NJ	100	9.8
2	OH	78	7.7
3	PA	55	5.4
4	FL	46	4.5
5	WA	43	4.2
6	NC	38	3.7
7	OR	37	3.6
8	IN	35	3.4
9	KS	35	3.4
10	GA	31	3.4
11	CA	30	2.9
12	MO	28	2.8
13	TN	26	2.6
14	NE	24	2.4
15	NY	24	2.4
16	TX	23	2.3

Order	State	Frequency	Percent (%)
17	AL	21	2.1
18	IA	21	2.1
19	ID	21	2.1
20	WI	21	2.1
21	MT	20	2.0
22	WY	20	2.0
23	IL	19	1.9
24	MD	18	1.8
25	KY	17	1.7
26	VA	17	1.7
27	CO	15	1.5
28	MN	14	1.4
29	SC	13	1.3
30	AR	11	1.1
31	MI	11	1.1
32	OK	10	1.0
33	SD	10	1.0

Order	State	Frequency	Percent (%)
34	UT	9	0.9
35	ND	8	0.8
36	AK	7	0.7
37	WV	7	0.7
38	RI	6	0.6
39	MS	5	0.5
40	NM	5	0.5
41	NV	5	0.5
42	AZ	4	0.4
43	CT	4	0.4
44	DE	3	0.3
45	HI	2	0.2
46	LA	1	0.1
47	MA	1	0.1
48	ME	1	0.1
49	VT	1	0.1
50	NH	0	0