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Civic Environmental Stewardship: Aligning Organizational and Participant Motivations

Natural area management and sustainability in cities is ever more reliant on civic environmental stewardship. Many conservation organizations sponsor stewardship programs that enlist volunteers to care for the land and restore urban ecosystems. Stewardship program success depends on alignment of individuals' and sponsoring organizations' goals. We conducted surveys with a sample of 165 volunteers across natural areas stewardship events in metropolitan King County (Washington, U.S.). An adapted Volunteer Functions Inventory framework was used to understand volunteers' motivations, satisfactions, and volunteering history. Our findings confirmed the multidimensional dynamics of volunteerism, as stewardship volunteers were motivated and expressed satisfaction for practical altruism, social interactions, experiential learning and a sense of positive impact. High frequency volunteers expressed higher values across all satisfactions outcomes. People who participated in stewardship events closer to home indicated higher event-related social esteem and personal efficacy. Overall, volunteers were generally of greater education attainment, more affluent, and culturally identified as white at a higher rate than the region's populace, suggesting the need for program innovations to improve stewardship participation diversity. Findings that differ from more general volunteer studies indicate volunteers' concerns for other people and the environment, in the near term and as legacy for the future. Stewardship organizations' programs are guided by goals and values. A systematic approach to knowledge building about volunteer motivations can inform more successful volunteer engagement, such as recruitment and retention.

Keywords

volunteer, restoration ecology, civic ecology, natural resource management, urban ecosystems, social science, human dimensions, satisfactions, Seattle, King County

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INTRODUCTION

Many local governments manage natural areas, such as urban forests, wetlands, riparian zones, shorelines, and habitat for ecosystem services. These lands, often biodiverse refuges within urbanized areas, help support local sustainability and resilience goals, and improve human quality of life. Maintaining the health, quality and ecosystem services functions of such lands can only be achieved through ongoing planning and management, yet fiscal limitations can limit capacity for essential activities. Considering limited or declining availability of resources for ecosystem management, local agencies and organizations must consider more collaborative solutions to restore and sustain natural systems (Wolf et al. 2013). Consequently, many conservation organizations now directly support volunteer stewardship programs or support local groups that enlist volunteers to care for the land and specific resource systems (Measham and Barnett 2008; Cook and Inman 2012; Wright et al. 2015; Hauer et al. 2018) and are often members of networks that can mobilize regionally to better govern and manage urban ecosystem services (Fisher et al. 2012; Connolly et al. 2014).

There are many different expressions of stewardship. Effective volunteerism for the environment is form and context dependent (Fisher et al. 2012) and increasingly diverse situations and activities demonstrate how volunteers can contribute to the social, ecological, and economic resilience of cities, perhaps even strengthening the roots of democracy (Fisher et al. 2015). Individuals may recognize needs in their communities – such as parks in decline, vacant lot neglect, or poor street tree condition – and initiate grassroots groups to improve conditions of nearby public green spaces and ecosystems (Svendsen and Campbell 2008; Hunter 2011; Kassam et al. 2018; Gottwald and Stedman 2020). A broader interpretation of this grassroots activity is “active citizenship” and “green self-governance,” which are situations where communities organize themselves in order to “protect rights and take care of common goods” (Buijs et al. 2016; Mattijssen et al. 2018). Other investigators have focused on activities to encourage restoration and biodiversity on private lands and gardens (Mumaw and Bokessey 2017; Mumaw and Mata 2021), and others focus on civic science lead by science-based organizations (Phillips et al. 2019). Each expression of stewardship can be associated with various formal and informal organizational goals, principles, and processes.

In this study we focused on “civic environmental stewardship,” by which we mean the collective action of groups of volunteers who are active on public lands, often without fiscal compensation, and often sponsored by local organizations, such as government agencies or nonprofits (Johnson et al. 2019). We operationalized this as programmed events in urbanized locations which, like other studies, involved volunteers to support tree planting in cities (Roman et al. 2015), fire adapted landscapes (van Wilgen et al. 2012), and ecological restoration and monitoring (Sheppard et al. 2017). Additional studies have described civic environmental stewardship activity, including beach clean-ups (Jorgensen et al. 2021), citizen science (McKinley et al. 2015), recreation infrastructure development (Halpenny and Caissie 2003), urban foraging resource management (McLain et al. 2017) and urban green infrastructure more broadly (Andersson et al. 2014). Civic environmental stewardship is a widely adopted approach to address multiple social and ecological objectives.

Sustained efforts for urban ecosystem and natural area management are ever more reliant on civic environmental stewards (Sanderson and Huron 2011; Wolf et al. 2013; Asah et al. 2014). Event and program sponsors, whether they are local governments, non-profit organizations, or community groups, dedicate substantial time and effort to volunteer programs. Program achievements often describe success in terms of the extent of landscape activity (such as invasive plants removed or number of trees planted) and general metrics of volunteer activity (such as event attendance numbers and hours of service) (Sheppard et al. 2017). Additional knowledge about the quality of experience and other social dimensions can help inform sponsors' efforts to improve volunteer organization and support (Bennett et al. 2018; Turnbull et al. 2020).

We conducted survey research about environmental stewardship volunteers in the metropolitan Seattle region (U.S.) to better understand volunteers' motivations, satisfactions and volunteering history. Our goal was to better understand how volunteer characteristics and motives align with satisfactions, using a validated assessment tool that is widely accepted in volunteerism, the Volunteer Functions Inventory. We then aligned these responses with our prior research on environmental organization values and goals. Our systematic approach to knowledge building about stewardship can aid sponsoring organizations to build program capacity and develop more effective strategies and operations. Increased understanding of the motivations and satisfactions of volunteer stewards can improve engagement of and relationship building with volunteer populations (Asah and Blahna 2012; Asah et al. 2014).

BACKGROUND

Social and Ecological Goals of Environmental Stewardship

Successful ecological restoration and management in the urban context holistically addresses both ecosystem and human needs (Clewett and Aronson 2006; Schueller et al. 2006; Wolf and Kruger 2010; Lee and Hancock 2011; Jellinek et al. 2018). While critical to the operations of ecosystem management programs, scientific knowledge of biophysical processes alone cannot assure success (Geist and Galatowitsch 1999). Ongoing human commitment and engagement are critical to ensuring long-term sustainability of natural areas. Committed individuals contribute ecological knowledge, field techniques and public support to help restore or conserve ecosystems. Additionally, participation in land management can influence participants' well-being in a variety of ways, perhaps providing physiological, psychological, economic and spiritual benefits (Asah et al. 2014; Husk et al. 2016; Molsher and Townsend 2016; Wolf and Housley 2017; Maller et al. 2019).

Research has examined the collaborations between individuals, groups and organizations to manage local natural resources (Wondolleck and Yaffee 2000; Koontz et al. 2004; Keough and Blahna 2006; Ostrom 2009), including considerations of scale in socio-ecological systems. The geography of ecological outcomes of stewardship can range from a region (such as the urban to wildland landscape gradient or large watersheds) to a single site (such as a park or open space parcel). The human dimensions scales of stewardship may range from a collective activity footprint generated by a network of organizations and groups within a region (Belaire et al. 2011; Romolini et al. 2016b) to the motivations and actions of individual volunteer stewards.

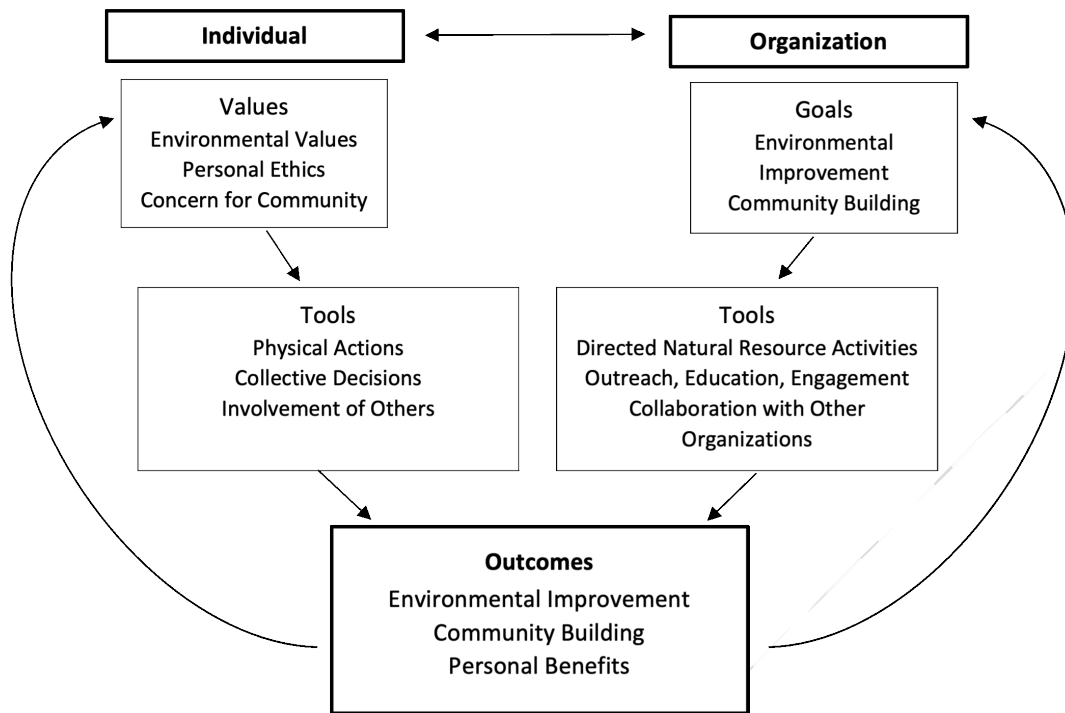


Figure 1: Framework of Stewardship Organization Values and Goals (adapted from Romolini et al. 2012).

The alignment of organization and individual values is important in civic relationships. For instance, in the private sector congruence between employee and organization values, across multiple value dimensions, is associated with job satisfaction and employee commitment to the organization, and reduced turnover (Amos and Weathington 2008). Healthcare organizations employ values-based recruitment and have interest in the impact of value congruence (Patterson et al. 2016). Similar studies address the nature of the bond between volunteers and organizations, noting that positive experiences are predicted by congruence of organizational mission and values with personal values (McCormick and Donohue 2016). Affective bonds support volunteers' commitment and desires to achieve organization objectives (Juaneda-Ayensa et al. 2017), as well as support greater 'meaningfulness' of the volunteer experience (McCormick and Wollmering 2017). Studies have also explored the motivational drives of volunteers and linkages to organization human resources management practices to provide fulfilment for volunteers (Traeger and Alfes 2019, Ashfaq et al. 2020).

Sustained environmental stewardship program success depends on alignment of individual and institutional goals (Clayton and Myers 2009; Krasny et al. 2014; Krasny et al. 2015). Landscape stewardship in cities requires collective effort to mobilize engagement, knowledge and funding (Andersson et al. 2017). Romolini et al. (2012) interviewed practitioners and managers in local government and nonprofit sectors to better understand the interrelationship of organizational and individual social scales within stewardship organization leadership. Figure 1 illustrates the complex interplay of organizational needs and motivations of individual professionals underlying seemingly straightforward field-based natural areas programs. Organizational goals, often expressed in mission statements and outreach communications that

address environmental and community enhancements, define programmatic execution of field work and community engagement activities. Yet the success of these efforts is ultimately dependent on individuals, and the interviewed professionals passionately described personally held values and concerns, some of which aligned with organization activity and some that underpinned a deeper commitment to environment and stewardship.

The interviewees' embedded social dimensions shaped personal inputs to the physical and social tools used by their respective organizations. The practitioners described situations of success when personal and organizational dimensions were effectively integrated, leading to outcomes of environmental improvement and community building that also generated personal satisfactions for organization staff. Omoto and Snyder (2002) describe a similar dynamic in volunteerism, describing how individual and collective action are processes promoted by a sense of community, expressed as both psychological connections and action context.

Volunteer Motivations and Satisfactions

We previously evaluated the intersection of organizational goals and the values of the professionals who plan and manage civic environmental stewardship programs. This study sought to further understand social dimensions of stewardship by accessing the additional dispositional factors influencing volunteer participation. Individual decisions are based on diverse extrinsic and intrinsic motivations (Finkelstein 2009). While there has been an increase in the number of studies about the psychosocial motivations of environmental stewardship volunteers, many are qualitative, and the quantitative studies use a wide variety of different approaches to scale development and data collection. We explored the more extensive research of diverse volunteer situations to inform the framework and objectives of this research.

Early studies of volunteer participation confirmed that altruism was central (Frisch and Gerrard 1981), and likely an important value expression (Katz and Kahn 1978). For AIDS volunteers, it was found that a 'helping disposition' was associated with program satisfaction (Omoto and Snyder 1995). While the 'chance to help others' was highly rated in a survey of community service volunteers (e.g. scout leaders, elder services), Rouse and Clawson (1992) found that additional motives of achievement and affiliation, and incentives of purpose and solidarity were also highly rated.

Steen's (2006) work on public sector service addressed 'impure altruism', noting that civic volunteerism is rationally driven but also complex and multi-dimensional, and an earlier review (Smith 1994) concluded that determinants are highly multivariate. Additional studies of service volunteers, across a variety of contexts, have explored underlying reasons for helping behaviors to identify influences on frequency and duration of volunteer service, and to examine changes in participant attitudes following volunteer activities (Omoto and Snyder 1995; Donald 1997; Clary et al. 1998; Ryan et al. 2001). These efforts have identified general motivations related to voluntary action, including individual value sets, the desire to learn, personal development, community involvement and enhancement of self-esteem (Omoto and Snyder 1995).

Motivations precede decisions about or interest in volunteering. Satisfactions are the perceptions about how well motives were addressed or reinforced in the volunteer experience

(Finkelstein 2008). There are both direct and implicit connections between these two constructs (Davis et al. 2003). Motivations may initiate an experience episode, then commitment to subsequent activity can be dependent on satisfaction. For repeat or traditional volunteers, the connection of motivation to satisfaction becomes a feedback loop that may sustain longer-term commitment (Omoto and Snyder 1995). Studies of service volunteering have found that volunteers who were given tasks that aligned with their motivations for helping reported greater satisfaction and stronger intentions to continue serving in the short and long term (Clary and Snyder 1999; Stukas et al. 2005).

The motivations and satisfactions dynamic has implications for volunteer engagement by organizations. Chacón et al. (2007) proposed a three-stage model of volunteer duration of service. Functional intentions and motivations support an initial stage of service, as has been addressed in prior environmental stewardship research (Asah and Blahna 2012, 2013). Volunteers rarely work independently; they usually associate with an organization that presents a resonant set of values, goals and programs. If initial experiences are satisfying, volunteers will develop organizational commitment as the second stage and continue their activity (Mowday et al. 1979), contributing to retention (Asah et al. 2014). In the third state a functional role becomes part of the volunteer's personal identity, often with associated behaviors (Callero et al. 1987; Charng et al. 1988). Less is known about how stewardship behavior influences personal identity and potential deeper affiliation or relationship with an environmental stewardship organization. Adapting and applying validated measurement scales across stewardship situations can provide insights about patterns of volunteer and organizational interactions, leading to more effective ecological and social stewardship activity.

Research Objectives and Measures

Successful volunteer programs depend on alignment of motivations and values of organizational sponsors and participating volunteers. We employed a functional motivations approach to study volunteers, one which has been validated and applied across multiple realms of social public service, but less so in studies concerning civic environmental stewardship. A survey was designed to address the following research objectives. What are the factors that motivate volunteers who participate in environmental stewardship? Once activated by participation, what factors describe stewardship volunteer satisfaction? Volunteers bring a range of personal skills and abilities to episodes of service experience; what stewardship actions are individuals most willing to contribute? Finally, in what ways can volunteer satisfactions and motivations be interpreted as contributing to or aligning with organizational goals and values? Examining the processes underlying how individuals become involved in landscape and ecosystem sustainability can reveal how volunteer participation is activated and can be sustained by organizations.

Survey scales are an attempt to capture a theoretical understanding of the world, often described by latent constructs, and are assembled to measure behaviors, attitudes and hypothetical scenarios we expect to exist. Validated scales are the result of a rigorous process of conceptualization, variable item development and testing for reliability and multiple dimensions of validity (Boateng et al. 2018). After a review of different scales that have been used to measure preferences and satisfactions related to volunteer stewardship experiences, we selected

the Volunteer Functions Inventory (VFI) for two reasons. First, environmental volunteer survey content is often based on volunteer motives related to specific activities, locations, or types of volunteer events. The VFI constructs are comprehensive and subsume much of the motivation constructs used in the civic environmental stewardship literature. Second, the history of use of the VFI across many different types of volunteer activities allows for potential comparability of environmental stewardship with other types of voluntary activities.

Based on more than a decade of developmental research Clary and Snyder (1999) operationalized the VFI as a standard measurement approach to assess motivational and satisfaction dimensions. *Functionalism* is a psychological construct addressing the multiple personal and social purposes, needs and goals that are fulfilled by an individual's attitudes and behaviors (Omoto and Snyder 1995; Snyder and Omoto 2008). Different people may engage in the same behavior for different reasons, and the same behavior may serve different functions for each individual (Katz 1960; Snyder 1993).

The VFI was developed then subsequently cross-validated in studies of both currently active and previous volunteers involved in a wide variety of activities (Clary et al. 1998). The motivation scales have a high degree of internal consistency, and prior factor analyses confirmed its conceptualization and internal structure. The tool has been used to assess functional volunteerism across diverse situations, including Habitat for Humanity (Okun and Schultz 2003), youth sport activities (Kim et al. 2010), and Chinese university students who served children, immigrants, and senior citizens in need (Wu et al. 2009).

Table 1. Conceptual Dimensions of the Volunteer Functions Inventory (Clary and Snyder 1999)

Dimension	Definition
Values	Desire to express or act on important values like humanitarianism or altruism
Understanding	Seeking to learn more about the world or exercise skills that are often unused
Enhancement	Pursuing psychological growth and development
Career	Seeking career-related experience or knowledge
Social	Acting to strengthen social relationships
Protective	Desire to reduce negative feelings (such as guilt) or address personal problems

While considered a conceptually robust model (Table 1), the VFI has been implemented in only a limited number of studies concerning environmental volunteerism. A study of parks and recreation volunteers conducted analysis structured by the VFI and added variables for co-production (e.g. Knowledge of Government Operations and Department Needs Me) (Silverberg et al. 2000). Dorn et al. (2021) used VFI to study Master Gardener volunteers finding that Learning (a modified function) was most important, and that Social functions were entwined with other values. Other studies of stewardship motivations report findings generally aligning with the VFI dimensions (Ryan et al. 2001, Moskell et al. 2010). For example, Bruyere and Rapp (2007) listed six factors that are conceptually similar to VFI: learning about the natural world; social engagement with others who share values, and doing something positive with friends and family; sharing values and gaining esteem; appreciation for efficient project organization; interest in gaining vocational or career opportunities. They found an additional factor, a motivation focused on familiar place, that appeared to distinguish environmental volunteerism

motivations from other situations. Sense of place has important linkages to environmental preferences in general (Jaśkiewicz 2015; Kil et al. 2021), and several authors have found that measures of both sense of place and place attachment correlated to the public's interest in sustaining urban parks (Gooch 2003; Ryan 2006; Mumaw 2017).

Many of motivational influences reported in the environmental volunteerism literature, including some that are measured unevenly, are subsumed by the VFI, and are ancillary. For example, Asah and Blahna (2013) found that “ego defense” was a moderately important motivation for environmental volunteering in Seattle, WA but is rarely included in volunteer motivation studies, such as the motivation scale used in tree planting efforts in New York City (Johnson et al. 2018) where survey constructs were based solely on participant interviews. Ego defense describes the need to reduce one's personal feelings of guilt (e.g., for potential human damage to the environment), and is not well articulated (or even consciously recognized) by participants, so it did not emerge as a potential motive in the NY City study. The VFI “protective” scale potentially taps the ego defense motive. So reduced specificity of response within a particular location or activity is countered by subscale comparability and generalizability of VFI.

METHODS

This survey study was structured by site and respondent sampling across an urbanized county in Washington state, U.S. Self-report assessments were conducted while volunteers actively participated in stewardship events. These data were collected to inform the stewardship programs of a complex regional network of local organizations and agencies (Romolini et al. 2016a).

Geographic Context

The Seattle-King County metropolitan region is located within the greater Puget Sound watershed, part of the Salish Sea. The region is the home of the Coast Salish, being a group of many tribes of ethnically and linguistically related indigenous peoples yet having distinct cultures and languages. The urbanized area is geographically bounded by the Cascade Mountains to the east and Olympic Mountains to the west, and is surrounded by extensive public lands, including state and national forests, parks, and wilderness areas.

The study region contains a steep gradient of landscape types from mountain to sea, and land uses range from wildland to urban with larger settlements concentrated at coastal areas. Upland areas were once covered by dense mixed conifer forests, a natural resource that was and continues to be harvested for timber and other wood products. Distributed within the matrix of urbanized landscape are patch forests, small to large remnants that are managed for ecosystem services, and in some instances, sustained yield.

King County is the most populous county in Washington state and has experienced recent rapid growth. From 2010 to 2020 the population growth rate was 13.9%, compared to 6.6% for the entire U.S. (U.S. Census QuickFacts). A state level Growth Management Act focuses development density within existing urban growth boundaries. Remnant forests are held in both public and private ownership within and beyond city boundaries. Many public lands are in mixed use management, and local government natural resource agencies rely on volunteer stewardship

organizations and programs to supplement management programs. Typical activities include invasive plant species removal, native species replanting, riparian restoration and trail building and maintenance.

Survey Development

Our survey was developed to integrate prior literature on volunteerism and practical needs of local stewardship managers. It was composed of five sections. Two sections were derived from the VFI and addressed volunteer motivations and satisfactions. Minor modifications to the VFI sections concerning outdoor settings were informed by prior studies that focused on environmental volunteerism (Ryan et al. 2001; Bruyere and Rapp 2007), such as making statements more inclusive of outdoor as well as social situations. In-field pretesting was conducted at early events in King County's volunteer calendar, including trial survey response with ten volunteers and verbal debrief. Values regarding landscape legacy were often mentioned during in-field pretesting so items were added. Noting the temporal relationship of motivations and post-participation attitudes Clary et al. (1998) also developed scales to assess functionally relevant benefits and satisfaction, and to predict commitment to volunteerism. Our satisfactions section was derived from these scales.

Volunteer managers often track the attributes of their volunteer cohort, such as personal or household traits, age, gender, and income, thus one section of independent variables asked about demographics. Another section included other common queries that address participation history, such as frequency and duration of service (Zappalà and Burrell 2001). As organizations are interested in retention, we included a section about likelihood of volunteering in the future (Galindo-Kuhn and Guzley 2002; Chacón et al. 2007) and as organizations offer many volunteer opportunities (Svendsen and Campbell 2008) we inquired about the types of activities favored by volunteers. These data were eventually compared to VFI response, to help understand how personal attributes relate to self-reports of motivations and satisfactions.

Study Sites and Respondent Sampling

Ecological restoration events held in King County parks and natural areas were sampled. The volunteer events were sponsored by the King County Parks and Recreation Division working in partnership with multiple organizations, including Washington Trails Association, Friends of the Cedar River Watershed, Friends of Soos Creek, Eastside Audubon, and Boys Scouts of America. King County provided support for partnering organizations including event planning, public outreach, modest funding and technical resources. Event site preparation and volunteer recruitment was typically conducted jointly by King County and the partner organizations.

The event sample frame was 35 events taking place on Saturdays over three months in the spring season, with an estimated 850 individuals participating. Seventeen events were randomly sampled. Participation in these events ranged from 5 volunteers to occasionally more than 100, with the median being 24. On average 40% of volunteers were surveyed at each sampled event. 165 surveys were completed with only one refusal for an effective response rate of 99.5%. Thus, the results represent 19.2% of all King County Parks' stewardship volunteers during the sampling timeframe.

Events typically began with a short introduction of the day's activities, a safety discussion, and a Q&A session. The event leader(s) would introduce the survey administrator to the group. The administrator would explain the purpose of the survey, consent provisions and the project sponsors. Volunteers were approached after work began. The event sign-in sheet or a field count of individuals was used in conjunction with a random number table to select respondents. Surveys took approximately 20 minutes to complete.

Survey administrators recorded the field activities for each event. The activities across the sampled events included: invasive plant removal (32%), planting (11%), landscape maintenance (8%), other/multiple (47%), which typically involved removals, planting, watering, and mulching. Additional event information, and queries to the event sponsors about material contributions were analyzed and summarized in a separate study of economic value (Daniels et al. 2014).

Field surveys were administered by Forterra, EarthCorps, and the University of Washington. The survey was administered to individuals using on-site randomized intercepts. On-site surveying can introduce response bias as respondents may be less candid in person than if replying to a more anonymous method. Yet in-field interactions were chosen over a post-event internet survey to improve both response rate and representation of the volunteer population. Also, we assumed intercept responses to questions of personal motivation and satisfaction were likely more authentic than recall or recollection of a past experience.

Analysis

Demographic and participation questions were categorical response prompts. Likert scales indicating level of agreement with verbal statements were used for motivations and satisfactions. Analytic investigations included response frequencies and distributions, data reduction procedures and descriptive statistics, using SPSS statistical software. The dependent variable sets were collapsed into categories using Category Identifying Methodologies (Kaplan and Kaplan 1989), an approach that employs principal axis factor analysis with Varimax rotation to extract dimensional clusters based on observed covariation of individual items. Following dimensional analysis the resulting clusters were assigned category descriptors using interpretive decision rules (Wolf 2004). Descriptive statistics were generated for each category. In addition, new variables were constructed for each respondent by aggregating mean values across all items within each category. Dummy variables were created by combining attributes across the independent variables (such as age or income). The new dependent variables created for each respondent were used in comparisons with demographic and volunteer history responses. To summarize, survey items (a.k.a. variables) were sorted into categories (Tables 4, 5, and 6) based on factor analysis. Items within each category were then aggregated, generating mean values for each category, and creating a reduced set of variables for each respondent, which were then compared to independent variables (Table 7).

RESULTS – VOLUNTEER ATTRIBUTES AND PARTICIPATION

Respondent Characteristics

Table 2 displays the volunteers' demographic characteristics. Not all respondents provided a gender orientation, but the distribution of female to male was similar. Concerning education attainment, 47% of volunteers attended or graduated college, similar to 45% of King County adults having a college degree at the time of the survey. Our sample also had a sizeable count of people having graduate degrees. Full time employment was about 60%, comparable to the U.S. population, but perhaps lower than would be expected considering the volunteers' education levels. The rate of retired individuals was comparable to the U.S. population. Annual household income was evenly distributed within the \$40-120K range, with 26% exceeding that range. Median income for the county was \$67,706 at the same time period. The primary cultural identity for those responding was white at 79%, while the county specified 69% of the population as white, 6% as Black, 15% as Asian, and 9% of Hispanic or Latinx origin. Overall, volunteers were generally of higher education attainment, more affluent, and culturally identified as white at a higher rate than the region's populace.

Table 2. Volunteer Respondent Characteristics

Characteristic	Response	Characteristic	Response
Age		Employment	(%)
mean (s.d.)	43 (15)	part time	11
range	17-84	full time	61
Gender	(%)	retired	13
female	50	home duties	2
male	48	student	6
Education	(%)	unemployed	5
< high school	1	non-response	4
high school	6	Annual Household Income	(%)
some college	19	<20K	15
college grad	47	20-40K	5
graduate degree	27	40-60K	12
Cultural Identification	(%)	60-80K	14
African American	2	80-100K	12
Hispanic	2	100-120K	10
American Indian	0	120-140K	7
NHPI	0	140-160K	6
Asian	0	>160K	13
White	79	nonresponse	3
Mixed	0		
Other	0		
Nonresponse	17		

Participation Patterns

Volunteers were asked several questions about their event access and historic stewardship participation (Table 3). When asked if the current event was in the volunteer's neighborhood a slight majority did not live near the project location. This was not entirely consistent with travel times to the events as approximately two thirds of the volunteers indicating traveling more than

15 minutes to reach the event site. When asked about elapsed time since participants had first volunteered about 70% of volunteers indicated long term stewardship activity. Perhaps reflecting this long-term commitment, the majority were repeat participants with 46% participating in civic environmental stewardship three or more times per year.

Table 3. Volunteer History and Participation

Attribute	Response (%)
Event in Your Neighborhood?	
Yes	44
No	56
Travel Time to Event	
<15 min	30
15-35 min	48
>35 min	22
Time Since First Volunteered	
<12months	21
Between 12 and 36 months	7
>36 months	71
Volunteer Frequency (per year)	
1st time	13
1-2 times	39
3-5 times	22
6-10 times	10
10-20 times	4
>20 times	10
nonresponse	2

RESULTS: VOLUNTEER PERCEPTIONS

Volunteer Motivations

What motivates volunteers to commit time and effort to stewardship of public lands? Extension and conservation district stewardship programs often focus on the land management actions of private landowners, being people who have vested interest in nearby resources. This study focused on people who dedicate time and effort to conserving and restoring natural areas that are owned by local government or conservation organizations. Thirty-four variables were used to assess motivations. The section introduction asked, “Why is volunteering important to you?” and respondents rated each item on a scale of 1 to 7, “not at all” to “extremely important”. Means on items ranged from a high of 6.51 for the item “*This work can make things better for future generations*” to a low score of 2.89 for the item “*I can make new contacts that might help my business career*”.

Confirmatory factor analysis was conducted to reduce the variable set to a set of latent themes, each based on correlation, using Category Identifying Methodology (described earlier). The categories generally align with the VFI conceptual structure (noted in parentheses in Table 4). Original VFI items were slightly resorted in this analysis, and the new structure and category labels may prove to be an improvement in construct validity for field-oriented volunteer activity. The slightly revised structure may also make the VFI more generalizable to environmental

volunteerism. The resulting eight categories included 26 of the original items, with six discarded due to double or low factor loadings (Table 4), and this variable structure explains 59% of total variance, meaning that the resulting categories, after the extraction analysis, accounted for a substantial ratio of the response variability across the survey measures.

The category earning the highest mean rating is *Outward Caring*, with responses indicating altruistic values aimed at both people and the land. While some prior literature on environmental volunteerism distinguishes between altruistic (human oriented) and biospheric (nature oriented) values our survey indicated a bridging construct, and perhaps that “care” is an overarching functional trait within the urban context. The next highest category, with almost the same mean rating is *Legacy Commitment*, which appears to project values of land care into the future. *Group Cohesion*, only slightly lower in rating, indicates the importance of the work to build group cohesion though the definition of group (e.g. workplace or neighborhood) is not specified. The next category, *New Understandings*, addresses appreciation for opportunities to learn. The

Table 4. Volunteer Motivations Categories (1-7 Likert scale, two highest loading variables per factor are listed)

Category	mean (s.d.)
Outward Caring (Values)	5.86 (1.22)
I feel it is important to help others	
I am genuinely concerned about the environmental purpose that I am volunteering for	
Legacy Commitment (Values)	5.81 (0.99)
This work can make things better for future generations	
I would like to make a lasting impact on the environment	
Group Cohesion (Social)	5.71 (1.36)
The morale of my group improves after we volunteer as a team	
Our group works together better as a team because of volunteering	
New Understandings (Understanding)	5.39 (1.33)
Volunteering lets me learn through direct “hands on” experience	
Volunteering allows me to gain a new perspective on things	
Personal Esteem (Enhancement)	4.96 (1.59)
Volunteering makes me feel better about myself	
Volunteering increases my self-esteem	
Social Esteem (Social)	4.63 (1.42)
Others with whom I am close place a high value on community service	
Volunteering is an important activity to the people I know best	
Protective Mood (Protective)	4.30 (1.79)
Volunteering allows me to escape from my own troubles	
No matter how bad I’ve been feeling, volunteering helps me to forget about it	
Career Development (Career)	2.97 (1.78)
Volunteering will help me succeed in my chosen profession	
I can make new contacts that might help my business career	

remaining four categories have means below 5, starting with *Personal Esteem*. Of similar rating is *Social Esteem*, suggesting that volunteering raises esteem on both intrinsic and extrinsic dimensions.

It is also interesting to note that when comparing group scores on the two social scales, interpersonal group cohesion categories are more important to volunteers than the external impressions other people may have of their work. *Protective Mood*, of lower rating but still slightly higher than the scale midpoint, points to a transformative emotional state associated with volunteering. Finally, having a substantially lower rating, *Career Development* opportunities are of much less importance to volunteers, reflecting the high rate of employment or retirement status of volunteers in this study.

Volunteer Satisfactions

Another set of variables asked volunteers about satisfaction that they may experience when volunteering for environmental stewardship events, with some of the statements referring to the local organizations that sponsor the stewardship events. The rating scale ranged from 1=very dissatisfied to 7=very satisfied. Factor analysis generated four categories that included twelve items (Table 5). Six were discarded due to low loadings or cross-loading on multiple factors.

The highest rated item, at mean 6.38 (s.d. 0.87) was “*The support I receive from people in the organization(s)*”. Overall, volunteers reported a high level of satisfaction as three categories’ means were at about 6.0, and the last nearly at 5.0. A category interpreted as *Organization Support* was most highly rated, expressing appreciation for contributions of the sponsoring organizations to the quality of volunteer experience. Registering nearly the same rating was *Participation Efficacy*, as volunteers expressed a sense of worth for their work. Similar to Motivations results, a *Social Interactions* category indicated the importance of engaging with other people during restoration events. The last, but still highly rated category of *Personal Efficacy* suggests that volunteers felt that their efforts were meaningful on a personal level.

Table 5. Volunteer Satisfactions Categories (1-7 Likert scale, highest loading variables per factor are listed)

Category	mean (s.d.)
Organization Support	6.00 (0.87)
The support I receive from people in the organization(s)	
How well organization goals and projects activities match up	
Participation Efficacy	5.97 (1.01)
How worthwhile my contribution is	
The difference my work is making	
Social Interactions	5.76 (1.15)
The amount of time spent with other volunteers	
The amount of interaction I have with other volunteers in the organization	
Personal Efficacy	4.88 (1.86)
The chance I have to utilize my skill and knowledge in my volunteer work	

VOLUNTEER CONTRIBUTIONS

The organizations that sponsor stewardship activity within the King County stewardship network are increasingly interested in mobilizing their volunteers' efforts across a variety of tasks and functions. Based on discussions with stewardship program managers, the practitioners who directly plan and manage events, a bank of statement variables was constructed to explore what volunteers are interested in contributing to stewardship based on their talents, experience, and interests. The rating scale was 1= not at all interested to 7 = very interested.

The highest rated item, with a mean of 6.03 (s.d. 1.35) was "*Planting native plants*", not surprising as respondent sampling was from urban ecosystems restoration events. The lowest was "*Help with fund-raising*" with a mean of 2.4 (s.d. 1.3). Factor analysis was again applied to the collection of thirteen items which sorted across four categories (Table 6). *Vegetation Management* was a the most highly rated category with a mean of 5.56, though a standard deviation of 1.36 indicates mixed response, with planting rated higher than invasives removal. *Light Construction* – including efforts to build trails or simple structures – was nearly as highly rated. The last two categories, *Event Administration* and *Program Support* were both slightly above the mid-point of the willingness rating scale, but substantially lower than the first two. Both categories included activities that take more effort for planning, preparation, follow up activity, and potentially multiple sessions.

Perhaps reflecting the demographics of employment and income of the volunteers, a number of respondents commented that they enjoyed stewardship activity because it was different from their daily work tasks that were more desk and computer bound. Higher scores on the activities that involve physical activity and are done outdoors are consistent with this sentiment.

Table 6. Volunteer Contributions Categories (1-7 Likert scale, two highest loading variables per factor are listed)

Category	mean (s.d.)
Vegetation Management	5.56 (1.36)
Planting native plants	
Invasive plants removal	
Light Construction	5.50 (1.39)
Trail building and maintenance	
Construction of simple structures (such as a bridge or outdoor shelter)	
Event Administration	4.04 (1.52)
Project or event planning	
Training or managing other volunteers	
Program Support	3.82 (1.65)
Natural history and ecological knowledge in the field	
Providing IT support, such as mapping or social media	

RESULTS: COMPARING RESPONDENT CHARACTERISTICS

Means for Motivations, Satisfaction, and Contributions were compared across demographic and stewardship participant pattern variables. For each respondent, category scores were generated by averaging scores of all variables that had loaded on a factor. The constructed dependent variables were used for independent samples t-test and one-way ANOVA comparisons between respondent groups ($\alpha < 0.05$) using statistical approaches for uneven sample sizes. As we conducted multiple comparisons, *post hoc* Bonferroni correction was applied to each analysis. For example, statistical significance is indicated for the *Motivations* categories if the $\alpha < .05/8 = .006$; α for *Satisfactions* and *Contributions* is .0125, and .0166 for *Well-being*. Table 7 presents statistically significant differences.

Independent variables were collapsed, then used to compare responses. Household Income and Education level, often correlated, were not associated with any differences. Cultural Identification data was not diverse enough to enable comparisons. The greatest number of differences in demographic responses were associated with Gender, as women rated categories of *Personal Esteem*, *Protective Mood*, *Organization Support* and *Vegetation Management* higher, but rated lower on *Light Construction*. Age showed little effect, with younger people showing substantially greater interest in *Career Development* but shared similar attitudes about other motivations and satisfactions with older respondents. Volunteers who were employed full time were more satisfied with *Social Interaction* and expressed greater interest in working on *Event Administration*.

Of all demographic and event variables Volunteer Frequency was most associated with variability in response. Respondents who claimed to volunteer six or more times per year expressed higher ratings for all four Satisfaction categories and indicated greater interest in all four Volunteer Contribution categories though they most preferred *Vegetation Management* and *Light Construction* activities. People having an elapsed time of 3 years or more since first volunteering also had higher ratings on *Participation Efficacy*. Both *Social Esteem* and *Personal Efficacy* categories were rated higher by people participating in events within their neighborhood. *Social Esteem* was also judged higher by people traveling less than 20 minutes to the event, suggesting the importance of local community service for volunteers. These results suggest the importance of personal and community relationships as a dimension of activity primarily mobilized for environmental restoration.

DISCUSSION

Motivations and Satisfaction

While landscape decline, from regional to site scales, may be an important institutional motivation for policy-driven landscape management and restoration initiatives, our prior research and other studies indicate that stewardship sponsoring organizations are also strongly motivated by multiple social, psychological, and economic dimensions. The findings of this survey research were similarly multi-dimensional, as volunteers expressed consistent and high scoring responses for aspects of practical altruism – including concerns for other people and the environment, in

Table 7. Comparisons of Means for Volunteer Attributes on Categories of Motivations, Satisfactions, and Contributions (significant differences on are indicated by comparative means with t-statistic, p-value below)

	Category Mean (s.d.)	Gender F, M	Age ≤ 30, ≥ 45	Employment ≤ 30, ≥ 45	Volunteer Freq 2= <, ≥ 6	First Volunteer Time 12 m<, ≥ 36 m	Neighborhood yes, no	Travel Time 20< min, ≥ 34
Motivations¹								
Outward Caring	5.86 (1.22)							
Legacy Commitment	5.81 (0.99)							
Group Cohesion	5.71 (1.36)							
New Understandings	5.39 (1.33)							
Personal Esteem	4.96 (1.59)	5.33, 4.59 3.069, 0.003						
Social Esteem	4.63 (1.42)						4.98, 4.36 2.852, 0.005	5.02, 4.19 2.852, 0.005
Protective Mood	4.30 (1.79)	4.75, 3.85 3.214, 0.002						
Career Development	2.97 (1.78)		4.00, 2.25 5.289, 0.001					
Satisfaction²								
Organization Support	6.00 (0.87)	6.21, 5.80 3.081, 0.002			5.83, 6.37 3.796, 0.001			
Participation Efficacy	5.97 (1.01)				5.78, 6.37 2.965, 0.004	5.40, 6.07 3.058, 0.003		
Social Interactions	5.76 (1.15)			6.06, 5.57 2.668, 0.008	5.48, 6.31 4.41, 0.001			
Personal Efficacy	4.88 (1.86)				4.41, 5.88 4.363, 0.00	5.23, 4.60 2.123, 0.03		
Contributions³								
Veg Management	5.56 (1.36)	5.83, 5.30 2.520, 0.013			5.15, 6.20 4.243, 0.001			
Light Construction	5.50 (1.39)	5.15, 5.85 3.289, 0.001			5.22, 6.06 3.199, 0.002			
Event Administration	4.04 (1.59)		4.41, 3.80	3.73, 4.50 2.511, 0.013	2.575, 0.011			
Program Support	3.82 (1.65)				3.33, 4.39 4.448, 0.001			

¹Bonferroni Correction: .05/8= .006

²Bonferroni Correction: .05/4= .0125

³Bonferroni Correction: .05/4= .0125

the near term and as legacy for the future. Appreciation of social interactions were also pervasive, expressed as both self-esteem and the regard of other people who matter. Experiential learning opportunities were motivating, perhaps associated with interests in learning as expressed by secondary education attainment of the group. Satisfactions included appreciation for the sponsoring organization, a sense of positive impact of event participation, and interactions with other volunteers.

Scores were well above the mid-point for most of the dependent motivations and satisfactions categories. Few, but notable, response differences were found based on demographic traits and volunteer history. Volunteers who participated in events more than six times per year expressed consistently higher values across all satisfactions and contributions categories. Additional study, perhaps using qualitative methods, could better discern whether this degree of satisfaction was the effect or driver of greater stewardship commitment, to inform organizational engagement of volunteers. People who were employed full-time highly enjoyed the *Social Interactions* afforded by the events, perhaps appreciating opportunities to build new friendships outside of the routine social situations of home and work. They also indicated greater interest in assisting with *Event Administration*, though this was rated lower than the activities of *Vegetation Management* and *Light Construction* which were most favored by all respondents.

Other studies have reported connection to place as a motivator or satisfaction. Our unique finding was the potential role of social connections within place in environmental stewardship volunteering, an important contribution as Wilson (2012) called out need for better understanding of social context on volunteers' satisfaction and commitment. We found that *Social Esteem*, an expression of community service and shared values, was rated higher for people who seemed to be volunteering at events closer to their households, as indicated by reduced travel times and events held within the volunteer's neighborhood. Higher ratings of *Personal Efficacy* were also associated with neighborhood events.

Future Applications

This research focused on sponsored stewardship events on public lands and natural areas across an urbanized, regional landscape. There were similarities and differences when compared to studies of other stewardship contexts. Reviewing studies of motivations of nature-based citizen scientists, those involved in biodiversity assessment, indicated the importance of discovery and a sense of surprise as contributors to their sense of nature-connectedness (Ganzevoort and van den Born 2019). Maund et al. (2020) found that value for and desire to understand the environment were primary motivations, and a study of butterfly monitoring found multiple motivations, centering on desire to contribute to society, meet with other people, and increase one's range of knowledge on the study topic (Tsybulsky 2020). A large sampling of Dutch nature volunteers across multiple activities found two crucial motivations – contributing to nature conservation and personal connection to nature (Ganzevoort and van den Born 2020). A study of gardeners doing wildscaping on their properties found ten interconnected motivations including mutual refuge with wildlife, changing norms, aesthetic beauty, and sense of place (Jones et al. 2021).

We observe that the VFI may not conceptually include all such responses in a direct way, as they may be ancillary rather than primary functional dimensions. Our resulting structure of

motivations and satisfactions categories suggest a first level adaptation for broader use in stewardship assessment. Additional research could test modifications to acknowledge the specificity of diverse stewardship activities and encounters, evaluate use of the tool with both community based and more culturally diverse respondents and assess eudaimonic and subjective well-being derived from personal meaning, need fulfillment and perceived self-realization (Ryan and Deci 2001; Tay and Diener 2011).

Nonetheless, we learned that the VFI survey framework, here adjusted slightly for the civic stewardship context, is a legacy tool that has relevance for organizations that would seek to understand the alignment of volunteer and organization values in order to better engage cadres of citizens and residents to address essential ecosystem needs. A 2017 review of 48 studies employing VFI (Chacón et al. 2017) found a total sample of more than 20,000 participants across diverse volunteer situations, and that the scales show high reliability. We used the VFI measures framework as a robust foundation for stewardship volunteer assessment to better understand environmental stewardship motivations, in particular, and also as the basis for post-participation satisfactions. Use of the VFI by other organizations and investigators can enable comparisons across volunteer sites, organizations and program purposes to provide a more complete and consistent understanding of environmental stewardship volunteering, and volunteering in general.

Implications for Organizations

Organizations that sponsor stewardship events are keenly interested in information that could improve volunteer engagement, in part to improve recruitment and retention. Sustained activity over an extended period of time is a result of a match of a person's motivational interests and expectations with situations that can satisfy those interests (Clary and Snyder 1999). Matching messages to motives can be persuasive (Clary et al. 1994; Asah and Blahna 2013). Our prior study of stewardship organization practitioners (Figure 1) also indicated multiple values that informed the goals and tools activated to achieve organizational outcomes (Romolini et al. 2012; Wolf et al. 2013). Organization professionals and event managers can explore the intersection of their values with volunteers, then frame public outreach and messaging in ways that are inherently appealing to the public, becoming civic implementations of identity marketing (Jan Alsem and Kostelijk 2008) or values driven marketing (Kotler et al. 2019), both of which rely on client relationships built on consistency and authenticity (Douillet Guzmán 2020).

Organizations can consider how to craft event outreach and then plan events in ways that address the highest rated motivations and satisfactions to recruit volunteers, then build longer relationships. For instance, events focused on vegetation management might include messaging and imagery that reinforce motivations of outward caring and group cohesion. In addition, there are more nuanced indications of how to build relationships with volunteers. More frequent volunteers indicated greater willingness to offer volunteer services beyond field work, including event administration and program support. Environmental organizations typically have many functional needs in addition to field work. These results suggest that urban environmental stewardship organizations, like those in this study, could be more resourceful in engaging volunteers for extended activities after they have developed a relationship through field events.

The pay-it-forward values of legacy were rated highly. Hunter and Rowles (2005) identified overlapping categories of legacy: biological legacy, material legacy, and a legacy of values. They found that individuals clearly identify with at least one form of legacy, with many expressing all three, but with varying degrees of intensity. Some of our respondents anecdotally expressed family legacy, indicating a transfer of nature knowledge and appreciation across generations. As an expression of environment-based values that is consistent with the VFI, our study found that legacy commitment was rated highly. This psychosocial dimension might be an additional prompt in volunteer recruitment and programming. Organization professionals likely share this value and can promote the legacy consequences for event sites and communities when engaging volunteers. Understanding the role and complexity of legacies in environmental stewardship is an important topic for future research.

When Satisfaction categories were compared by the independent variables of volunteer attributes (Table 6) we found that those people who participate more often show significantly higher ratings. Are people who volunteer more often just generally more appreciative of the event planning and execution, or are they more inclined to volunteer because of a positive outlook about events? Might they also recognize and resonate to the values expressed by organization staff? We are unable to discern the direction of the relationship, but this finding is important for future research to better understand how to nurture positive and authentic relationships with volunteers and encourage repeat participation. Volunteers who participate with high frequency are potentially more effective, and may do so with less organizational support costs. Higher frequency volunteers were also more willing to step up to each of the four Contributions categories, again potentially expanding the functional capacity of an organization.

Of note were the differences in ratings indicated by women participants on some of the motivations and satisfactions categories. In other research Currie et al. (2016) found that for women, the motivations to participate with a group was the conservation experience, while men got involved for something to do and valued social connections more. These specific differences were not found in our study. We did find that women rated personal benefits more highly - *Personal Esteem* and *Protective Mood*. Concerning field activities, women expressed greater interest in *Vegetation Management*, but less so for *Light Construction*. Considering the patterns of response for women, event planners could develop event appeals that attract and sustain participation from a gender perspective. It would be interesting to test whether appeals directed at women might also increase participation by other members of a household, as we observed that women (particularly at near-home events) were more often accompanied by children and other family members.

In general, the methods and results of this study suggest how civic environmental stewardship organizations might develop stewardship programming for various target audiences, and develop better engagement messaging and in-field experiences for their volunteers. The methods of the study illustrate how many types of nature-based volunteer organizations, including those focused on civic environmental stewardship, can develop and use motive and satisfaction measures, and assessments of volunteer attributes and history to better inform how to mobilize volunteers' contributions to organizational context and needs.

Limitations

The in-person survey administration method may have introduced some bias, as respondents potentially would be less likely to indicate negative responses in-person to someone perceived as being associated with a volunteer event. This potential bias was accepted over other biases that would have been introduced with alternative survey methods.

People of less education, with potentially related lower incomes, and representing ethnic diversity were not broadly represented in our data collection. Our in-field sampling approach suggests that this is not an issue of non-response bias but is a representation of the potential volunteer pool. Numerous U.S. cities have identified disparities in the distribution of urban green, including parks and woody vegetation (Nesbitt et al. 2019), thus there may be less opportunity for nearby project sites. In addition, various conservation organizations and agencies have acknowledged limited cultural diversity in their service and visitor base. Meanwhile, considering both green infrastructure functions (such as stormwater management and heat management), and health benefits associated with green spaces, there is ever greater effort by local governments to engage more culturally diverse communities in civic greening and stewardship. Unfortunately, our survey offers little statistical inference about the general array or comparative perceptions of more diverse event participants. Future research should address the reasons for low or non-participation in civic environmental stewardship across ethnic groups, in terms of attitudes, values, or lifestyle conditions (such as the need for childcare or multiple jobs precluding weekend work parties).

Our earlier research identified values of conservation organization practitioners. This research about volunteer motivations and satisfactions could be interpreted as values expressions. We did not study the potential alignment of psychosocial response across the two populations. Good organizational management is important (West and Pateman 2016). Yet, as dependence on volunteers continues to expand in urban natural resources management, better understanding by organization staff about how to recognize and transmit their values in ways that are compatible with volunteer expectation could help build stronger programs. This dynamic is not unlike how businesses are keenly interested in how to attract and sustain employees who share values as well as necessary skill and knowledge sets (Amos and Weathington 2008; McCormick and Donohue 2016; Patterson et al. 2016).

CONCLUSIONS

Stewardship is essential to the operations of ecosystem restoration organizations and agencies in the Puget Sound region, as well as many other urbanized areas. This research supports evidence-based approaches to volunteer engagement, based on empirical understandings of volunteer motivations, satisfactions, and attributes, including historical service. Stewardship sponsors, whether they are municipalities, non-profit organizations, or community groups, should pursue better understanding of the interaction of personal dispositions and organizational aspirations to help to promote sustained volunteerism (Penner 2002).

Based on the theory-based Volunteer Functions Inventory we found that while altruism toward the environment was highly motivating, those expressions of care extended to social

interactions as well, such as helping others, legacy of lasting impacts and group cohesion. While motivations and satisfactions patterns of response were widely shared, we detected some differences primarily associated with gender and one's frequency of volunteering. We confirmed that VFI is a valuable legacy tool for stewardship volunteer assessments, but also recognize that additional functional constructs may be specific to stewardship, and merit further research. The results of our study can support how stewardship sponsors stimulate future action for nature, build more effective volunteer systems, and improve their on-the-ground programs (Ganzevoort and van den Born 2020). Our earlier research explored civic environmental stewardship at the organization scale within the Puget Sound region. This study provides insight about the individual scale of civic environmental volunteer effort in the region and provides knowledge to better support civic volunteers programs that result in beneficial impacts on the landscape.

LITERATURE CITED

- Amos, E.A., Weathington, B.L. 2008. An analysis of the relation between employee-organization value congruence and employee attitudes. *Journal of Psychology* 142, 6, 615-631.
- Andersson, E., Barthel, S., Borgström, S., Colding, J., Elmqvist, T., Folke, C., Gren, Å. 2014. Reconnecting cities to the biosphere: Stewardship of green infrastructure and urban ecosystem services. *Ambio* 43, 4, 445-453.
- Andersson, E., Enqvist, J., Tengö, M. 2017. Stewardship in urban landscapes. In: Bieling, C., Plieninger, T. (eds.) *The Science and Practice of Landscape Stewardship*. Cambridge University Press, pp. 222–238.
- Asah, S.T., Blahna, D.J. 2012. Motivational functionalism and urban conservation stewardship: Implications for volunteer involvement. *Conservation Letters* 5, 6, 470-477.
- Asah, S.T., Blahna, D.J. 2013. Practical implications of understanding the influence of motivations on commitment to voluntary urban conservation stewardship. *Conservation Biology* 27, 4, 866-875.
- Asah, S.T., Lenentine, M.M., Blahna, D.J. 2014. Benefits of urban landscape eco-volunteerism: Mixed methods segmentation analysis and implications for volunteer retention. *Landscape and Urban Planning* 123, 108-113.
- Ashfaq, F., Butt, M., Ilyas, S. 2020. Volunteering: What drives and retains it? An analysis of motivational needs together with organizational policies and practices. *Qualitative Research Journal* 21, 2, 189-205.
- Belaire, J.A., Dribin, A.K., Johnston, D.P., Lynch, D.J., Minor, E.S. 2011. Mapping stewardship networks in urban ecosystems. *Conservation Letters* 4, 464-473.

- Bennett, N.J., Whitty, T.S., Finkbeiner, E., Pittman, J., Bassett, H., Gelcich, S., Allison, E.H. 2018. Environmental stewardship: A conceptual review and analytical framework. *Environmental Management* 61, 4, 597-614.
- Boateng, G.O., Neilands, T.B., Frongillo, E.A., Melgar-Quinonez, H.R., Young, S.L. 2018. Best practices for developing and validating scales for health, social, and behavioral research: A primer. *Frontiers in Public Health* 6, 149.
- Bruyere, B., Rappe, S. 2007. Identifying the motivations of environmental volunteers. *Journal of Environmental Planning and Management* 50, 4, 503-516.
- Buijs, A.E., Mattijssen, T.J., Van der Jagt, A.P., Ambrose-Oji, B., Andersson, E., Elands, B.H., Steen Møller, M. 2016. Active citizenship for urban green infrastructure: Fostering the diversity and dynamics of citizen contributions through mosaic governance. *Current Opinion in Environmental Sustainability* 22, 1–6.
- Callero, P.L., Howard, J.A., Piliavin, J.A. 1987. Helping behavior as role behavior: Disclosing social structure and history in the analysis of prosocial action. *Social Psychology Quarterly* 50, 3, 247-256.
- Chacón, F., Gutiérrez, G., Sauto, V., Vecina, M.L., Pérez, A. 2017. Volunteer Functions Inventory: A systematic review. *Psicothema* 29, 3, 306-316.
- Chacón, F., Vecina, M.L., Davila, M.C. 2007. The three-stage model of volunteers' duration of service. *Social Behavior and Personality* 35, 5, 627-642.
- Charng, H.-W., Piliavin, J.A., Callero, P.L. 1988. Role identity and reasoned action in the prediction of repeated behavior. *Social Psychology Quarterly* 51, 4 303-317.
- Clary, E.G., Snyder, M. 1999. The motivations to volunteer: Theoretical and practical considerations. *Current Directions in Psychological Science* 8, 5, 156-159.
- Clary, E.G., Snyder, M., Ridge, R.D., Copeland, J., Stukas, A.A., Haugen, J., Miene, P. 1998. Understanding and assessing the motivations of volunteers: A functional approach. *Journal of Personality and Social Psychology* 74, 6, 1516-1530.
- Clary, E.G., Snyder, M., Ridge, R.D., Miene, P.K., Haugen, J.A. 1994. Matching messages to motives in persuasion: A functional approach to promoting volunteerism. *Journal of Applied Social Psychology* 24, 13, 1129-1146.
- Clayton, S., Myers, G. 2009. *Conservation Psychology: Understanding and Promoting Human Care For Nature*. Wiley-Blackwell, 253 pp.
- Clewell, A.F., Aronson, J. 2006. Motivations for the restoration of ecosystems. *Conservation Biology* 20, 2, 420-428.

- Connolly, J.J.T., Svendsen, E.S., Fisher, D.R., Campbell, L.K. 2014. Networked governance and the management of ecosystem services: The case of urban environmental stewardship in New York City. *Ecosystem Services* 10, 187–194.
- Cook, H., Inman, A. 2012. The voluntary sector and conservation for England: Achievements, expanding roles and uncertain future. *Journal of Environmental Management* 112, 170-177.
- Currie, M.J.B., Lackova, P., Dinnie, E. 2016. Greenspace matters: Exploring links between greenspace, gender and well-being with conservation volunteers. *Landscape Research* 41, 6, 641-651.
- Daniels, J.M., Robbins, A.S., Brinkley, W.R., Wolf, K.L., Chase, J.M. 2014. Toward estimating the value of stewardship volunteers: A cost-based valuation approach in King County, Washington, USA. *Urban Forestry & Urban Greening* 13, 2, 285-289.
- Davis, M.H., Hall, J.A., Meyer, M. 2003. The first year: Influences on the satisfaction, involvement, and persistence of new community volunteers. *Personality and Social Psychology Bulletin* 29, 2, 248-260.
- Donald, B.J. 1997. Fostering volunteerism in an environmental stewardship group: A report on the task force to bring back The Don, Toronto, Canada. *Journal of Environmental Planning and Management* 40, 4, 483-505.
- Dorn, S., Newberry III, M.G., Bauske, E.M., Pennisi, S.V. 2021. If you build it, will they come? Examining motivations of Extension Master Gardener volunteers. *Society & Natural Resources* 34, 9, 1250-1267.
- Douillet Guzmán, L. 2020. A value-based brand: Build it and they will come. *Forbes*, 14 December, 2021:
<https://www.forbes.com/sites/forbescommunicationscouncil/2020/12/02/a-value-based-brand-build-it-and-they-will-come/?sh=42b114464ea7>
- Finkelstein, M.A. 2008. Volunteer satisfaction and volunteer action: A functional approach. *Social Behavior and Personality* 36, 1, 9-18.
- Finkelstein, M.A. 2009. Intrinsic vs. extrinsic motivational orientations and the volunteer process. *Personality and Individual Differences* 46, 5-6, 653-658.
- Fisher, D.R., Campbell, L.K., Svendsen, E.S. 2012. The organisational structure of urban environmental stewardship. *Environmental Politics* 21, 1, 26–48.
- Fisher, D.R., Svendsen, E.S., Connolly, J.J. 2015. *Urban Environmental Stewardship and Civic Engagement: How Planting Trees Strengthens the Roots of Democracy*. Routledge, 164 pp.

- Frisch, M.B., Gerrard, M. 1981. Natural helping systems: A survey of Red Cross volunteers. *American Journal of Community Psychology* 9, 5, 567-579.
- Galindo-Kuhn, R., Guzley, R.M. 2002. The Volunteer Satisfaction Index: Construct definition, measurement, development, and validation. *Journal of Social Service Research* 28, 1, 45-68.
- Ganzevoort, W., van den Born, R. 2019. The thrill of discovery: Significant nature experiences among biodiversity citizen scientists. *Ecopsychology* 11, 1, 1–11.
- Ganzevoort, W., van den Born, R.J.G. 2020. Understanding citizens' action for nature: The profile, motivations and experiences of Dutch nature volunteers. *Journal for Nature Conservation* 55, 125824.
- Geist, C., Galatowitsch, S.M. 1999. Reciprocal model for meeting ecological and human needs in restoration projects. *Conservation Biology* 13, 5, 970-979.
- Gooch, M. 2003. A sense of place: Ecological identity as a driver for catchment volunteering. *Australian Journal on Volunteering* 8, 2, 23–32.
- Gottwald, S., Stedman, R.C. 2020. Preserving one's meaningful place or not? Understanding environmental stewardship behaviour in river landscapes. *Landscape and Urban Planning* 198, 103778.
- Halpenny, E.A., Caissie, L.T. 2003. Volunteering on nature conservation projects: Volunteer experience, attitudes and values. *Tourism Recreation Research* 28, 3, 25-33.
- Hauer, R.J., Timilsina, N., Vogt, J., Fischer, B.C., Wirtz, Z., Peterson, W. 2018. A volunteer and partnership baseline for municipal forestry activity in the United States. *Arboriculture & Urban Forestry* 44, 2, 87-100.
- Hunter, E.G., Rowles, G.D. 2005. Leaving a legacy: Toward a typology. *Journal of Aging Studies* 19, 3, 327-347.
- Hunter, M.R. 2011. Impact of ecological disturbance on awareness of urban nature and sense of environmental stewardship in residential neighborhoods. *Landscape and Urban Planning* 101, 2, 131-138.
- Husk, K., Lovell, R., Cooper, C., Stahl-Timmins, W., Garside, R. 2016. Participation in environmental enhancement and conservation activities for health and well-being in adults: A review of quantitative and qualitative evidence. *Cochrane Database of Systematic Reviews* 5, CD010351.
- Jan Alsem, K., Kosteljik, E. 2008. Identity based marketing: A new balanced marketing paradigm. *European Journal of Marketing* 42, 9/10, 907-914.

- Jaśkiewicz, M. 2015. Place attachment, place identity and aesthetic appraisal of urban landscape. *Polish Psychological Bulletin* 46, 4, 573-578.
- Jellinek, S., Wilson, K.A., Hagger, V., Mumaw, L., Cooke, B., Guerrero, A.M., Erickson, T.E., Zamin, T., Waryszak, P., Standish, R.J. 2018. Integrating diverse social and ecological motivations to achieve landscape restoration. *Journal of Applied Ecology* 56, 1, 246-252.
- Johnson, M.L., Campbell, L.K., Svendsen, E.S., Silva, P. 2018. Why count trees? Volunteer motivations and experiences with tree monitoring in New York City. *Arboriculture & Urban Forestry* 44, 2, 59-72.
- Johnson, M., Locke, D.H., Svendsen, E., Campbell, L., Westphal, L.M., Romolini, M., Grove, J. 2019. Context matters: Influence of organizational, environmental, and social factors on civic environmental stewardship group intensity. *Ecology and Society* 24, 4, 1.
- Jones, M.S., Teel, T.L., Solomon, J., Weiss, J. 2021. Evolving systems of pro-environmental behavior among wildscape gardeners. *Landscape and Urban Planning* 207, 104018.
- Jorgensen, B., Krasny, M., Baztan, J. 2021. Volunteer beach cleanups: Civic environmental stewardship combating global plastic pollution. *Sustainability Science* 16, 1, 153-167.
- Juaneda-Ayensa, E., Clavel San Emeterio, M., Gonzalez-Menorca, C. 2017. Person-organization commitment: Bonds of internal consumer in the context of non-profit organizations. *Frontiers in Psychology* 8, 1227.
- Kaplan, R., Kaplan, S. 1989. *The Experience of Nature: A Psychological Perspective*. Cambridge University Press, 352 pp.
- Kassam, K.-A., Golshani, Z., Krasny, M.E. 2018. Grassroots stewardship in Iran: the rise and fall of Nature Cleaners. In: Krasny, M.E. (ed.) *Grassroots to Global: Broader Impacts of Civic Ecology*. Cornell University Press, pp. 65-84.
- Katz, D. 1960. The functional approach to the study of attitudes. *Public Opinion Quarterly* 24, 2, 163-204.
- Katz, D., Kahn, R.L. 1978. *The Social Psychology of Organizations (2nd ed.)*. Wiley, 848 pp.
- Keough, H.L., Blahna, D.J. 2006. Achieving integrative, collaborative ecosystem management. *Conservation Biology* 20, 5, 1373-1382.
- Kil, N., Stein, T.V., Holland, S.M., Kim, J.J., Kim, J., Petite, S. 2021. The role of place attachment in recreation experience and outcome preferences among forest bathers. *Journal of Outdoor Recreation and Tourism* 35, 100410.
- Kim, M., Zhang, J.J., Connaughton, D. 2010. Modification of the Volunteer Functions Inventory for application in youth sports. *Sport Management Review* 13, 1, 25-38.

- Koontz, T.M., Steelman, T.A., Carmin, J., Korfmacher, K.S., Moseley, C., Thomas, C.W. 2004. *Collaborative Environmental Management: What Roles For Government? Resources for the Future*, 224 pp.
- Kotler, P., Kartajaya, H., Setiawan, I. 2019. Marketing 3.0: From products to customers to the human spirit. In: Kompella, K. (ed.) *Marketing Wisdom*. Springer, pp. 139-156.
- Krasny, M.E., Crestol, S.R., Tidball, K.F., Stedman, R.C. 2014. New York City's oyster gardeners: Memories, meanings, and motivations of volunteer environmental stewards. *Landscape and Urban Planning* 132, 16-25.
- Krasny, M.E., Silva, P., Barr, C., Golshani, Z., Lee, E., Ligas, R., Mosher, E., Reynosa, A. 2015. Civic ecology practices: Insights from practice theory. *Ecology and Society* 20, 2, 12.
- Lee, M., Hancock, P. 2011. Restoration and stewardship volunteerism. In: Egan, D., Hjerpe, E.E., Abrams, J. (eds.) *Human Dimensions of Ecological Restoration: Integrating Science, Nature, and Culture*. Island Press, pp. 23-38.
- Maller, C., Mumaw, L., Cooke, B. 2019. Health and social benefits of living with "wild" nature. In: Pettorelli, N., Durant, S.M., du Toit, J.T. (eds.) *Rewilding*. Cambridge University Press, pp. 165-181.
- Mattijssen, T., Buijs, A., Elands, B., Arts, B. 2018. The 'green' and 'self' in green self governance – a study of 264 green space initiatives by citizens. *Journal of Environmental Policy and Planning* 20, 1, 96-113.
- Maund, P.R., Irvine, K.N., Lawson, B., Steadman, J., Risely, K., Cunningham, A.A., Davies, Z.G. 2020. What motivates the masses: Understanding why people contribute to conservation citizen science projects. *Biological Conservation* 246, 108587.
- McCormick, L., Donohue, R. 2016. Antecedents of affective and normative commitment of organisational volunteers. *The International Journal of Human Resource Management* 30, 18, 2581-2604.
- McCormick, L., Wollmering, R. 2017. Seeking common objectives: How research-driven practice can align organisational strategy and volunteering values. *Third Sector Review* 23, 1, 145-162.
- McKinley, D.C., Miller-Rushing, A.J., Ballard, H.L., Bonney, R., Brown, H., Evans, D.M., French, R.A., Parrish, J.K., Phillips, T.B., Ryan, S.F. 2015. Investing in citizen science can improve natural resource management and environmental protection. *Issues in Ecology* 19, 27.

- McLain, R.J., Poe, M.R., Urgenson, L.S., Blahna, D.J., Buttolph, L.P. 2017. Urban non-timber forest products stewardship practices among foragers in Seattle, Washington (USA). *Urban Forestry & Urban Greening* 28, 36-42.
- Measham, T.G., Barnett, G.B. 2008. Environmental volunteering: Motivations, modes and outcomes. *Australian Geographer* 39, 4, 537-552.
- Molsher, R., Townsend, M. 2016. Improving wellbeing and environmental stewardship through volunteering in nature. *EcoHealth* 13, 1, 151-155.
- Moskell, C., Broussard Allred, S., Ferenz, G. 2010. Examining motivations and recruitment strategies for urban forestry volunteers. *Cities and the Environment* 3, 1, 9.
- Mowday, R.T., Steers, R.M., Porter, L.W. 1979. The measurement of organizational commitment. *Journal of Vocational Behavior* 14, 2, 224-247.
- Mumaw, L., Bekessy, S. 2017. Wildlife gardening for collaborative public-private biodiversity conservation. *Australasian Journal of Environmental Management* 24, 3, 242-260.
- Mumaw, L. 2017. Transforming urban gardeners into land stewards. *Journal of Environmental Psychology* 52, 92-103.
- Mumaw, L., Mata, L. 2021. Wildlife gardening: An urban nexus of social and ecological relationships. *EcoEvoRxiv*, 14 December 2021: <https://doi.org/10.32942/osf.io/9rkhm>
- Nesbitt, L., Meitner, M.J., Girling, C., Sheppard, S.R.J., Lu, Y. 2019. Who has access to urban vegetation? A spatial analysis of distributional green equity in 10 US cities. *Landscape and Urban Planning* 181, 51-79.
- Okun, M.A., Schultz, A. 2003. Age and motives for volunteering: Testing hypotheses derived from socioemotional selectivity theory. *Psychology and Aging* 18, 2, 231.
- Omoto, A.M., Snyder, M. 1995. Sustained helping without obligation: Motivation, longevity of service, and perceived attitude change among AIDS volunteers. *Journal of Personality and Social Psychology* 68, 4, 671-686.
- Omoto, A.M., Snyder, M. 2002. Considerations of community: The context and process of volunteerism. *American Behavioral Scientist* 45, 5, 846-867.
- Ostrom, E. 2009. A general framework for analyzing sustainability of social-ecological systems. *Science* 325, 5939, 419-422.
- Patterson, F., Prescott-Clements, L., Zibarras, L., Edwards, H., Kerrin, M., Cousans, F. 2016. Recruiting for values in healthcare: A preliminary review of the evidence. *Advances in Health Sciences Education* 21, 4, 859-881.

- Penner, L.A. 2002. Dispositional and organizational influences on sustained volunteerism: An interactionist perspective. *Journal of Social Issues* 58, 3, 447-467.
- Phillips, T.B., Ballard, H.L., Lewenstein, B.V., Bonney, R. 2019. Engagement in science through citizen science: Moving beyond data collection. *Science Education* 103, 3, 665–690.
- Roman, L.A., Walker, L.A., Martineau, C.M., Muffly, D.J., MacQueen, S.A., Harris, W. 2015. Stewardship matters: Case studies in establishment success of urban trees. *Urban Forestry & Urban Greening* 14, 4, 1174-1182.
- Romolini, M., Bixler, R.P., Grove, J.M. 2016a. A social-ecological framework for urban stewardship network research to promote sustainable and resilient cities. *Sustainability* 8, 956.
- Romolini, M., Brinkley, W., Wolf, K. 2012. *What Is Urban Environmental Stewardship? Working Toward A Practitioner-Derived Framework*. Research Note PNW-RN-566, USDA Forest Service, Pacific Northwest Research Station, 41 pp.
- Romolini, M., Grove, J.M., Ventriss, C.L., Koliba, C.J., Krymkowski, D.H. 2016b. Toward an understanding of citywide urban environmental governance: An examination of stewardship networks in Baltimore and Seattle. *Environmental Management* 58, 254-267.
- Rouse, S.B., Clawson, B. 1992. Motives and incentives of older adult volunteers. *Journal of Extension* 30, 3, 1-3.
- Ryan, R.L. 2006. The role of place attachment in sustaining urban parks. In: Platt, R.H. (ed.) *The Human Metropolis: People and Nature In the 21st-Century City*. University of Massachusetts Press, pp. 61-74.
- Ryan, R.M., Deci, E.L. 2001. On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. *Annual Review of Psychology* 52, 1, 141–166.
- Ryan, R.L., Kaplan, R., Grese, R.E. 2001. Predicting volunteer commitment in environmental stewardship programmes. *Journal of Environmental Planning and Management* 44, 5, 629-648.
- Sanderson, E.W., Huron, A. 2011. Conservation in the city. *Conservation Biology* 25, 3, 421-423.
- Schueller, S.K., Yaffee, S.L., Higgs, S.J., Mogelgaard, K., DeMattia, E.A. 2006. *Evaluation Sourcebook: Measures of Progress for Ecosystem-and Community-Based Projects*. Ecosystem Management Initiative, University of Michigan, 215 pp.
- Sheppard, J.C., Ryan, C.M., Blahna, D.J. 2017. Evaluating ecological monitoring of civic environmental stewardship in the Green-Duwamish watershed, Washington. *Landscape and Urban Planning* 158, 87-95.

- Silverberg, K.E., Backman, S.J., Backman, K.F. 2000. Understanding parks and recreation volunteers: A functionalist perspective. *Society and Leisure* 23, 2, 453-475.
- Smith, D.H. 1994. Determinants of voluntary association participation and volunteering: A literature review. *Nonprofit and Voluntary Sector Quarterly* 23, 3, 243-263.
- Snyder, M. 1993. Basic research and practical problems: The promise of a "functional" personality and social psychology. *Personality and Social Psychology Bulletin* 19, 3, 251-264.
- Snyder, M., Omoto, A.M. 2008. Volunteerism: Social issues perspectives and social policy implications. *Social Issues and Policy Review* 2, 1, 1-36.
- Steen, T. 2006. Public sector motivation: Is there something to learn from the study of volunteerism? *Public Policy and Administration* 21, 1, 49-62.
- Stukas, A.A., Daly, M., Cowling, M.J. 2005. Volunteerism and social capital: A functional approach. *Australian Journal on Volunteering* 10, 2, 35-44.
- Svendsen, E.S., Campbell, L.K. 2008. Urban ecological stewardship: Understanding the structure, function and network of community-based urban land management. *Cities and the Environment* 1, 1, Article 4.
- Tay, L., Diener, E. 2011. Needs and subjective well-being around the world. *Journal of Personality and Social Psychology* 101, 2, 354-365.
- Traeger, C., Alfes, K. 2019. High-performance human resource practices and volunteer engagement: The role of empowerment and organizational identification. *VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations* 30, 5, 1022-1035.
- Tsybulsky, D. 2020. Self-reported reasons for participating in pro-environmental citizen science activities: A case study of butterfly monitoring in Israel. *Frontiers in Education* 5, 116.
- Turnbull, J.W., Johnston, E.L., Kajlich, L., Clark, G.F. 2020. Quantifying local coastal stewardship reveals motivations, models and engagement strategies. *Biological Conservation* 249, 108714.
- van Wilgen, B.W., Forsyth, G.G., Prins, P. 2012. The management of fire-adapted ecosystems in an urban setting: The case of Table Mountain National Park, South Africa. *Ecology and Society* 17, 1, 8.
- West, S., Pateman, R. 2016. Recruiting and retaining participants in citizen science: What can be learned from the volunteering literature? *Citizen Science: Theory and Practice* 1(2), 15.

- Wilson, J. 2012. Volunteerism research: A review essay. *Nonprofit and Voluntary Sector Quarterly* 41, 2, 176–212.
- Wolf, K.L. 2004. Nature in the retail environment: Comparing consumer and business response to urban forest conditions. *Landscape Journal* 23, 1, 40-51.
- Wolf, K.L., Blahna, D.J., Brinkley, W., Romolini, M. 2013. Environmental stewardship footprint research: Linking human agency and ecosystem health in the Puget Sound region. *Urban Ecosystems* 16, 1, 13-32.
- Wolf, K.L., Housley, E. 2017. Young adult conservation jobs and worker health. *Journal of Environmental Planning and Management* 60, 10, 1853-1870.
- Wolf, K.L., Kruger, L.E. 2010. Urban forestry research needs: A participatory assessment process. *Journal of Forestry* 108, 1, 39-44.
- Wondolleck, J.M., Yaffee, S.L. 2000. *Making Collaboration Work: Lessons From Innovation In Natural Resource Management*. Island Press, 280 pp.
- Wright, D.R., Underhill, L.G., Keene, M., Knight, A.T. 2015. Understanding the motivations and satisfactions of volunteers to improve the effectiveness of citizen science programs. *Society and Natural Resources* 28, 1013-1029.
- Wu, J., Wing Lo, T., Liu, E.S. 2009. Psychometric properties of the Volunteer Functions Inventory with Chinese students. *Journal of Community Psychology* 37, 6, 769-780.
- Zappalà, G., Burrell, T. 2001. *Why Are Some Volunteers More Committed Than Others? A Socio-psychological Approach to Volunteer Commitment in Community Services*. Research and Social Science Team: Working Paper No. 5. The Smith Family, 19 pp.