

ENJOYING GREEN CITIES: ASSESSING VISITORS' ATTITUDES AND PREFERENCES FOR URBAN FORESTS IN WASHINGTON, D.C.

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Abstract.—This study examined the attitudes and preferences of visitors to Washington, D.C., one of the top tourism cities in the United States. Results of a visitor survey conducted at two sites show that respondents have a highly positive attitude towards the city's urban forest and that their appreciation of the urban forest has a positive influence on their experiences as visitors. In addition, this study used conjoint analysis to explore tourists' preferences regarding the appearance of urban forests. Respondents gave high importance ratings to key urban forest attributes such as plant and color variety, planting pattern, and manner of growth. These findings will be useful for urban managers and planners as they try to ensure that both residents and visitors enjoy the benefits of urban forests.

1.0 INTRODUCTION

Increasing urbanization and the popularity of recreational activities has sparked an interest in urban forests. In the United States, 75 percent of the population lives in urban areas, and about 3.8 billion trees cover these areas (Dwyer et al. 2000). Urban forests can help reestablish the connection between urban populations and natural resources (Dwyer et al. 2000). Thus, proper management of urban forest resources is important to realizing their full benefits, especially environmental quality improvement and the enhancement of human health and well-being.

Urban forests serve a multitude of social functions for urban residents and city visitors. According to Dwyer et al. (2000), urban forests may be the only type of forest that urban residents experience due to travel constraints such as money or time. In addition, urban forests provide a venue for a number of recreational activities such as walking, jogging, and biking, and other social activities such as outdoor games, picnics, and simply hanging out with family and friends. Dwyer et al. (2000) emphasize that the nation's urban forests influence people's perceptions of and preferences towards both the city and the forest.

The present study explored visitors' attitudes toward and preferences for the appearance of urban forests in Washington, D.C. This city was selected because of its unique status as the nation's capital. Washington, D.C. is also the seventh most visited city in the country, and visitation has increased steadily over the past 5 years (Office of Travel & Tourism Industries 2009). Additionally, the abundance of parks and gardens across the city makes it an interesting place for assessing visitors' preferences and attitudes regarding urban forests.

2.0 LITERATURE REVIEW

Many studies have explored the roles of urban forests in influencing the quality of life and community activities in urban areas. Litvin (2005) observed that planting trees as part of a streetscape improvement project in Charleston, South Carolina increased business activity in the area. In a similar study in College Station, Texas, trees and shrubs planted in commercial areas had a positive influence on residents' satisfaction with their neighborhoods (Ellis et al. 2006). Research on the aesthetic benefits of urban forests has shown that people put a premium on natural urban views characterized by an abundance of trees and plants in gardens and parks (Price 2003). For

the tourism industry, marketers and planners prefer to use images of groomed natural landscapes when promoting an urban destination because prospective visitors are drawn to such images (Hunter 2008).

In Japan, the rapid urbanization of key cities has resulted in rising demand for accessible nearby forests to serve as places for communing with nature, recreation, and meditation. A similar trend is evident in the United States as more and more people living in cities demand urban forests in the form of local parks and playgrounds, primarily for family recreation (Zhu and Zhang 2008). Recent studies have also looked at the environmental and health benefits of urban forests. Studies by McHale et al. (2007) and Nowak et al. (2006) found that urban forests help improve human health and well-being by mitigating air pollution and the greenhouse effect through carbon sequestration.

Most of the above-mentioned studies include social surveys that elicit residents' perceptions, attitudes, and preferences. The present study adds to the growing body of knowledge on the benefits of urban forests by looking through the eyes of urban visitors rather than residents.

3.0 METHODS

Visitor surveys were conducted in Washington, D.C. on three occasions from September to October 2009. Because of a relatively large proportion of foreign visitors, purposive sampling was used to target visitors who could answer the questionnaire in English. Study participants were recruited at two locations: (1) the U.S. Botanic Garden, which is near the Smithsonian museums and the U.S. Capitol where most visitors spend time strolling; and (2) the U.S. National Arboretum, which is outside the main tourist area (National Mall).

The survey instrument was a self-administered questionnaire comprised of three sections. The first section focused on eliciting visitors' attitudes toward the urban forest by asking them to assess their level of agreement with 23 statements related to having urban forests in the city and the impacts of the urban forest

on their experiences as visitors. The respondents rated the statements using a five-point Likert scale where 1 = strongly disagree and 5 = strongly agree. Some of these statements were negatively worded; scores for these statements were reversed in the statistical analyses.

The second section of the questionnaire was a conjoint experiment combining different attributes and characteristics of urban forests. As seen in Table 1, each attribute had several levels, and a random orthogonal design was generated using SPSS 11.5 for Windows to obtain nine sets of hypothetical urban forest conditions (Table 2). The study participants were asked to rate their preference for each set using a rating scale of 1 to 10 where 1 = least preferred and 10 = most preferred. The last section of the questionnaire elicited background information (e.g., gender, age, education level) and served as a basis for grouping and comparing respondents during analysis. Data were analyzed through descriptive statistics, t-tests, and conjoint analysis.

4.0 RESULTS AND DISCUSSION

4.1 Socio-demographics

Of the 600 visitors who were approached and asked to participate, 355 agreed and answered the questionnaire, resulting in a 59.2 percent response rate. There were slightly more females (55.3 percent) than males (44.7 percent) in the sample, and 90.3 percent

Table 1.—Urban forest attributes and levels used for the conjoint experiment

Attribute	Level
Plant variety	Trees only
	Trees and grass
	Trees, shrubs and grass
Planting pattern	Scattered
	In patches
	Concentrated in parks and gardens
Color variety	Green with few other colors
	Green with many other colors
Growth	Natural
	Trimmed

Table 2.—Hypothetical urban forest types rated by the respondents

Type	Description
1	Composed of trees; concentrated in parks and gardens; mainly green with few other colors and trimmed
2	Composed of trees, shrubs and grass; concentrated in parks and gardens; mainly green with few other colors and naturally growing
3	Composed of trees and grass; scattered throughout the city; mainly green with few other colors and naturally growing
4	Composed of trees and grass; concentrated in parks and gardens; mainly green with many other colors and naturally growing
5	Composed of trees, shrubs and grass; planted in patches; mainly green with few other colors and naturally growing
6	Composed of trees; scattered throughout the city; mainly green with few other colors and naturally growing
7	Composed of trees; planted in patches; mainly green with many other colors and trimmed
8	Composed of trees and grass; planted in patches; mainly green with few other colors and trimmed
9	Composed of trees, shrubs and grass; scattered throughout the city; mainly green with many other colors and trimmed

of them were domestic visitors coming from nearby states such as Maryland, Virginia, New York, New Jersey, Pennsylvania, and Ohio. Foreign respondents (9.7 percent) were mainly from but not limited to Canada, Mexico, Germany, and the United Kingdom. There were 82.4 percent repeat visitors while 17.6 percent were first-timers. More than half (51.6 percent) of the sample was between 18 and 49 years old. The participants were generally well-educated; 52.8 percent had a graduate-level education and 39.7 percent had an undergraduate degree. A total of 74.1 percent earned at least USD60,000 per year. Concerning their trip characteristics, 36.9 percent were traveling in pairs (generally with their spouse/boyfriend/girlfriend), 34.6 percent were with their families (more than one other person), and 15.8 percent travelled with friends. Just over 62 percent had traveled to Washington, D.C. for leisure, 20.3 percent were visiting family, relatives or friends, and 18 percent traveled for other reasons such as for business or education.

4.2 Visitors' Attitudes Toward Urban Forests

Table 3 provides an overview of responses to items measuring attitudes toward urban forests. About two-thirds of the study participants strongly agreed that urban forests make the city more relaxing to visitors and make going around the city more interesting (67.8 percent and 66.6 percent, respectively). The

respondents also strongly agreed that the city is much better to visit because of the urban forest (57.8 percent) leading to a more satisfying visit or stay (57.2 percent). Finally, more than half (52.8 percent) said that they would recommend visiting the city's parks and gardens to their friends and relatives.

Furthermore, 48.8 percent of the respondents strongly agreed that urban forests help indicate seasonal changes; 48.3 percent strongly agreed that the trees and plants make the National Mall look natural, and 47.6 percent were strongly impressed by the city's greenery. These figures show that the study participants were aware of the impacts that the urban forests have on the appearance of the city. In addition, 45.6 percent enjoyed taking pictures of the urban forest while 44.9 percent said that the urban forest enhanced their visitor experience. It is worth noting that 43.1 percent of the respondents strongly agreed that the urban forest is part of the city's appeal for tourists.

These findings reveal that the visitors had a keen sense of the urban forest in Washington, D.C., that it is part of the city's image, and helps make the city a draw as a tourist destination. Their appreciative and very positive attitude toward the city's urban forest attested to the forest's impact on enhancing their experiences as visitors.

Table 3.—Summary responses of respondents on attitude statements

Statement	Responses				
	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)
Parks, gardens and street trees make the city more relaxing for visitors	0.6	0.3	2.4	28.9	67.8
Parks, gardens and street trees make going around Washington, D.C. interesting	0.3	0.0	0.9	32.3	66.6
Urban forests in Washington, D.C. make it a better place to visit	0.0	0.6	4.1	37.5	57.8
I am satisfied with my visit and stay in Washington, D.C.	0.0	0.0	2.6	40.2	57.2
I will tell my relatives and friends to visit Washington, D.C.'s parks and gardens	0.6	2.3	4.7	39.7	52.8
I enjoy taking pictures of parks and gardens as souvenirs	1.5	2.1	10.9	40.0	45.6
My visitor experience was enhanced by the urban forests in Washington, D.C.	0.0	0.9	8.5	45.5	44.9
I believe that urban forests are part of the tourist appeal of Washington, D.C.	0.6	6.2	12.6	37.5	43.1
Parks and gardens are places in the city where I can do recreational activities	1.8	2.4	21.2	42.1	32.5
The urban forests of Washington, D.C. are among the main attributes that attracted me to visit the city	1.2	6.8	25.4	36.4	30.2
I am satisfied with the appearance of the urban forests in the city	0.6	3.5	16.7	51.8	27.5
I believe that urban forests give Washington, D.C. a more urban appearance	3.3	13.8	21.9	33.8	26.9
Street trees and flowers give a feeling of security because it separates pedestrians from traffic	1.2	6.3	28.9	43.7	19.9
Crowds in parks and gardens lessen my enjoyment in these areas	8.0	23.1	32.3	29.1	7.4
Tree parks and gardens attract birds and other animals that annoy visitors	40.2	38.8	8.0	7.1	5.9
Parks, gardens and street plantings are still good to look at even if they are withered and unkempt	18.4	39.2	23.1	15.4	3.9
I feel tired after visiting parks and gardens	26.5	32.4	27.7	9.7	3.5
I am not impressed by the greenery of the city	47.6	34.3	9.2	5.6	3.3
Trees and plants in the National Mall make it look less natural	48.3	38.4	7.8	3.3	2.1
Visiting gardens and parks decreased my curiosity on trees and other plants found in Washington, D.C.	31.8	41.8	19.9	4.5	2.1
Urban forests do not give interesting scents and colors	31.8	43.6	14.8	7.9	1.8
Street trees and plantings in sidewalks hinder tourist mobility	38.6	44.5	12.1	3.2	1.5
Urban forests do not tell us of seasonal changes	48.8	37.5	9.8	3.0	0.9

Visitor groupings based on gender, age, and education level were compared, and the results with significant differences between the two groups are summarized in Table 4.

Female visitors more often than males enjoyed taking pictures of urban forests, were more impressed by the greenery, and viewed the urban forests as more relaxing (Table 4). On the other hand, male visitors more strongly believed that urban forests are part of the city's tourist appeal. People aged 50 years and older tended to be more impressed with Washington, D.C.'s greenery than younger people. They also believed that urban forests enhanced their experiences and made the city a better place to visit. Lastly, visitors with at least a college degree had a more aesthetic and functional view of urban forests compared to visitors who only had a high school education.

4.3 Visitor Preferences for Urban Forests

The conjoint analysis results revealed that study participants viewed planting pattern as the most important attribute of the urban forest's appearance, followed by color, plant variety, and growth (Table 5). The relative importance values show that all the attributes were of almost equal importance. This means that the visitors consider all four attributes when looking for their preferred urban forest type.

The positive utility values in Table 5 show which attribute levels the study participants preferred. Visitors preferred urban forests with more plant variety, a scattered planting pattern, more color, and natural growth.

Table 4.—Summary of results on group comparisons of respondents' perception

Statement	Group	n	M	SD	t-Value
I enjoy taking pictures of parks and gardens as souvenirs	Female visitors	177	4.41	0.85	-3.36**
	Male visitors	144	4.10	0.80	
I am not impressed by the greenery of the city	Female visitors	177	1.71	0.97	2.34*
	Male visitors	142	1.98	1.11	
	18-49 years old	163	2.02	1.10	3.19*
	≥50 years old	154	1.65	0.95	
Parks, gardens and street trees make the city more relaxing for visitors	Female visitors	177	4.69	0.60	-2.01*
	Male visitors	137	4.55	0.63	
I believe that urban forests are part of the tourist appeal of Washington, D.C.	Female visitors	178	4.03	0.96	2.76*
	Male visitors	144	4.31	0.83	
Visiting gardens and parks decreased my curiosity on trees and other plants found in Washington, D.C.	18-49 years old	164	2.17	0.92	2.94*
	≥50 years old	153	1.87	0.91	
My visitor experience was enhanced by the urban forests in Washington, D.C.	18-49 years old	165	4.25	0.70	-2.47*
	≥50 years old	154	4.44	0.66	
Urban forests in Washington, D.C. make it a better place to visit	18-49 years old	164	4.46	0.65	-2.13*
	≥50 years old	155	4.60	0.54	
I will tell my relatives and friends to visit Washington, D.C.'s parks and gardens	18-49 years old	166	4.30	0.86	-2.81*
	≥50 years old	155	4.53	0.60	
Trees and plants in the National Mall make it look less natural	High school level	21	2.14	1.42	2.11*
	College/graduate level	301	1.71	0.86	
Street trees and plantings in sidewalks hinder pedestrian mobility	High school level	21	2.33	1.11	2.66*
	College/graduate level	307	1.82	0.84	

Note: *significant at .05 level; **significant at .001 level

Table 5.—Conjoint analysis results showing the relative importance and utility values of urban forest attributes and levels

Attribute	Level	Relative importance (%)	Utility
Plant variety		24.15	
	Trees only		-0.0531
	Trees and grass		-0.0208
	Trees, shrubs and grass		0.0739
Planting pattern		26.59	
	Scattered		0.1250
	In patches		-0.1176
	Concentrated in parks and gardens		-0.0074
Color variety		25.86	
	Green with few other colors		-0.5897
	Green with many other colors		0.5897
Growth		23.40	
	Natural		0.1608
	Trimmed		-0.1608

5.0 CONCLUSIONS

The findings of the study revealed that visitors in Washington, D.C. were well aware of the city’s urban forest. Most visitors were familiar with the benefits of having urban forests in a tourist destination to enhance visitor enjoyment. Visitors expressed their appreciation for the resource by commenting that the city should maintain and even expand the areas allocated for urban forests. Most of the study participants were well-educated and lived in nearby states. They believed that the greenery of the city was impressive and was a part of its tourism appeal. This implies that in addition to the cultural and heritage attractions, the city’s tourism managers can also highlight its urban forests in promoting the city as a destination.

City planners and urban forest managers of cities such as Washington, D.C. are constantly monitoring the condition of their urban forests, and this study provides feedback on how visitors prefer urban forests to be structured. The study participants generally had a very positive attitude toward the current condition of the city’s urban forest. In terms of preferences about the appearance of urban forests in the city, visitors

gave almost equal importance to plant variety, planting pattern, color, and growth. However, they tended to prefer urban forest features scattered throughout the city with more types of plants, more color, and a less trimmed appearance. These findings provide managers with a clearer picture of what visitors like and enjoy while spending time in the city. Thus, these attributes should be carefully considered in plans to establish, maintain, or improve urban forests. Because it is one of the top city destinations both locally and internationally, Washington, D.C. needs to be dynamically attuned to the needs and expectations of its visitors.

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7.0 LITERATURE CITED

- Dwyer, J.F.; Nowak, D.J.; Noble, M.H.; Sisinni, S.M. 2000. **Connecting people with ecosystems in the 21st century: an assessment of our nation's urban forests.** Gen. Tech. Rep. PNW-GTR-490. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 434 p.
- Ellis, C.D.; Lee, S.W.; Kweon, B.S. 2006. **Retail land use, neighbourhood satisfaction and the urban forest: an investigation into the moderating and mediating effects of trees and shrubs.** *Landscape and Urban Planning*. 74: 70-78.
- Hunter, W.C. 2008. **A typology of photographic representations for tourism: depictions of groomed spaces.** *Tourism Management*. 29: 354-365.
- Litvin, S.W. 2005. **Streetscape improvements in an historic tourist city a second visit to King street, Charleston, South Carolina.** *Tourism Management*. 26: 421-429.
- McHale, M.R.; McPherson, E.G.; Burke, I.C. 2007. **The potential of urban tree plantings to be cost effective in carbon credit markets.** *Urban Forestry & Urban Greening*. 6: 49-60.
- Nowak, D.J.; Crane, D.E.; Stevens, J.C. 2006. **Air pollution removal by urban trees and shrubs in the United States.** *Urban Forestry & Urban Greening*. 4: 115-123.
- Office of Travel & Tourism Industries. 2009. **Overseas visitation estimates for U.S. states, cities and census regions: 2009.** 8 p. http://tinet.ita.doc.gov/outreachpages/download_data_table/2009_States_and_Cities.pdf. (Accessed June 12, 2010).
- Price, C. 2003. **Quantifying the aesthetic benefits of urban forestry.** *Urban Forestry & Urban Greening*. 1: 123-133.
- Zhu, P.; Zhang, Y. 2008. **Demand for urban forests in United States cities.** *Landscape and Urban Planning*. 84: 293-300.

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