Characteristics and Use Patterns of Visitors to Dispersed Areas of Urban National Forests

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Abstract: Public recreation areas near large urban centers are experiencing increasing pressure from visitation, especially in undeveloped and wildland areas that are close to expanding population centers. Understanding the use patterns, characteristics, and perceptions of recreation visitors is critical to managing these areas for maximum sustainable benefits. Of the over 120 National Forests in the United States, eighteen have been officially designated as 'Urban', because of their proximity to large metropolitan areas. Sixteen of these forests have designated Wilderness areas within them. This paper examines the recreation visitors to the undeveloped portions of those National Forests. Key market segments of visitors are identified with respect to demographics, residence, annual use frequency, and visit duration. In addition, visitor perceptions of crowding and safety and their relationship with visitation levels are examined.

Key Words: Urban forests, use patterns, visitor perceptions, crowding, visitor characteristics, demographics, wilderness.

Introduction

In the United States, eighteen of the approximately 120 National Forests have been identified as 'Urban Forests'. The designation indicates that these forests are within 50 mile of one or more large (over 1 million people) urban concentrations. Sixteen of these urban forests contain designated Wilderness. Eight of the urban forests are located close to cities that have warm weather almost year round. These include: Los Angeles (CA), San Diego (CA), Phoenix (AZ), Albuquerque (NM), Atlanta (GA), Jacksonville (FL), Orlando (FL), and Talahassee (FL). The other eight are near cities with cooler climate and noticeable winter use season: Portland (OR), Seattle (WA), Salt Lake City (UT), Denver (CO), Boston (MA), and Providence (RI). Together, these forests cover about 22.6 million acres of land, including almost 4.7 million acres of designated Wilderness. Urban Forests are a very important recreation and open space resource for their proximate urban populations. Consequently, a number of management issues center around the volume and timing of visitation, and certain characteristics of the visitors and their behavior. A list of the challenges for Urban National Forests can be seen at the website: www.fs.fed.us/recreation/permits/urban/urban02.htm.

The lack of information about visitor volume and characteristics, particularly to the undeveloped portions of those forests, can significantly hamper management effectiveness. Identifying key market segments of visitors can help in effective dissemination of information, building coalitions of stakeholders, and designing programs to mitigate conflicts among users. This paper focuses on an empirical examination of users and use patterns of visitors to dispersed areas in these national forests.

Data

The Forest Service's National Visitor Use Monitoring (NVUM) program is the data source for this analysis. From January 2000 through September 2003, the NVUM program has sampled visitors on every National Forest to estimate visitation volume and describe visit characteristics (English, et al., 2002). The approach involved estimating visitation and surveying visitors on a sample of days at developed recreation sites, access points to the general undeveloped forest area, and access points to designated Wilderness. Across the 16 forests, an average of 73 days of sampling occurred in General Forest Areas and 39 in Wilderness. The average number of individuals sampled in those categories was 426 and 188, respectively.

Interviewed visitors were asked about visit duration, activity participation during their visit, demographic information of gender, race, age class, and

home ZIPCODE, as well how many times per year they visited the forest for recreation. A subset of visitors was asked questions that enable recreation economic analysis, including annual use of the forest for their primary activity, and how much they spent on this visit to the forest in the local area. A different subset was asked questions regarding satisfaction and importance ratings for a number of access, service, and environmental quality items, and their perception of crowding at the site visited.

General Results

Visitation

Urban forests accommodate a larger than average share of visitation. Total national forest recreation visits to the 16 urban National Forests that contain Wilderness number nearly 50 million, or almost one-fourth of all visits estimated for the entire National Forest System. However, these forests account for only about eleven percent of the approximately 192 million acres of land in the National Forest System. In dispersed areas, these sixteen forests absorb about one-fifth of the visits to general forest area land (29 million out of a national total of about 135 million). The Urban forests contain about 13.5 percent of the total Wilderness acreage managed by the Forest Service. The 3.2 million Wilderness visits that occur on these 16 forests represents nearly one third of the total visits to all Wilderness managed by the agency.

The monthly distribution of visitation to these forests differs markedly between warm-climate and cool-climate forests (Figure 1). There is a greater concentration of visitation during the summer months in the cool-climate urban forests, because many parts of the forests are inaccessible due to snow from November through April. Wilderness use is especially concentrated – over 60 percent of all Wilderness visitation to these cool-climate forests occurs in July, August, and September, and only about 10 percent from November through April combined. In contrast, visitation to Wilderness in the warm-climate urban forests is very evenly distributed throughout the year, with about 7% of visitation in each month from November through April. During summer months the proportion rises to only a little less than 10 percent per month.

Visitor Origin

Local visits were those taken by people who lived within 50 miles of the forest. Slightly less than sixty percent of visits to the dispersed area of these forests were made by local residents. The proportion of visits made by local residents was different between the warm and cool weather forests. For urban forests in warm-weather climates, about 70% of visitation was from people who lived in the local area, versus only 52 percent for urban forests in cool climates. The proportion of visits made by locals was not different for Wilderness versus general dispersed forest areas.

Frequency of use

A large portion of visitors reported making only one visit to the forest in the previous 12 months. However, a fair number indicated that they visited several times per month, and a few visited daily. Three frequency of use categories defined were:

– Frequent users: visited at least 35 times per year.
– Regular users: visited at least 5 but fewer than 35 times per year.
– Infrequent users: visited fewer than 5 times per year.

Frequent visitors accounted for about 22 percent of all visits to the dispersed portions of the urban national forests, regular users for just over 40 percent, and infrequent users slightly less than 38 percent. These percentages were essentially the same for both warm and cool climate forests. As well, the percentage of visits for each of the frequency categories was the same for Wilderness as for the general forest area.

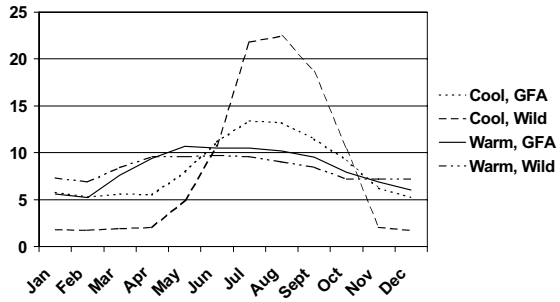

Figure 1. Monthly distribution of visitation for urban national forests, by climate type and dispersed area type.

Frequent users are a relatively small group of individuals. Despite accounting for 22 percent of the visits to the dispersed area of these forests, the frequent users make up only about one percent of all the individuals who visit the forest. Regular users make up slightly more than 12 percent of all visiting individuals. The remaining 87 percent of the people who visit these forests fall into the infrequent user group.

Defining Visitor Segments

Visitor segments were defined by cross-classifying visits by frequency of visit category, and local/non-local residence. Analysis was performed to see if the size of these segments were different for either climate type. The first segment was defined by frequent visitors (Table 1). Nearly all of the frequent visitors were local residents. Within that frequency category, locals outnumbered nonlocals by about nine to one in both visits and visitors. We assumed that the few frequent users who were not local residents were likely to behave similarly to the local frequent users, and in any case were too small a group to merit a separate segment.

Table 1. Defining visitor segments for urban national forests.

	Visit frequency		
	Frequent	Regular	Infrequent
For All Forests	(>34/yr)	(6 – 34/yr)	(<6 / yr)
Visit distribution (%):			
Local Residents	19.5	29.8	18.9
Non-Local Residents	2.5	10.7	18.7
Visitor distribution (%):			
Local Residents	0.9	8.7	39.5
Non-Local Residents	0.1	3.5	47.3
Warm Climate Forests:			
Visit distribution (%):			
Local Residents	20.4	33.5	12.8
Non-Local Residents	1.9	7.6	23.9
Visitor distribution (%):			
Local Residents	1.0	10.2	32.8
Non-Local Residents	0.1	2.7	53.1
Cool Climate Forests:			
Visit distribution (%):			
Local Residents	18.8	27.1	15.2
Non-Local Residents	3.0	13.0	22.9
Visitor distribution (%):			
Local Residents	0.7	7.8	30.3
Non-Local Residents	0.2	4.1	56.9

Regular users were divided into two segments based on residence. Local, regular users accounted for almost thirty percent of the visits but less than nine percent of the visiting individuals. Non-local, regular users comprised slightly less than 4 percent of visiting individuals, and accounted for 10.7 percent of visits. The final segment was made up of infrequent users.

There was very little difference in the size of the segments with respect to either visits or visitors when the forests were divided into warm and cool climate forests. For both climate types, about twenty percent of visits were made by local, frequent users, and just under one-fourth by non-local, infrequent users. The most noticeable difference was that for regular users, the proportion of visits made by locals versus nonlocals was about 6 percent different across climate types. Examining the proportion of visits and visitors by type of area in the forest (Wilderness versus general forest area), showed almost no differences from the overall percentages shown in Table 1.

Describing Visits Made by the Segments

Characteristics of the visits made by people in each of the segments were compared to explore how the people who made up the segments used the forest (Table 2). The segments are arrayed from those who have the most contact with the forest (frequent visitors) to those with the least (infrequent users). Of the regular users, we would expect locals to have more contact than the regular non-local segment. Note that the comparisons in Table 2 are of the visits made by the persons in each segment, not of the individuals themselves.

Demographics

Seventy-six percent of the visits made by people in the frequent use segment were made by males in that segment. For the local regular users, the percentage was about the same (75.6 %), and only slightly less (74.1) for the non-local regular users. However, for the infrequent users, the percent of visits made by males was only 67.6 percent.

Across all segments, the vast majority of visits were made by whites. Between 93 and 94 percent of visits made by both the frequent users, and the regular, local users were by whites. For the other two segments, the percent of visits made by whites was about 90 percent. There was very little difference and no strong patterns in the proportion of visits made by people in various age classes across the segments.

Visit duration

Visits by frequent users had the shortest duration, whether measured by the average (4.5 hours) or median (2.75 hours) visit length. The measures of visit duration for visits made by the regular local users were about the same as for the frequent users. Visits by the regular, non-local visitors averaged slightly more than 12 hours in duration, and about half of the visits by these individuals lasted more than four hours. The infrequent users had the longest average visit duration, slightly more than 25 hours. However, their median visit duration was about the same (4.25 hours) as for the regular non-local segment.

Activity Participation

Across all segments, over 45 percent of visits include participation in one or more of four activities: Hiking/walking, viewing natural features, viewing wildlife, and a general relaxing/hanging out activity. Among the other activities, two showed distinct patterns across the array of segments. The percent of visits that involved developed camping was only 3.3 percent for frequent users. The percentage increased to 5.2 percent for regular, local users, 8.2 percent of regular, non-local visitors, and 11.0 percent for infrequent users. Off Highway Vehicle (OHV) use was most common for local users, including the local-dominated frequent visitor segment (12.6 percent of visits included OHV use), and the regular local segment (14.4 percent of visits). In contrast, less than five percent of visits by the infrequent user segment involved OHV use.

Primary activity

Over one-third of the visits (37.0 percent) taken by individuals in the frequent user segment had a primary activity of hiking/walking. For each of the other three segments, the percent of visits with hiking as a primary activity was between about 25 and 30 percent. The percent of visits with a biking (including mountain biking) activity was also highest in the frequent user segment (7.3 percent), and declined steadily across the other segments, to less than 2 percent for the infrequent users. As a primary activity, developed camping was almost non-existent for visits by individuals in the frequent user segment (0.1 percent of visits). However, fully seven percent of visits made by the infrequent use segment had developed camping as a primary activity. Viewing natural features as a main activity was also greatest among the infrequent user segment (10.1 percent of visits), and

Table 2. Visit characteristics by user segment to urban national forests.

	Segment			
	Frequent Users	Regular, Local	Regular, Non-local	Infrequent Users
Percent visits by males:	76.0	75.6	74.1	67.6
Race:				
– White	93.1	93.8	88.9	90.4
– Hispanic	5.1	2.8	3.3	5.8
– Other	1.8	3.4	7.8	3.8
Length of NF Visit (hrs)				
– Average	4.52	7.81	12.3	25.35
– Median	2.75	3.25	4.0	4.25
– 3rd Quartile	5.25	5.50	8.75	23.25
% Visits with Primary Activity:				
– Hiking	37.0	25.9	29.4	24.6
– Hunting	8.4	9.4	2.6	8.0
– Biking	7.3	5.9	4.1	1.7
– Fishing	7.0	5.4	9.9	4.8
– OHV use	4.5	8.7	5.4	3.7
– Viewing Natural Features	5.4	6.7	9.0	10.1
– Developed Camping	0.1	3.4	1.5	7.0
% Visits with Participation in:				
– Hiking	56.9	49.7	52.8	57.0
– Viewing natural features	58.1	63.8	58.7	71.4
– Viewing Wildlife	45.5	52.4	45.2	57.5
– Relaxing	52.5	53.0	58.1	59.3
– Developed Camping	3.3	5.2	8.2	11.0
– OHV use	12.6	14.4	8.6	4.8
Importance ratings:				
Parking Availability	3.7	3.6	3.5	3.8
Parking Lot Condition	3.4	3.4	3.5	3.6
Road Condition	3.6	3.9	4.1	4.1
Trail Condition	4.2	4.1	4.2	4.2
Signage Adequacy	3.6	3.9	4.0	4.3
Rec Info Availability	3.4	3.7	3.9	4.1
Employee Helpfulness	3.9	3.9	4.2	4.3
Perception of Safety	4.0	4.1	4.2	4.4
Crowding:				
% rating Low	55.8	52.7	59.5	65.8
% rating Moderate	36.4	41.0	34.3	30.2
% rating High	7.8	6.3	6.2	4.0

least common among visits by the frequent user segment (5.4 percent).

Experiences

Insight into how to serve the different segments can be gleaned by examining what elements of the visit are most important. The survey asked importance ratings for several items related to the quality and condition of the environment, the condition of access facilities, and services provided by the agency. A five-point scale was used to evaluate importance, where 1 is not important and 5 is very important. The average rating for the items was compared across segments. There was no difference across segments with respect to three environmental quality items – condition of the natural environment, quality of the landscape, and quality of scenery. For each of these items and segment the average rating was between 4.5 and 4.7. The average ratings for the other items are displayed in Table 2.

The two items that showed the greatest variation in average importance rating across the segments were for the availability of recreation information and the adequacy of signage. For both of these items, frequent users had the lowest average importance rating (3.4 and 3.6 respectively). Successively higher importance ratings were given by regular local users, regular non-local users, and visitors in the infrequent user segment. The same pattern, that the segment that most often visited the forest had the lowest rating and the segment visiting least often had the highest rating, was repeated on several other items as well. Other items with this pattern included the importance of a perception of safety, helpfulness of employees, and condition of parking lots. The importance of trail condition was approximately equal across all segments.

For all segments, the importance of parking lot condition was at or tied for lowest rating. For all segments except frequent users, perception of safety and trail condition had an average importance rating as high as or higher than any other item. For the frequent users, trail condition had a higher importance rating than a perception of safety.

For crowding, a 10-point scale, where1 = not at all crowded and 10 = very crowded was used.

Frequent users had a higher proportion of visits with a High crowding rating than did any other segment. Conversely, infrequent users had the fewest visits with that level of crowding (4.0 percent). As well, infrequent users had the higher percentage of visits with a Low crowding level.

Segment Differences by Climate Type

An issue of interest was whether the visit or visitor characteristics of the segments were the same for warm climate and cool climate urban forests. The proportion of visits made by the different segments was fairly close across the climate types. However, the proportion of visits made by both frequent and regular local visitors was slightly higher for the warm climate forests (Table 3).

With respect to the demographics of the visits segments, there was no clear pattern of difference in the proportion of visits by age class, or by gender. The proportion of visits by Hispanics was higher in every segment for the warm climate forests than for the cool climate forests. There were no clear patterns of differences for the other racial groups.

There were some patterns of differences in the activity mixes for segments between the climate types. In the cool climate forests, a higher proportion of visits by all segments had primary purposes for dispersed winter activities (snowmobiling and cross-country skiing), hiking, and viewing natural features. Biking was a more common primary activity for all segments for warm climate urban forests. For frequent and regular local users, hunting and OHV use were more common primary activities on warm climate urban forests.

There were no distinct patterns of differences across climate type for the importance ratings given by members of the segments. However, for three of the four segments there were differences in the ratings of how crowded the area was. Frequent users rated crowding about the same for both the cool climate and warm climate forests. However, for the other three segments, fewer visitors to cool climate forests gave low crowding ratings, and a higher proportion gave high crowding ratings. A likely explanation is the seasonal concentration of most of the dispersed area visitation for the cool climate forests.

For each segment, females were a slightly higher proportion of the visitor population for the cool climate urban forests than for the warm climate urban forests. There were no distinct patterns of differences for the other demographic characteristics, except for the proportion of Hispanics. That group was a greater proportion of visitors for all segments for the warm climate forests.

For three of the segments, the average number of annual visits to the forest for any recreation activity was about the same. Frequent users of the cool climate forests took on average about 10% more visits per year than did members of the same user segment on warm climate urban forests. For every segment, the average number of visits for the indicated primary activity was very slightly higher for visitors to the warm climate forests. Frequent users of the warm climate forests had a much higher average annual total time on the forest (576 hours per year) than did members of the same segment on the cool climate forests (405 hours per year). For the other three segments, the differences in annual time spent for warm versus cool climate forests were quite small.

Table 3. Visit Differences between warm and cool climate urban forests.

	Segment			
	Frequent Users	Regular, Local	Regular, Non-local	Infrequent Users
% Visits by segment				
Warm	20.1	30.2	6.9	42.8
Cool	18.9	23.0	11.0	47.4
% visits by Hispanics				
Warm	7.9	3.6	8.3	8.3
Cool	2.2	1.9	1.0	2.7
% Visits for Primary Activity				
– X-C ski or Snowmobile				
Warm	0.0	0.0	0.0	0.0
Cool	10.7	8.1	12.2	1.1
– Hiking				
Warm	35.0	22.8	24.9	14.2
Cool	38.6	28.7	31.4	20.8
Viewing Natural Features				
Warm	3.8	4.5	6.9	8.6
Cool	6.7	8.8	9.9	11.0
– Biking				
Warm	9.3	6.4	7.6	1.5
Cool	5.8	3.6	2.5	1.1
– OHV use				
Warm	6.5	11.1	3.2	3.5
Cool	3.1	6.4	6.3	2.2
– Hunting				
Warm	14.5	13.5	1.0	10.4
Cool	3.9	5.7	3.4	2.9
Crowding rating				
Low (1–3)				
Warm	57.1	56.9	81.0	73.0
Cool	55.1	51.3	36.5	58.8
Moderate (4–7)				
Warm	33.2	41.1	13.3	24.8
Cool	38.0	38.5	44.9	35.4
High (8–10)				
Warm	9.7	1.9	4.7	2.2
Cool	6.9	10.1	18.7	5.8

Conclusions

Segmenting visitation by the geographic origin of visitors and frequency of visit can be helpful in identifying key visitor subgroups. For the users of dispersed areas in urban national forests, local frequent users make up a sizeable segment. Visits made by these individuals are of relatively short duration, and their activities often center on regular exercise (hiking, biking), or relaxation (including viewing nature or wildlife). Very few of these users come primarily for camping or viewing natural features, indicating that many of the visitors doing those activities are infrequent users.

Frequent users care less about the availability of recreation information, signage, and the helpfulness of employees, – they already know where they are going and what to do, so these are less needed. Their lower perception of the importance of feeling safe may come from familiarity as well. They aren't worried about feeling safe because they are comfortable and know where to go or where to avoid. On average, these frequent users spend about 500 hours per year recreating on the forest, compared to about 100 hours per year for regular users.

There are differences between the same segments of users according to climate. Hunting is a much more prominent use for warm climate urban forests, and associated with that, so is use of Off Highway Vehicles.

Regular and infrequent users in cool climate forests were more likely to perceive high levels of crowding than for the same segment in warm climate forests. This difference is likely related to the seasonal concentration of use in cool climate forests.

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