

CITY PARK VISITATION AND ATTITUDES ABOUT URBAN FORESTS: EXPLORING THE RELATIONSHIP

Joshua W. R. Baur
Department of Health Science and Recreation
San Jose State University
One Washington Square, MH 407
San Jose, California 95192
joshua.baur@sjsu.edu

Joanne F. Tynon
Oregon State University

Paul Ries
Oregon State University

Randall S. Rosenberger
Oregon State University

Abstract

We looked at how urban green space visitation relates to knowledge and attitudes about urban forests. Using data collected from a mailback survey that we randomly distributed to residents in Portland, Bend, Eugene, and Springfield, Oregon, we looked at urban forest knowledge, attitudes about urban nature problems and threats to urban forests. We used *t*-tests to look at possible differences in attitudes and knowledge between frequent and infrequent visitors to urban green spaces. Frequent visitors were significantly more familiar with the terms “ecosystem” and “urban forest.” Frequent visitors generally rated problems created by urban green spaces as less severe. Few differences were found for attitudes about threats to urban forests. Our results suggest that city green space usage has a relationship with attitudes about urban natural resources. Promoting usage of such areas could positively affect public attitudes and support for urban natural resources and management.

1.0 Introduction

The majority of ecosystem services research has principally focused on the provisioning and regulating services (Chan, Satterfield, & Goldstein, 2012). Molnar and Kubiszewski (2012) reviewed over 3700 published papers and found that provisioning services and regulating services each constituted about 35% of the total papers, while cultural services research papers constituted just over 5% of the total. Cultural services provide benefits such as reflection or aesthetic appreciation that are hard to quantify but are highly valued (Chan et al., 2012). Omitting cultural services from ecosystem services studies could result in suboptimal natural resource decisions (Faehnle, Backlund, & Tyrvaenen, 2011). One of the ways to expand our understanding of cultural services is to examine how outdoor recreation experiences influence public attitudes and perceptions of ecosystem services.

Relationships between outdoor recreation participation and environmental attitudes and behavior have been studied since the mid-70s beginning with the work of Dunlap and Heffernan (Teisl & O'Brien, 2003). Dunlap and Heffernan (1975) suggested that there would be a positive association between participation in outdoor recreation and pro-environmental behavior, and that different types of recreation activities would be associated variously with pro-environmental behavior. Since Dunlap and Heffernan's seminal study, the topic area has received considerable attention. Subsequent research has continued to confirm, for the most part, that there is a significant positive relationship between outdoor recreation participation and pro-environmental attitudes and behavior (Tarrant & Green, 1999; Teisl & O'Brien, 2003; Thapa & Graefe, 2003). Considering the proposed relationship outdoor recreation has with environmental attitudes and behaviors, and the relative lack of empirical study of recreation in the context of ecosystem services, we wanted to explore whether visitation to urban green spaces would have a relationship with attitudes about ecosystem services. We defined an urban green space as a park, forest reserve, or other designated natural area located in, or close to, their city. We looked at whether recreation experiences in urban green areas were associated with different levels of knowledge about urban forests and ecosystem services as well as attitudes about problems associated with urban forests and differences in perceived threats to urban forest health.

2.0 Methods

This study was carried out using a mixed-mode approach, in which focus groups constituted the qualitative portion of the research and a mailback questionnaire constituted the quantitative component. Our research sites were the cities of Bend, Eugene, Portland, and Springfield, Oregon, in the United States. All research activities were reviewed and approved by the university's Institutional Review Board.

2.1 Focus groups

Focus groups were carried out early in the project to help us obtain background information, stimulate new ideas, and learn about how participants thought and talked about urban forest ecosystem services (Berg, 2007). Using customary methodology (Krueger & Casey, 2009) we conducted focus groups with two categories of participants: natural resource professionals and non-governmental stakeholders. The first and second author conducted the focus groups whose outcomes directly contributed to questionnaire development and later data interpretation.

2.2 Questionnaire distribution

Analysis of focus group outcomes was combined with a review of urban ecosystem services literature to develop our mailback questionnaire. The questionnaire was mailed in the fall of 2011 to randomly selected recipients in Bend, Eugene, Portland, and Springfield, Oregon, using a modified Dillman approach (Dillman, Smyth, & Christian, 2009). Using Oregon Department of Motor Vehicle driver and state identification data, we mailed a postcard announcing the project and the impending arrival of the questionnaire. Recipients received a full survey package that contained the questionnaire, a cover letter, and a self-addressed, postage paid return envelope after the postcard. A second thank-you postcard was mailed about two weeks after the questionnaire that also reminded people about responding. A second full survey package was mailed out about two weeks after the reminder postcard. Addresses for 144 out of the 3900 people we attempted to contact by mail were not valid, and we received 12 refusals. There were 734 completed surveys returned for a final response rate of 20% (734/3744). We conducted a

nonresponse bias check and found that non-respondents did not significantly differ from respondents.

2.3 Questionnaire items

2.3.1. Knowledge about urban forests and ecosystem services

Members of the public commonly have differing levels of knowledge about forest management, and such varying knowledge can have an impact on their responses and attitudes about management (Loomis, Bair, & Gonzalez-Caban, 2001; Toman, Shindler, & Brunson, 2006). We asked respondents about how familiar they were with three terms – urban forests, ecosystems, and ecosystem services. Available scale responses ranged from 0, “Never heard this term before,” to 6, “Very familiar with this term.”

2.3.2. Ecosystem disservices/problems

Ecosystem functions provide services to people but they also generate disservices such as allergens, leaf litter, and sidewalks damaged by tree roots (Lyytimäki, Petersen, Normander, & Bezák, 2008; Lyytimäki & Sipilä, 2009). We asked respondents to rate a variety of disservices commonly associated with urban forests, including those mentioned above. We asked people to rate the severity of the disservice on a scale from 0, “Not a problem at all,” to 6, “A severe problem.”

2.3.3. Threats/challenges to urban forests

Members of the public often possess different attitudes about natural resource management than trained professionals (Eisenhauer & Nicholson, 2007; Raik, Lauber, Decker, & Brown, 2005). Urban forest managers need to consider public perceptions about threats to urban forest ecosystem health (Barro & Dwyer, 2000; Di Giulio, Holderegger, & Tobias, 2009) to understand how the public may respond to management activities (Bright, Cordell, Hoover, & Tarrant, 2003). We asked a series of questions about public perceptions of the severity of certain threats to urban forest health. Respondents identified threat severity on a scale from 0, “No threat at all,” to 6, “A severe threat.”

2.4 Data analysis

We used *t*-tests to evaluate differences between frequent and infrequent visitors to city green spaces. We developed the frequent/infrequent user categories by median usage of 35 visits annually. Those at or below the median were called infrequent users, and those above the median were frequent users. Cases were weighted by age, ethnicity, and gender, using 2010 US Census data. Due to their proximity, the cities of Eugene and Springfield were combined as a single urban center for the purposes of analyses.

3.0 Results

3.1 Familiarity with “urban forest,” “ecosystem,” and “ecosystem service”

Overall, the sample reported being most familiar with the term “ecosystem,” and least familiar with the term “ecosystem service.” Frequent visitors to urban green spaces were significantly more familiar with “ecosystem” than were infrequent visitors (see Table 1). Effect size was typical to substantial (Vaske, 2008).

Table 1.
Familiarity with Terms - Comparisons of Infrequent and Frequent City Green Space Users (n = 713)

Term	Familiarity ^a - <i>M</i> (<i>SD</i>)		<i>t</i>	<i>p</i> - value	<i>r</i> _{pb} ^c
	Infrequent users ^b	Frequent users ^b			
Ecosystem	4.87(1.29)	5.49(.92)	7.097	<.001	.268
Urban forest	3.37(1.77)	3.66(1.79)	2.179	.030	.082
Ecosystem service	2.27(1.87)	2.36(2.08)	.650	.516	na

a. Level of familiarity on scale from 0, "Never heard this term before," to 6, "Very familiar."

b. Variable was continuous. We used the median value of 35 visits annually as the split.

0-35 visits are categorized as infrequent, over 35 annually categorized as frequent.

c. Effect size is the point biserial correlation. Effect sizes interpreted as minimal = .100, typical = .243, and substantial = .371 (Vaske, 2008).

3.2 Attitudes about problems associated with urban forests

When asked about a selection of problems commonly associated with urban forests and other green spaces, frequent visitors to urban green spaces uniformly judged the problems less severe than infrequent visitors (Table 2).

Table 2

Attitudes about Problems associated with Urban Forests - Comparisons of Infrequent and Frequent City Green Space Users (n =643)

Problem	Problem severity ^a - <i>M</i> (<i>SD</i>)		<i>t</i>	<i>p</i> -value	<i>r</i> _{pb} ^c
	Infrequent users ^b	Frequent users ^b			
Too little public money spent on urban forest care	2.95(1.60)	2.84(1.69)	.852	.395	na
Sidewalks broken by tree roots	3.05(1.74)	2.49(1.54)	4.508	<.001	.168
Places for trash/litter to accumulate	3.24(1.62)	2.26(1.62)	7.935	<.001	.287
Places for people to loiter	3.17(1.71)	2.23(1.68)	7.293	<.001	.266
Leaf litter/fruit drop	2.73(1.79)	2.05(1.49)	5.404	<.001	.205
Falling tree limbs	2.64(1.68)	1.85(1.44)	6.499	<.001	.243
Source of plants that cause allergies	2.56(1.85)	1.74(1.79)	5.945	<.001	.220
Have to spend too much personal money on street tree care	2.51(1.74)	1.71(1.52)	6.296	<.001	.237
Nuisance wildlife	2.34(1.71)	1.54(1.45)	6.556	<.001	.245
Too much public money spent on urban forest care	1.95(1.59)	1.19(1.36)	6.642	<.001	.251
Lost opportunities for development	1.60(1.78)	.93(1.37)	5.441	<.001	.209
Irritating sounds or smells	1.53(1.60)	.86(1.35)	5.827	<.001	.220
Sources of neighborhood conflict	2.22(1.73)	1.17(1.30)	8.849	<.001	.327

a. Level of perceived problem on scale from 0, "Not a problem at all," to 6, "Severe problem."

b. Variable was continuous. We used the median value of 35 visits annually as the split.

0-35 visits are categorized as infrequent, over 35 annually categorized as frequent.

c. Effect size is the point biserial correlation. Effect sizes interpreted as minimal = .100, typical = .243, and substantial = .371 (Vaske, 2008).

The problems listed in Table 2 are ordered from highest average problem rating to lowest, for frequent and infrequent visitors combined. For example, for the entire sample, respondents felt that too little public money being spent on urban forest care was the biggest problem. We found no difference in this attitude statement based on visitation frequency. Urban forests and trees generating neighborhood conflict was judged to be the least severe problem associated with urban forests for the entire sample. However, the magnitude of the difference between infrequent and frequent visitors for attitudes about neighborhood conflict is in the typical to substantial range.

3.3 Perceived threats to urban forests

As a compliment to perceived problems from urban forests, we also wanted to learn more about what respondents perceived as threats to urban forest health.

Table 3

Perceived Threats to Urban Forests - Comparisons of Infrequent & Frequent City Green Space Users

Threat from...	Threat level ^a - <i>M</i> (<i>SD</i>)		<i>t</i>	<i>p</i> -value	<i>r</i> _{pb} ^c
	Infrequent users ^b	Frequent users ^b			
Lack of public understanding about urban forest ecosystems	4.37(1.47)	4.52(1.25)	1.416	.157	na
Agency red tape/bureaucratic hassles	4.61(1.44)	4.23(1.56)	3.272	.001	.124
Rising costs of maintenance & management	4.39(1.43)	4.20(1.30)	1.774	.077	na
Increasing human population	3.97(1.83)	4.46(1.60)	3.745	<.001	.142
Lack of public support for urban forest management	4.23(1.55)	4.09(1.49)	1.23	.219	na
Misleading information from special interest groups	4.27(1.68)	4.03(1.74)	1.783	.075	na
Lack of funds for management	4.16(1.49)	4.10(1.34)	0.506	.613	na
Habitat loss	3.94(1.51)	3.98(1.51)	0.334	.738	na
Non-native plants	3.89(1.60)	4.01(1.51)	1.018	.309	na
Pesticide,herbicide use	3.61(1.77)	3.72(1.64)	0.875	.382	na
Lack of public involvement in management	3.64(1.64)	3.66(1.56)	0.192	.848	na
Changes in climate	3.41(1.80)	3.55(1.75)	1.047	.296	na
Not enough scientists or experts involved with management	3.55(1.77)	3.38(1.56)	1.336	.182	na
Pests, plant diseases	3.61(1.52)	3.28(1.40)	2.907	.004	.111
Fertilizer use	3.19(1.81)	3.51(1.70)	2.393	.017	.090

a. Level of perceived threat on scale from 0, "No threat at all," to 6, "Severe threat."

b. Variable was continuous. We used the median value of 35 visits annually as the split. 0-35 visits are categorized as infrequent, over 35 annually categorized as frequent.

c. Effect size is the point biserial correlation. Effect sizes interpreted as minimal = .100, typical = .243, and substantial = .371 (Vaske, 2008).

Table 3 reports results and is ordered by the average threat level across both frequent and infrequent visitors. There was little difference between frequent and infrequent visitors for all threat variables. For items that did demonstrate a significant difference, effect sizes were generally minimal, indicating virtually no practical difference between the groups.

4.0 Discussion

In general, our results agree with other research on a connection between outdoor recreation experiences and environmental attitudes and behavior (e.g., Teisl & O'Brien, 2003). With respect to ecosystem knowledge, frequent visitors expressed greater familiarity with ecosystem terms and the term "urban forest." The term "ecosystem service" was least well understood by both groups. On the whole, less frequent visitors perceived problems associated with urban forests to be more severe than frequent visitors. Our exploration of attitudes about threats diverged somewhat from expectations. There was little difference between frequent and infrequent visitors to urban green spaces on perceived threats to urban forests.

Schultz and his colleagues' research (1999, 2000, 2001) offers a possible explanation for the connection between outdoor recreation and environmental attitudes. Schultz (2001) suggested that environmental values can be explained by underlying value orientations and beliefs about how personal actions affect nature. Schultz and Zelezny (1999) suggested that two value orientations – self-enhancement and self-transcendence – largely account for environmental attitudes. Self-enhancement types will be more driven by direct rewards for the self and self-gain. Self-transcendence refers to a person's capacity to see others and the outside world as a part of themselves. Critical to a sense of connection to the natural world, self-transcendent types do not conceive of nature as separate from self. It is possible that, as Schultz has suggested, visitors to city green spaces in our sample generally feel more connected to them than do people who visit less frequently. Though plausible, we cannot conclude from our analysis that differing value orientations account for differences in attitudes.

The importance of the difference in value orientations lays in how members of the public might respond to changes in the resources. A person possessing self-transcendent value orientation would be less motivated by direct and tangible benefits an urban green space may provide her. Consequently, management actions that interfere with visitation in order to promote ecological health would likely not diminish support for the green space. Conversely, a self-enhancement type might be more likely to seek out substitutes for activities they can no longer enjoy in a natural area in which access has become restricted for ecological reasons. Because the self-enhancement type primarily seeks out direct benefits, once those benefits are reduced or removed, the individual no longer has reason to value the natural area or those managing it. It seems apparent that underlying value orientations are important to understand and research further, given that they probably play a substantial role in how citizens respond to management and access to urban green spaces.

Our results indicating a relationship between visitation and attitudes suggest that more frequent use of urban parks, forest reserves, or other designated natural areas in and near cities would likely coincide with greater public understanding and support for urban natural resource management. In order to promote usage, urban green spaces must appear to potential visitors to be well cared for, clean, and safe. Maintenance and upkeep activities are critical to ensuring parks and natural areas are clean, neat, and visibly cared for. Departments should try to prevent

accumulation of trash and litter, and ensure that facilities are in good working condition and clean. Infrequent visitors in our sample rated trash and litter accumulation and loitering as fairly severe problems associated with urban forests and green spaces. Frequent visitors also rated these items as problems, but significantly less severe than infrequent visitors. Sense of safety is a very important feature in public natural spaces (Mull, Beggs, & Renneisen, 2009), and it could be that infrequent visitors in our sample are not visiting urban green spaces because they have encountered areas that they felt were inadequately maintained and did not feel safe. This is speculation, but is among many plausible reasons for fewer visits.

Currently, parks and other city departments are struggling with decreasing budgets but there are some workable responses to maintenance needs in an age of smaller budgets. One possible approach is to look for services and equipment that could be shared among city agencies. Parks and recreation districts and other natural resource agencies could conceivably establish arrangements to share maintenance equipment and personnel with schools and other municipal agencies to save on costs. Another cost saving strategy is the use of volunteers from community groups or local businesses. Urban natural resource agencies are likely to continue facing challenging budgetary conditions for the foreseeable future, so agency staff and decision makers need to think creatively about collaboration and partnerships with non-profit organizations and area businesses. Maintaining existing, and developing new relationships with community members and businesses not only provides tangible benefits, but can also help a parks department improve outreach and engagement.

Parks departments that engage with the community can help improve public understanding of natural resource management. Our results indicate that Oregon city residents are unfamiliar with the term “ecosystem services” though they are probably aware of benefits they experience even if they do not know the term. It is noteworthy that though “ecosystem service” was least well understood, the term “ecosystem” was the term respondents were most familiar with. Frequent visitors to urban green spaces were generally more familiar with the term than infrequent visitors. That there is a relationship suggests that outdoor recreation visits may be a means to help educate the public about the services people enjoy from healthy ecosystems. Resource managers might consider offering more guided walks and other programming that would help raise awareness of ecosystem services. In addition to educating the public about ecosystems, natural resource managers also need to improve their own understanding of public attitudes about management to better serve the public and manage natural resources.

Our results reveal little attitude difference about threats to city green spaces between frequent and infrequent visitors. We might have expected to see greater differences between our visitor frequency groups considering that research has indicated environmental knowledge (McDaniel & Alley, 2005) and pro-environmental attitudes and behaviors are positively associated with outdoor nature experiences (Schultz, 2000; Tarrant & Green, 1999). Our results are consistent with prior research in that more frequent visitors did score the threats more highly overall, but the differences were seldom statistically significant, and the practical differences between these two categories were mostly minimal. Interestingly, people in our sample rated threats to urban forest health as more severe than the problems created by urban forests and green spaces. Apparently, city residents are tolerant of the challenges urban green spaces create, and are more concerned about the health and well-being of urban forests and green spaces. Our results are

promising since they imply that city residents in general seem to recognize the substantial challenges natural resources in and around cities face. On average, lack of public understanding about urban forest ecosystems was considered the biggest threat. This could signal that Oregon's city residents are willing, and perhaps eager, to learn more about urban forests and their care and management.

Perceived problems created by urban forests showed more difference based upon visitation frequency. Urban trees as sources of conflict in the neighborhood showed the greatest difference. It appears that Oregon residents who visit city green spaces frequently do not perceive conflicts among neighbors resulting from street trees to be as severe as infrequent visitors. Conflict among neighbors is seemingly beyond the reach or responsibility of urban natural resource managers, but this result does present an intriguing possibility. If more city residents are motivated to visit urban green spaces, and learn about urban tree care and maintenance through outdoor education opportunities, increased awareness and understanding of the issues associated with urban trees could possibly help to reduce conflict among neighbors, at least indirectly.

Our sample regarded too little public funds spent on care to be the most severe problem regardless of visitation frequency. This may suggest that Oregon's city residents would be willing to support efforts to increase funding for urban tree and green space. However, tax payers are not usually enthusiastic about tax increases or additional borrowing. Our respondents seem to feel that more money should be spent on urban tree and green space care, but our results may have been different had we proposed an actual tax increase or bond measure. Nevertheless, that respondents felt that urban trees and green spaces need additional financial resources might be information that city natural resource agencies could use to strengthen their bargaining position and mobilize public support during budget deliberations.

Both frequent and infrequent visitors considered what we called "agency red tape/bureaucratic hassles" to be the second largest threat to urban forest health. Many interpretations of this outcome are possible, including those involving current anti-government sentiment in the U.S. (Rasmussen Reports, 2014), frustrating personal experiences with city agencies, and poor public understanding of urban tree care policies and resource limitations. This outcome should be of concern to natural resource professionals in Oregon's cities, and is certainly a topic worthy of additional investigation. More information is needed on what people believe about bureaucracy and challenges created by city agencies in order to better serve the public and manage urban natural resources effectively.

5.0 Conclusion

Our results agree with prior research that indicates that time spent in outdoor recreation activities has a relationship with environmental attitudes. Our study demonstrates that, in general, city residents in Oregon believe that threats to urban forest health are, at a minimum, moderate and that problems arising from urban green spaces are not as severe. Visitation frequency appears to be related to knowledge about urban forests and ecosystems though both frequent and infrequent visitors expressed little familiarity with the term "ecosystem service." This may be a troubling outcome if city natural resource agencies in our study areas have been expending resources to educate the public about this topic. Clearly much more research on public attitudes, knowledge, and perceptions of urban forests and green spaces is needed. For instance, research looking at

specific minority groups' perceptions of urban forest ecosystem services is currently limited. The present study provides basic information on different attitudes among frequent and infrequent users, but cannot provide insights into why these groups differ. Qualitative research is necessary to explore reasons why people differ. Comparative studies among different cities will also be of great value. An interesting future research project would be to replicate this study in other states and empirically evaluate how urban residents in other states compare to urbanites in Oregon. Only by fully integrating and giving equal weight to social science research in management decisions will city natural resource managers be accounting for the full range of benefits and costs associated with urban trees and green spaces.

6.0 Study limitation

There may be some question about the representativeness of our sample since response rate was somewhat low and the majority of respondents were Caucasian. We corrected for this by weighting data, using 2010 Census Data for the cities in which we conducted our survey. Future studies looking at similar urban forest issues would benefit by targeting specific populations to ensure adequate representation of all groups. We obtained our sample using Oregon Department of Motor Vehicle (OR DMV) information so, strictly speaking, our results are only generalizable to people registered with the OR DMV. We considered usage of DMV records as a reasonable strategy given that most people, though certainly not all, possess DMV identification. Another possible limitation is respondent selection bias. Considering our research topic, city residents who were more informed or interested in urban trees and green spaces might have been likelier to reply. Though our non-response check did not reveal any meaningful difference, considering our somewhat low response rate, self-selection bias is a concern.

Finally, our study did not consider other outdoor recreation activities. For example, frequent city green space visitors might also be more frequent visitors to national parks. National park visits probably also influence attitudes about urban forest ecosystem services. We did not inquire about the kinds of activities people engage in while using urban green spaces or the duration of visitation. There may be meaningful differences in attitudes connected to more or less active types of recreation or the amount of time spent recreating in a visit. Related outdoor recreation habits should be included in future studies of public attitudes about urban forests and green spaces.

7.0 References

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