CAMPER CHOICE BEHAVIOR FOR THREE PROXIMAL SITES

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Abstract.—This study investigated the degree of distinctiveness in camper choice behaviors among developed, walk-in, and wilderness camp settings, all located with a 3-mile radius of each other. Objectives of the study were to determine if there were differences in the personal characteristics, experience use history (EUH), and alternate site use (substitution) for campers of U.S. Forest Service developed, walk-in, and designated Wilderness camp areas. On-site and mail surveys (n=424, 83.7% response rate) were used to collect data at the three camping areas in the Sumter National Forest in South Carolina during 2003. Results indicated that the three site choices were serving rather distinct groups of campers, with six of eight user characteristics differing significantly (p¼.05). EUH did not vary significantly among the three sites. Although the three camping choices were all located within a 3-mile radius (10-15 minutes) and along the same road system, campers did not substitute freely among the alternate areas.

1.0 INTRODUCTION

Camping is a traditional and popular outdoor recreation activity. Some 83.1 million Americans participated in camping in 1999, representing over one-fourth of the U.S. population (U.S. Forest Service 2000). However, there is considerable diversity among the many types of campers, types of camp settings and site features, and use patterns-activities of campers, leading Shafer (1969) to publish the classic paper, "The Average Camper Who Doesn't Exist." In his study, Shafer surveyed campers across five developed New York State campgrounds, and found considerable diversity among campers by location, features of the campgrounds, and month of camping. Shafer concluded that "in survey studies of campers, you can no more lump together data for different campgrounds than you can mate widgeons and wombats (p.1)."

Our study differs from Shafer's in that diversity among campers is examined for three different types of Forest Service camping opportunities, all located within a 3-mile radius of each other, and along the same travel corridor. The three campground opportunities and choices—developed, walk-in, and Wilderness—provide a spectrum of recreation opportunities to campers, all within a readily accessible travel distance (Driver et al. 1987, Manning 1999). The purpose of our study was to examine for differences in camper characteristics, experience use history (EUH), and substitution-alternate use behavior, among the three proximal site choices. Relative to Shafer's research, we were asking the basic question, "Does an average camper exist at the three proximal sites or are campers distinctly different at the sites?"

1.1 The Site Choices and Research Questions

The three diverse camping opportunities, all located within a 3-mile radius of each other, provide a unique site situation for researching recreation choice behavior. Campers have a choice to easy-access, vehicle camp in the Cherry Hill developed campground, to walk in 350 yards to camp in the pioneer Burrell's Ford campground, or to backpack camp in the Ellicott Rock Wilderness.

The Cherry Hill (CH) choice is a developed, fee-based ($10 per site), drive-in campground with modern bathroom and showers, potable water, and RV camping-pads with tables and fire rings. Access is by way of a paved road. Burrell's Ford (BF) walk-in campground is a more primitive, less developed setting that requires campers to park vehicles in a gravel area and walk 350 yards to an informal camping area with non-designated campsites. The only amenities offered to campers are a vault toilet, lantern holders, and several scattered picnic tables. Potable water is not available. However, the setting is located adjacent to the Chattooga River, a trout fishing resource. The third area, Ellicott Rock Wilderness (ER),

is an 8,274-acre designated federal Wilderness. The major entry point to the Wilderness is from the BF walk-in parking area, located only one-third of a mile from the nearest Wilderness boundary. Thus, access is easy and most backpackers camp adjacent to the Chattooga River. No camping fee is charged at either of the latter two sites, nor are permits required.

Based on the field situation of having three diverse camping opportunities, all conveniently located without distant travel barriers, the following research questions were identified for study.

(1) Are campers of the developed, walk-in, and Wilderness settings … (a) distinct campers of one of these settings? (b) loyal to a particular setting choice? (c) different in their personal characteristics? (2) Do the campers of the three settings differ in terms of EUH; in length and frequency of use of each camping choice? (3) Do campers substitute (alternate use) among the three proximal site choices? (a) Are they aware of the alternative site choices? (b) Have they used the alternate sites? (c) Would they be willing (future use) to use the alternate sites?

2.0 METHODS

2.1 Study Area

The research was conducted on the Andrew Pickens District of the Sumter National Forest in northwest South Carolina from May through October 2003. The Andrew Pickens District has several outstanding opportunities for outdoor recreation, including the Chattooga National Wild and Scenic River (CNWSR) and the adjacent Ellicott Rock Wilderness. Several opportunities for camping also occur, including the three sites of this study.

2.2 Sample and Data Collection

All campers encountered in each of the three settings were requested to participate, comprising a convenience sample. Sampling occurred on weekends (including Friday evenings) between 8:00 am and 8:00 pm for a total of 60 sampling days. A total of 424 campers completed questionnaires; 307 on-site and 117 mail-back (83.7% response rate). Sample sizes for the three study sites were: 188 for CH, 124 for BF, and 112 for ER.

Cherry Hill and BF campers were sampled at campsites. Researchers either waited for respondents to complete the survey, or came by the campsite later to collect completed questionnaires. While no one refused to participate, 12 questionnaires were returned blank. This data collection procedure yielded 312 completed surveys (96% response rate). Given the difficulty of completing on-site surveys with backpackers in Wilderness area (e.g., visitor desire for solitude and researcher desire to be as unobtrusive as possible), participants were provided the questionnaire and a postage-paid, business reply envelope enclosed within a plastic resealable bag. When contacted at the trailhead or along trails, campers were requested to provide their name and address in order to be sent follow-up reminders and another copy of the questionnaire should they lose or damage the survey provided on-site (Dillman 2000). One hundred and eighty-seven (187) questionnaires were distributed; there were no refusals. One hundred and twelve (112) completed surveys were returned (60% return rate).

2.3 Variables and Operational Definitions

Personal characteristics were measured through the use of eight socio-economic and use-variables; age, education, gender, income, group size, group composition, length of stay, and primary activities while camping. EUH was operationalized by measuring total years and number of times last year of camping at the site where sampled, and total years camping at other local areas (Hammitt et al. 2004). Campsite alternative use was operationally defined with three questions to determine respondent awareness of the two other adjacent camp settings, their past use of the two alternatives, and their willingness to use the two alternatives in the future. Specific questions were: "Did you know that camping is available at _____?" (other two sites). "If YES, have you ever camped there?" Number of years ___? Times per year ___? "How willing would you be to camp at the other two sites if you could not camp at _____(sampled site)?" A 5-point response scale was offered, where 1 = not at all, 2 = moderately unwilling, 3 = neutral, 4 = somewhat willing, and 5 = very willing.

Table 1.—Experience use history (EUH) of campers at the three types of camping area opportunities

	Cherry Hill		Burrell's Ford		Ellicott Rock			
EUH Variables	M	SD	M	SD	M	SD	F	P
Years camping at site	6.73	9.42	6.89	9.25	5.68	7.46	0.04	0.527
Times camped at site last year	1.50	2.86	0.93	1.43	1.67	3.19	2.70	0.068
Total times camped at site	12.84	26.47	8.40	15.79	10.31	17.03	1.59	0.204
Years camping at other local areas	9.75	11.52	9.31	10.89	9.27	10.12	0.09	0.919
Times camped at other local areas last year	2.64	4.92	1.69	2.45	2.97	4.47	2.94	0.054
How many other local areas camped at last year	1.61	2.94	1.68	3.11	2.30	3.49	1.71	0.068

3.0 RESULTS

3.1 Comparisons across the three study sites revealed that the respective campers differed significantly in age, group composition, and primary activity at the p < 0.001 level, and in gender, education, and group size at p < 0.05.

Cherry Hill Profile. Campers at CH were older than the other two sites (M = 43 years) and consisted of more family units (45.9%). However, the size of camping group was smaller (M = 4.1 individuals) than for the walk-in (M = 5.0) and the Wilderness areas (M = 5.8). The majority of CH campers were males; but more females (35.2%) were represented in the developed campground than in the other sites. The education level of CH campers was somewhat lower than at the other two sites, with a business/trade or some college training most prevalent (29.7%). Most campers participated in hiking/walking, camping, and fishing, with their primary activity considered camping (56.2%).

Burrell's Ford Profile. The walk-in campers were the youngest (M = 34.5) and about equally represented by family, and friend groups (37.4 & 34.1%, respectively). A few more males (about 4%) were represented than at CH. Over one-half (53%) of BF campers had at least a college degree, with 23.5 percent having a graduate school degree. Large numbers of BF campers participated in hiking/walking, camping, viewing scenery, and fishing, with the primary activities being camping and trout fishing (fishing was more common at BF than at the other two sites).

Ellicott Rock Profile. The Wilderness campers averaged 38.8 years of age and consisted more of friend-groups (45.9%), with the camping parties being more male dominated (nearly 80%) than groups at the other two sites. Contrary to other wilderness research (Hendee et al. 1990), which shows party size to be smaller in wilderness, ER had the largest camping groups. Consistent with previous wilderness research, the ER campers were the most educated, with nearly 60 percent having at least a college degree. Camping and backpacking were the dominant activities; fishing was least represented among the three sites (27.9%).

3.2 Experience Use History

There were no significant differences (p < 0.05) in EUH variables among the three camping opportunities (Table 1). Camping at each of the three respective sites averaged about 7 years, 1 to 1.5 times during the last year, and a total of about 10 times for campers at the sampled site. Camping at other local areas was somewhat greater than for the study sites. Campers averaged about 9 years and 2 to 2.5 times per year (last year) at other local areas. Although not significant, ER users camped at more local areas (M = 2.3) in the last years than did the CH (M = 1.6) and BF (M = 1.7) campers.

3.3 Alternative Site Use/Potential Use

Although campers at the three sites differed somewhat in awareness and past use of some of the sites, they were consistently neutral in their willingness to substitute the sites in the future (Table 2). Concerning awareness of the sites, BF was the most well known among campers of the sites, CH was second, and ER was the least known camping opportunity. For example, at CH, 77.5 percent knew of BF; at ER, 68 percent knew of BF (Table 2). Campers at BF were the least likely to know about the other two sites (i.e., CH, 45%; ER, 31.9%). Consistent

Table 2.—Substitution behavior of campers among three types of camping area opportunities

	Cherry Hill[1]		Burrell's Ford[2]		Ellicott Rock[3]			
	N	%	N	%	N	%	χ^2	p
Campers aware of camping at Site 1	138	77.53	54	45.03	73	68.02	34.03	<0.001
Campers who have camped at Site 1	51	27.10	14	11.30	34	30.40	8.06	0.018
Campers aware of camping at Site 2	63	35.60	38	31.90	37	34.30	0.43	0.809
Campers who have camped at Site 2	13	6.90	11	8.90	6	5.43	1.88	0.390
	Cherry Hill		Burrell's Ford		Ellicott Rock			
	M[4]	SD	M	SD	M	SD	F	*p*
Willingness to substitute [5] to Site 1	3.00	1.47	3.17	1.26	3.29	1.29	0.75	0.475
Willingness to substitute to Site 2	3.11	1.38	3.53	1.11	2.96	1.28	2.59	0.079

[1] For Cherry Hill campers, site 1 = Burrell's Ford, site 2 = Ellicott Rock
[2] For Burrell's Ford campers, site 1 = Cherry Hill, site 2 = Ellicott Rock
[3] For Ellicott Rock campers, site 1 = Burrell's Ford, site 2 = Cherry Hill
[4] Means based on a 5-point scale, where 1 = not at all willing to 5 = very willing
[5] Only campers who were aware of camping opportunities at the other sites were included in the willingness to substitute analysis

with the neutrality to use the alternate sites in the future, relatively few respondents had camped at the alternate sites in the past. Concerning CH campers, 27.1 percent had camped at BF and 6.9 percent at ER; for BF campers, it was 11.3 percent at CH and 8.9 percent at ER; and for ER campers, it was 30.4 percent at BF and 5.4 percent at CH. Thus, even though the three camping alternatives are relatively close to each other (3-mile radius, 10-15 minutes) and fairly well known among campers, the campers appear to be rather loyal and distinct in their choice of camping areas-opportunities.

4.0 DISCUSSION AND IMPLICATIONS

The ultimate purpose of this research was to examine the distinctiveness of campers of three diverse camping opportunities, all located within accessible distance of each other, in terms of camper characteristics, EUH, and alternative site use behavior with respect to the three settings. The study area was somewhat unusual in that three rather diverse opportunities for camping were readily available within a 3-mile radius of each other. In addition, the majority of campers had to drive by the developed campground to reach the parking area that served both the walk-in and Wilderness sites. The basic research question that was investigated and needs to be discussed is: Is there an "average camper" that is using all three settings, and are the three camp setting opportunities justified, being so readily available, based on the characteristics, use history, and alternative use/potential use, for the three specific settings?

The data indicated that the three camp settings serve fairly distinct groups of users, based on significant differences among user characteristics. Of eight user characteristics tested, six varied significantly among the settings. Thus, the three camp settings seem to be serving different profiles of users, a reason for having a spectrum of recreation opportunities available. Most of the patterns of differences among sites demonstrated face validity, with the most primitive setting (ER Wilderness) serving a different user profile than the most developed (CH setting). The one exception to expected findings was that the largest group or party size camped in the Wilderness area, averaging nearly six people per group. Most wilderness research shows party size to average between 2 and 3 individuals per camping party (Hendee et al. 1990, Manning 1999, Roggenbuck & Lucas 1987). The larger group size for Ellicott Rock Wilderness may be explained

by the small size of the area, easy access, and use by fishing and organized groups (scouts, education). Most groups camp near the Chattooga River, characterized by level hiking and within five miles of entry trailheads.

On the other hand, EUH did not vary for the three sites. The ER was designated Wilderness in 1975, BF has been in existence since the 1960s, and CH was developed in the 1950's. Yet, the average number of years of camping at the respective sites ranged only from 5.7 to 6.9 years. While there was considerable variation (e.g., standard deviation) in the response of individual campers, none of the six indicators of past use history examined was distinct for any of the three camp settings.

Campers at the respective settings were, however, fairly distinctive in that they used primarily one of the camp opportunities, and did not alternate use freely among the three areas. Although two-thirds of ER campers and three-quarters of CH campers were aware of the BF camping opportunity, less than a third of them had ever camped at the walk-in area. It was even lower for ER and CH campers having ever used each other's setting, averaging only about 5% of users. Even when presented with the situation that "if you could not camp at the sampled site, how willing would you be to camp at the two alternate sites," most campers were neutral or undecided about camping at one of the alternate camping opportunities.

In conclusion, the data indicated that there was not an "average" camper at the three proximal camping opportunities, nor will there likely be in the future. Even when camping opportunities are located in the same geographical area, with no distance travel barriers, a spectrum of diverse camping opportunities is still necessary to meet the camping choices behavior of campers.

5.0 ACKNOWLEDGMENTS

This paper is based on the Master of Science theses of Drew and Jenny Cavin (currently doctoral students at Texas A&M University), formerly of Clemson University. Dr. James Absher of the U.S. Forest Service provided partial funding for the study.

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COMPARATIVE ANALYSIS OF THE ATTITUDES AND PERCEPTIONS OF THREE TYPES OF LAKE GEORGE BOATERS

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Abstract.—The experiences and concerns of three types of Lake George recreational boaters were assessed to see if different levels of investment and experience with the lake lead to potentially different perceptions and concerns regarding congestion, overcrowding, and safety hazards on the lake. Mail questionnaires were sent out in the summer/fall of 2005 to the three types of users: (1) residential dock owners; (2) annual boat permit holders; and (3) temporary boat permit holders. Results highlight the similarities between residential dock owners and annual boat permit holders, and the differences between these two groups and temporary boat permit holders. Residential dock owners and annual boat permit holders have a longer history of involvement with Lake George, spend more time on the Lake, and are more likely to be concerned about crowding-related and safety issues than temporary boat permit holders. Recreation planners can use the results of this analysis to inform planning and communication with stakeholders on Lake George issues and perhaps other areas with similar types of recreational boaters.

1.0 INTRODUCTION

A large study was undertaken to provide the Lake George Park Commission (LGPC) with planning information to assist it in fulfilling its legislative mission of providing reasonable public access to Lake George without congestion, overcrowding, or safety hazards. As part of the study, the experiences and concerns of three types of Lake George recreational boaters were assessed. Each of these types of recreational boaters may have different levels of investment and experience with the lake, which may lead to potentially different perceptions and concerns regarding congestion, overcrowding, and safety hazards on the lake. By understanding the potential differences between users, the LGPC can better develop a management plan for the Lake.

2.0 METHODS

Three types of Lake George recreational boaters were surveyed by mail for this study. The first group, residential dock owners, represents residential landowners with lakeshore property and recreational boats. Any residential landowner with a dock on the Lake must obtain a permit from the LGPC. We drew a systematic sample of 600 names from the 2005 permit list of 2,380 for our survey sample. The second group, annual boat permit holders (n=10,713), purchased a permit from the LGPC allowing them to use motorboats (10 hp. or more) or larger sailboats (18 ft. or more) on Lake George during the 2005 season. In drawing our sample of 600 names from this list, we excluded residential dock owners. Thus, this group represents annual users who do not own land along the Lake. The third group, temporary boat permit holders, purchased a permit from the LGPC allowing them to use motorboats (10 hp. or more) or larger sailboats (18 ft. or more) on Lake George for a day or a week during the 2005 season. We drew a systematic sample of 599 names from the 2005 list of 5,732 permit holders.

Mail questionnaires were developed based on a review of the literature (e.g., Dawson et al. 2005a, Graefe et al. 2005), and input from stakeholders. Questionnaires were reviewed by the LGPC staff and given final approval by the LGPC. The questionnaire asked about use of the Lake for recreation, satisfaction with the experience, and perceptions of potential water-based recreation issues or problems.

The temporary boat permit holders' surveys were mailed out over the course of the summer of 2005 as names became available. This strategy allowed for better recall of the trip experience than would have been obtained if we

Table 1.—Socio-demographic characteristics of survey respondents, by lake user group

User Characteristics	Residential Dock Owners	Annual Boat Permit Holders	Temporary Boat Permit Holders
		Percent	
Gender*			
Male	66.5	81.8	88.1
Female	33.5	18.2	11.9
Permanent Residence Community Type*			
Rural	19.6	19.5	28.2
Community with <5,000 people	15.4	19.2	9.1
Community with 5,000-24,999 people	34.9	40.8	40.7
Community with 25,000-1000,000 people	18.4	14.2	14.9
Community with >100,000 people	11.7	6.3	7.1
Mean Age	62.6	55.1	48.0

*Statistically significant difference between lake user groups using Chi-square test at P = 0.05.

waited until the end of the season. We anticipated that the other groups would use Lake George over the entire summer season, so mailings went out to them right after Labor Day. Up to three reminder letters were sent to nonrespondents over the course of the month following the first mailing to try to encourage their participation in the study, as advocated by Dillman (2000).

Data were entered on the computer and analyzed using the SPSS statistical package. Statistical comparisons between user groups were made using chi-square tests. Reliability and factor analysis (principal components with Varimax rotation) were used to analyze the questions on the satisfaction with the features of the 2005 recreation experience.

3.0 RESULTS AND DISCUSSION

3.1 Survey Response Rates and User Characteristics

The response rate, adjusted for undeliverable surveys, ranged from 42 percent to 60 percent. Residential dock owners had the highest response rate—60 percent with 355 usable surveys, followed by annual boat permit holders—55 percent with 329 usable surveys, and temporary boat permit holders—42 percent with 246 usable surveys.

Several variables can be used to characterize Lake George recreational boaters and distinguish between user groups. First is gender, with most responding boaters being male (Table 1). Second, the average age of survey respondents was over 45 years for all groups, but residential dock owners were by far the oldest with an average age of 63 years. The third variable we can use to characterize users is the size of the community where they live year-round. The majority of users live in rural to small communities of less than 25,000 people.

Most Lake George users do not live in the area year-round (Table 2). Residential dock owners and annual boat permit holders were most likely to be seasonal residents, with a second home or condo in the area. As expected, temporary boat permit holders considered themselves to be visitors or day-users.

Most respondents, especially residential dock owners and annual boat permit holders, have had a long association with the Lake George area—on average in the 30 to 40 year range (Table 2). Temporary boat permit holders have had on average a shorter association. Users were willing to travel substantial distances from their permanent residences to visit Lake George. The average distance traveled ranged up to nearly 300 miles, and a number of respondents traveled 2,000 to 3,000 miles.

Residential dock owners owned on average one to two motorized boats and the same number of non-motorized boats (Table 3). Annual and temporary boat permit holders were more likely to own one or more motor boats, but very few non-motorized boats. Few

Table 2.—Survey respondents' relationship and experience with Lake George, by lake user group

Users' Relationships with Lake George	Residential Dock Owners	Annual Boat Permit Holders	Temporary Boat Permit Holders
		Percent	
Residence*			
Year-round	22.3	20.1	1.2
Seasonal	77.1	57.6	28.1
Visitor/Day-user	0.6	22.3	70.7
Mean # years visited or lived in Lake George area	40.3	32.8	18.3
Mean distance (miles) from Lake George to year-round residence	299	169	220

*Statistically significant difference between lake user groups using Chi-square test at P = 0.05.

Table 3.—Boat ownership characteristics of survey respondents, by lake user group

Boat Ownership	Residential Dock Owners	Annual Boat Permit Holders	Temporary Boat Permit Holders
Mean # motorized boats	1.4	1.3	1.1
Mean # non-motorized boats	1.5	0.7	0.2
% Owning a PWC	12.4	12.5	15.6

respondents from any user group indicated that they owned a personal watercraft (PWC). Therefore, the majority of motor boats on the Lake were larger.

Boaters enjoyed a variety of activities while boating; primary among them were cruising, swimming, water skiing, and fishing. Cruising was enjoyed by more residential dock owners than other groups (87% vs. 75-80%). Swimming and fishing from the boat were enjoyed by more annual and temporary boat permit holders than residential dock owners (swimming—65-69% vs. 46%, fishing—46-51% vs. 30%).

Estimates of days boated on Lake George differed by user group. As an illustration, Figure 1 shows motorboat use (other than PWCs) for the three groups. Annual boat permit holders accounted for the largest percentage of use in all months and had especially high use in July and August. Residential dock owners used the lake in all months at a more steady rate. Temporary boat permit holders, who made up the smallest proportion of total use, were present on the lake mostly in July and August. The pattern of use among groups was the same for the other types of boats.

3.2 Satisfaction with the Recreation Experience

A list of 13 features of the Lake George recreational experience, such as "scenic beauty" and "enjoying my favorite water sports," was developed based on previous research identifying the likely range of important items (Connelly 1987, Dawson et al. 2005b) and discussions with LGPC staff. Respondents were asked to rate on a 5-point Likert-type scale their satisfaction with each feature over the course of their Lake George recreation experience in 2005. Using the results of reliability and factor analysis (63% of total variance explained), we have grouped the features into three factors for ease of discussion, and present them here in order based on the percent of variability explained by the factor.

Respondents were generally satisfied with each of the features during the 2005 season (Table 4). Most people were satisfied with the features that made up the first factor—"nature appreciation and social bonding." Very few people were dissatisfied with any of these features. This was not the case with the "high-quality environment" factor, in which up to 25 percent of respondents in some groups were dissatisfied with

Table 4.—Satisfaction with features during 2005 season on Lake George, by lake user group

Features	Residential Dock Owners	Annual Boat Permit Holders	Temporary Boat Permit Holders
		Percent	
NATURE APPRECIATION AND SOCIAL BONDING			
Scenic Beauty			
Satisfied	96.7	96.2	99.1
Neutral	1.2	1.2	0.9
Dissatisfied	2.1	2.1	0.0
Sharing the experience with my family			
Satisfied	94.5	95.7	94.9
Neutral	5.2	3.5	4.6
Dissatisfied	0.3	0.8	0.5
Enjoying the natural world			
Satisfied	88.7	89.7	94.1
Neutral	8.1	8.1	5.9
Dissatisfied	3.2	2.2	0.0
Feeling of relaxation			
Satisfied	88.1	89.4	91.9
Neutral	8.8	5.3	6.3
Dissatisfied	3.1	5.3	1.8
*Feeling of camaraderie within my group**			
Satisfied	77.2	78.1	87.0
Neutral	21.8	21.1	12.1
Dissatisfied	1.0	0.8	0.9
HIGH-QUALITY ENVIRONMENT			
Clear, clean water**			
Satisfied	70.9	83.6	94.6
Neutral	12.0	9.1	3.6
Dissatisfied	17.1	7.3	1.8
*Feeling of peace and quiet***			
Satisfied	67.9	70.4	82.3
Neutral	17.5	14.1	13.0
Dissatisfied	14.6	15.5	4.7
*Feeling safe while boating***			
Satisfied	67.8	71.5	86.3
Neutral	16.1	12.8	7.8
Dissatisfied	16.1	15.7	5.9
*Not feeling crowded by other boaters***			
Satisfied	54.2	52.7	74.2
Neutral	21.1	20.8	17.2
Dissatisfied	24.7	26.5	8.6
WATER ACTIVITIES			
*Enjoying my favorite water sports***			
Satisfied	74.3	72.0	86.2
Neutral	23.0	26.2	11.5
Dissatisfied	2.7	1.8	2.3
Opportunity for physical exercise			
Satisfied	71.7	66.4	66.0
Neutral	26.9	32.5	33.0
Dissatisfied	1.4	1.1	1.0
*Challenging my boating skills***			
Satisfied	38.1	39.3	53.8
Neutral	60.4	59.3	43.4
Dissatisfied	1.5	1.4	2.8
*The thrill of a speed boat ride***			
Satisfied	41.8	34.9	48.1
Neutral	55.2	60.2	49.9
Dissatisfied	3.0	4.9	2.0

*To increase sample sizes in each cell, we collapsed "dissatisfied" and "neutral" into one category, then found a statistically significant difference between lake user groups using Chi-square test at P = 0.05.
**Statistically significant difference between lake user groups using Chi-square test at P = 0.05.

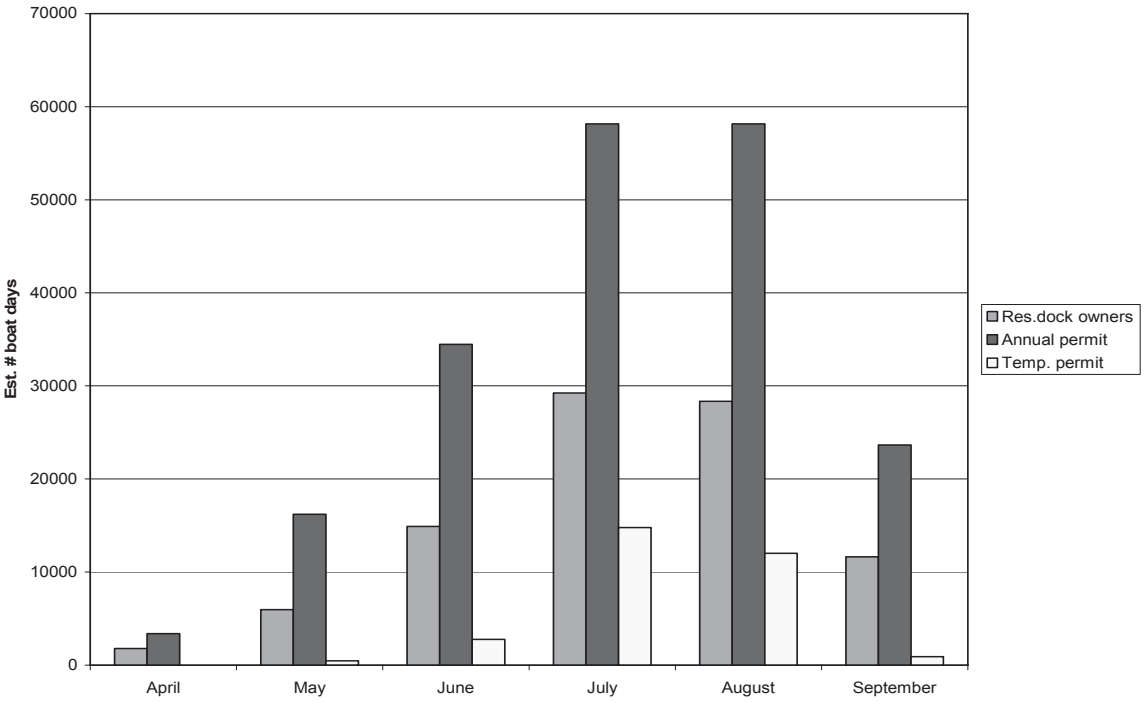

Figure 1.—Estimated number of boat days on Lake George in 2005 by month and boater type, based on respondents' recall of use listed in the mail questionnaire.

specific components. Dissatisfaction was highest among residential dock owners and annual boat permit holders on the issue of crowding and to a lesser extent feeling safe while boating. For the third factor, "water activities," respondents were generally satisfied or neutral. Very few respondents were dissatisfied with features grouped into the third factor. Generally, more temporary boat permit holders were satisfied with these features than other groups. Overall satisfaction with the 2005 Lake George experience was high, with over 90 percent of respondents indicating some level of satisfaction. Less than 5 percent of respondents were dissatisfied, and there were no significant differences between groups in terms of overall satisfaction.

The aspects that contributed most to respondents' dissatisfaction with their 2005 Lake George experience centered around feeling crowded on the water (Table 5). There were too many boaters, making too much noise, not following the rules, creating boat wakes and speeding. A number of respondents said PWCs were a problem, but did not specify why. Others indicated the problem with PWCs was that they were too noisy, running too close to shore, or going too fast. Others indicated a type of problem—noise or speed for example—but did not specify the type of boat causing the problem. Noise and PWCs were sources of dissatisfaction for more residential dock owners than for other users.

3.3 Concerns Related to Congestion and Overcrowding

Crowding at anchorages, swimming areas, and campgrounds along with related issues such as noise and rowdy behavior were seen as the biggest problems on Lake George by 27 percent of respondents. Other issues written in by respondents as being the biggest problem included conflicts between different types of boaters and too many boats on the lake. Noise from personal watercraft was considered a major problem by one-third of annual boat permit holders and residential dock owners; another third thought it was a minor problem (Table 6). Two-thirds or more of the temporary boat permit holders did not think noise was a problem from personal watercraft or other boats. This same pattern was seen for other issues associated with congestion such as rowdy behavior, where residential dock owners

Table 5.—Most common written descriptions of things that contributed most to respondents' dissatisfaction with their 2005 Lake George recreation experience, by lake user group

Things That Contributed Most to Dissatisfaction	Residential Dock Owners	Annual Boat Permit Holders	Temporary Boat Permit Holders
	Percent of respondents who wrote down something		
Overcrowding, too many boaters	26.7	33.3	26.9
Motorized noise—too much or too loud	28.1	13.0	4.8
Decline of water quality	11.1	12.5	5.8
Problems with other boaters—too rowdy, not following rules	7.4	8.9	11.5
PWCs (type of problem not specified)	13.4	7.8	2.9
Speeding by other boaters, feeling unsafe	6.0	5.2	6.7
Too expensive	3.2	3.1	8.7
Limited public access to the water	0.5	3.6	4.8
Boat wakes	4.6	3.1	3.8
Too much upland development, concerned about stormwater runoff	6.0	2.6	2.9

and annual boat permit holders were more likely than temporary boat permit holders to think there was a problem.

3.4 Concerns Related to Safety

Unsafe operation of boats, unmarked boating hazards, and the number of boating accidents or "near-misses" were seen as the biggest problems on Lake George by 16% of respondents. Two-thirds of residential dock owners and annual boat permit holders thought unsafe operation of boats was a problem on Lake George, compared with only one-third of temporary boat permit holders (Table 6). Unmarked boating hazards and the number of boating accidents or "near-misses" were not problems for most boaters.

Some respondents wrote in that they were concerned that other boaters were not aware of the rules for boating on Lake George and this lack of awareness contributed to unsafe conditions. However, when boaters were asked about their awareness of the special rules and regulations on Lake George, almost all indicated some level of awareness (Table 7). Temporary boat permit holders were the least likely to be aware of the special regulations. Some would argue that too many rules can detract from a person's enjoyment of a recreation experience, but most boaters on Lake George did not indicate that this was the situation for them. Over half of the residential dock owners and annual boat permit holders indicated that the rules added to their enjoyment of the Lake. Temporary boat permit holders were more likely to be neutral regarding the rules' effects on their enjoyment.

4.0 CONCLUSIONS

Results of this analysis appear to highlight the similarities between residential dock owners and annual boat permit holders, and the differences between these two groups and temporary boat permit holders. For almost every characteristic, perception, or concern examined, these similarities and differences existed. Residential dock owners and annual boat permit holders have a longer history of involvement with Lake George, spend more time on the Lake, and are more likely to be concerned about crowding-related and safety issues than temporary boat permit holders. Recreation planners can use the results of this analysis to inform planning and communication with stakeholders on Lake George issues and perhaps other areas with similar types of recreational boaters.

5.0 ACKNOWLEDGMENTS

Funding for this research was provided by the Lake George Park Commission.

Table 6.—The extent to which respondents found potential recreation-related issues to be a problem on Lake George in 2005, by lake user group

Recreation-related Issues	Residential Dock Owners	Annual Boat Permit Holders	Temporary Boat Permit Holders
		Percent	
*Noise from personal watercraft**			
Not a problem	27.2	34.6	68.4
A minor problem	36.4	35.0	23.6
A major problem	36.4	30.4	8.0
*Noise from other boats**			
Not a problem	25.4	43.8	77.6
A minor problem	48.2	35.0	18.8
A major problem	26.4	21.2	3.6
*Unsafe operation of other boats**			
Not a problem	32.8	35.1	67.6
A minor problem	49.3	45.9	27.0
A major problem	17.9	19.0	5.4
*Crowding at boat anchorages**			
Not a problem	74.4	54.4	76.3
A minor problem	17.9	29.1	17.2
A major problem	7.7	16.5	6.5
*Rowdy behavior of other boaters**			
Not a problem	47.8	53.6	75.9
A minor problem	39.6	32.5	21.4
A major problem	12.6	13.9	2.7
*Crowding at public boat launching sites**			
Not a problem	87.2	68.6	69.6
A minor problem	9.0	24.4	18.7
A major problem	3.8	7.0	11.7
*Activities on the water disturbing my enjoyment when I am onshore**			
Not a problem	45.3	65.6	88.3
A minor problem	38.8	24.9	9.0
A major problem	15.9	9.5	2.7
*Unmarked boating hazards**			
Not a problem	64.0	63.8	77.5
A minor problem	29.4	28.8	19.8
A major problem	6.6	7.4	2.7
*The number of boating accidents or "near-misses"**			
Not a problem	73.2	69.2	86.0
A minor problem	20.2	23.3	12.2
A major problem	6.6	7.5	1.8

*Statistically significant difference between lake user groups using Chi-square test at P = 0.05.

Table 7.—Recreational boaters' awareness of and feelings about special rules and regulations in place on Lake George, by lake user group

Awareness of Special Rules and Regulations on Lake George*	Residential Dock Owners	Annual Boat Permit Holders	Temporary Boat Permit Holders
		Percent	
Little awareness	4.3	4.3	15.9
Some awareness	35.8	39.0	49.8
Great deal of awareness	59.9	56.7	34.3
*Rules' effect on enjoyment**			
Adds	72.0	59.8	40.8
Neither adds nor detracts	22.6	31.8	45.7
Detracts	5.4	8.4	13.5

*Statistically significant difference between lake user groups using Chi-square test at P = 0.05.

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EASTERN WILDERNESS USERS: PERCEPTIONS FROM TWO SMALL WILDERNESS AREAS

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Abstract.—This study explores perceptions of wilderness recreationists in the eastern United States, with a focus on definitions of wilderness areas and factors that may decrease enjoyment of the wilderness experience. The eventual aim is to compare these data with information collected from wilderness users in the western United States. The few studies performed on this comparison over the past 25 years have produced inconsistent results and indicated a need for more research. This survey was conducted at wilderness areas in the Allegheny National Forest in Pennsylvania.

1.0 INTRODUCTION

Wilderness areas in the eastern United States are generally very different from those in the West. Eastern Wilderness areas tend to be smaller because much of the land in this region is privately owned and thus there is far less government land to designate. Eastern Wilderness areas also have largely been disturbed in the past, such as through farming or timber operations, while many of those in the West still retain their pristine state. Additionally, many eastern Wilderness areas tend to be closer to population centers and are more easily accessible than many western areas, and they usually receive higher numbers of visitors as a result. This leads to more congestion, as the larger visitation rates take place in smaller areas than in the West (Roggenbuck & Watson 1989).

As there are clearly differences between eastern and western Wilderness areas, are there differences in the users of these areas as well? Given the more congested conditions at their local Wilderness areas, would eastern users be more tolerant of encountering other people in the Wilderness? Would western users be more adamant than their eastern counterparts that the Wilderness areas they use be untouched and have no history of disturbance than their eastern counterparts? Some research has examined this topic in the past, particularly in a spurt in the late 1970s and early 1980s, but it was largely inconclusive. Some studies found that there were few differences between users from the East and those from the West (Boteler 1981, Lucas 1980, Roggenbuck 1980). Other researchers, however, found more differences between Eastern and Western Wilderness users (Donnelly et al. 1981). Little if any study has been performed on this topic since the early 1980s, and the lack of a consensus suggested a need for further study.

The goal of this study was to examine the wilderness perceptions of visitors to two small Wilderness Areas in the Allegheny National Forest. These data will provide a baseline for comparison with data collected in the future from Wilderness Areas in the Western U.S. to see if there are differences in the perceptions between the geographic regions.

2.0 METHODS

2.1 Study Area

This study was conducted at the Wilderness areas in the Allegheny National Forest in north-central Pennsylvania. This forest was established in 1923 after most of the area had been denuded of trees, and as a result is composed almost entirely of second-growth forest (Allegheny National Forest 2005). At 513,325 acres, it is the largest tract of federal land in Pennsylvania, and of that acreage, 2 percent is designated as Wilderness. The first Congressionally-designated Wilderness that was surveyed in the Allegheny was Hickory Creek Wilderness. This area was designated in 1984 and comprises 8,633 acres of previously clear-cut land. Its borders are delineated by a paved state-maintained road and a gravel U.S. Forest Service Road. It is adjacent to Heart's Content Scenic Area, which also serves as a trailhead. Heart's Content has proved to be an effective site for studying the Hickory Creek Wilderness (Graefe et al. 2000). The second Wilderness area studied was the Allegheny Islands

Wilderness. Like Hickory Creek, it was established in 1984. This Wilderness area comprises seven islands that stretch along 56 miles of the Allegheny National Wild and Scenic River. Some of these islands were formerly farmland, while others have always been wetlands. The total size of the islands is 368 acres, which makes this area one of the smallest Wilderness reserves in the United States (Allegheny National Forest 2005). To the west of the river lie numerous farms, roads, and towns. U.S. Route 62 parallels the river to the east, and traffic counts conducted as part of the National Visitor Use Monitoring (NVUM) survey indicated that an average of 2,000 vehicles, including many commercial trucks, use this highway each day. These reserves were of special interest in this study because of their small size and former use. They are quite different from the traditional western Wilderness areas that covers tens or hundreds of thousands, or even millions, of acres of relatively pristine landscape, such as the Bob Marshall Wilderness in Montana, Frank Church-River of No Return Wilderness in Idaho, and the Gates of the Arctic Wilderness in Alaska. A glance at a map reveals that these preserves are all several times larger than the entire Allegheny National Forest. There is no spot in the Allegheny Islands Wilderness where a visitor cannot see development on either side of the river or at least hear the traffic on Route 62. Hickory Creek is quieter because of its more secluded location and larger size, but inside, visitors will find the remains of an old World War II-era artillery range and other signs of former use.

2.2 Survey Methods

The survey was performed in conjunction with the 2005 NVUM Survey conducted by the U.S. Forest Service in the Allegheny National Forest. This survey, held every five years in each national forest, is designed to elicit information about visitor demographics as well as what types of activities recreationists are doing in the forest and how long they are staying. The Wilderness surveys were conducted on 20 different days during the summer and early fall of 2005. For Hickory Creek, the survey sites were at Heart's Content trailhead and along Forest Road 119, which borders the Wilderness. Surveys for the Allegheny Islands were performed at canoe pullouts along the Allegheny River. Additional survey days were added to the NVUM survey days assigned to those locations by the Forest Service, which were randomly chosen. Interviewees were self-identified Wilderness users, and were further screened to ensure that they had indeed visited a Wilderness. This second step became necessary when it was noticed very early on, especially at Heart's Content—which unlike the adjacent Wilderness area contains a tract of old-growth trees—that many visitors believed they had been in the Wilderness when in fact they had not. All interviews were conducted as visitors were finished with their recreational experience and preparing to leave the site.

2.3 Survey Design

The first part of the survey contained six statements about Wilderness areas and interviewees were asked to identify on a Likert-type scale of 1 to 5, with 1 being "strongly disagree" to 5 being "strongly agree," how much they agreed with the statements. These statements were devised to reflect ideas codified in the Wilderness Act of 1964 (Wilderness Society 2005), as well as isolate some conditions in Eastern Wilderness areas that may be different from those in the West, such as prior development.

The second part of the survey was designed to determine how encountering certain situations in a Wilderness area might detract from the user's experience. This detriment was measured on a Likert-type scale of 1 to 5, with 1 being "no bother" to 5 being "major annoyance." Again, many of these situations were selected based upon how conditions vary between the East and West, such as congestion along trails (Roggenbuck and Watson 1988) and distances from population centers. Many of these potentially detrimental conditions were also taken from previous studies, such as encountering campfire rings in the wilderness (Roggenbuck and Watson 1993) and hearing noise from passing aircraft while in a wilderness (Fidell et al. 1996, Tarrant et al. 1995).

3.0 RESULTS

This survey produced 49 responses in the Allegheny National Forest Wilderness areas in the summer of 2005. One interviewee from California was not included in this study owing to his Western roots. Most respondents came from over 100 miles away, with the majority coming from western Pennsylvania and eastern Ohio. Some items

Table 1.—Results of Survey in the Allegheny National Forest

	Mean	Standard Dev.
Statements about Wilderness areas		
1=Strongly disagree 3=Neurtral 5=Strongly Agree		
A wilderness area is one that is free of human disturbance	4.69	0.72
A wilderness area is one that has always been free of human disturbance	3.60	1.36
A wilderness area is a place where nature is primarily in control	4.77	0.59
A wilderness area is a place that needs to be specifically designated as such by the government	2.85	1.65
A wilderness area is a difficult place to access	2.94	1.21
A wilderness area is a danger place	2.35	1.16
Detrriment to Wilderness experience		
1=No bother 5=Severe detriment		
Seeing other people	2.75	1.23
Hearing other people	3.31	1.24
Seeing development outside of the wilderness area from within	4.08	1.20
Hearing development outside of the wilderness area from within	4.40	1.03
Seeing trails	1.27	0.74
Seeing fire rings or other signs of previous camping	1.92	1.18
Seeing items left behind by others	4.85	0.55
Seeing aircraft overhead	2.56	1.40
Hearing aircraft overhead	2.81	1.47
Encountering dogs	2.04	1.34
Encountering horses or other pack animals	2.15	1.37

showed a strong consensus among the users, such as distaste at finding items left behind by others, satisfaction in finding trails, and agreement with the statements that Wilderness areas are places free from human development and are areas where nature is primarily in control. There was less agreement about other questions, such as the need for government designation of Wilderness areas, the effects of seeing and hearing aircraft overhead, and the presence of dogs and horses in the Wilderness. Full results are shown in Table 1.

The gathering of data proved more difficult than had been anticipated, as is reflected in the low sample size. One difficulty was that many visitors who believed they had visited a Wilderness area had in fact visited the old-growth forest at Heart's Content, which is not designated as Wilderness. Thus, they were not eligible for the survey even though many wanted to take it. Second, Forest Service personnel stated that the Allegheny seemed to be experiencing lower-than-normal visitation during the summer of 2005. They attributed this to rainy and cold weather that lasted late into the season, as well as the surge in gasoline prices experienced during that summer. Third, there seemed to be low wilderness usage in general. Even during the Memorial, Independence, and Labor Day holidays, which were by far the busiest times of visitation in the Allegheny National Forest, the parking area at Hickory Creek was far from full. Randomly selected weekend days also hinted at low usage. Finally, many of the sites chosen by the Forest Service for the NVUM survey along the Allegheny River proved to be less than ideal for gathering data from Wilderness users. Most river sites selected were public boat and canoe access points run by the Pennsylvania Fish and Boat Commission. However, observations over the summer indicated that the majority of canoeists using the Allegheny River Islands access the river via privately run canoe services. These businesses own property along the river, which canoeists use as their pullouts. As very few survey days were scheduled at these privately owned

canoe pullouts, the number of respondents for both the NVUM and our Wilderness survey along the river were very low. Only six of the 48 Wilderness surveys collected came from the Allegheny Islands.

4.0 CONCLUSION

It appears that few people visited the Wilderness areas of the Allegheny National Forest in 2005. Of those who did, most agreed on some statements about Wilderness areas and situations that could detract from their Wilderness experiences, but disagreed on others. In general, visitors to the Hickory Creek and Allegheny Islands Wildernesses share the traditional view that Wilderness areas are free of development and human disturbance.

In the summer of 2006, it is hoped that this survey can be conducted at Wilderness sites in the Mt. Hood National Forest and Columbia River Gorge National Scenic Area in Oregon, as well as possibly in Alaska. The same questions will be asked, and the data will then be compared with that gathered from the eastern U.S. to determine if any regional trends can be detected.

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FROM LANDSCAPES TO SOUNDSCAPES: UNDERSTANDING AND MANAGING NATURAL QUIET IN THE NATIONAL PARKS

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Abstract.—Research at Muir Woods Natural Monument suggests that soundscapes are an important component of parks and outdoor recreation, that human-caused noise is a potentially important indicator of quality for park soundscapes, and that visitors have normative standards for the maximum acceptable level of human-caused noise in parks. Formulating indicators and standards of quality may be a useful way of understanding and managing park soundscapes.

1.0 INTRODUCTION

A growing body of research and management experience documents the potential impacts of outdoor recreation in national parks and related areas. For example, visitors can trample fragile vegetation, erode soils, pollute water, and disturb wildlife (Hammitt & Cole 1998). Moreover, there are often aesthetic implications of these impacts that can degrade the quality of the visitor experience (Manning et al., 2004).

Research and management attention is now being extended to include aural impacts of outdoor recreation. "Natural quiet"—the sounds of nature undisturbed by human-caused noise—is now being recognized as an important and endangered resource in parks and related areas. In particular, human-caused noise can mask the sounds of nature and detract from the quality of the visitor experience. The U.S. National Park Service has recently created a Natural Sounds Program to help manage soundscapes in national parks, and has revised its management policies to address the importance of this resource:

> The National Park Service will preserve, to the greatest extent possible, the natural soundscapes of parks. Natural soundscapes exist in the absence of human-caused sound. The natural soundscape is the aggregate of all the natural sounds that occur in parks, together with the physical capacity for transmitting sounds. The Service will restore degraded soundscapes to the natural condition whenever possible, and will protect natural soundscapes from degradation due to noise (undesirable human-caused noise). (National Park Service Management Policy 4.9).

One way to understand and manage soundscapes in parks and related areas is to adapt the framework of indicators and standards of quality (Manning 2004). Indicators of quality are measurable, manageable variables that can be used to help define the condition of park resources and the visitor experience. Standards of quality define the minimum acceptable condition of indicator variables. Once indicators and standards of quality have been formulated, indicator variables are monitored and management actions are taken to ensure that standards of quality are maintained. This approach is central to contemporary park and outdoor recreation management frameworks, including Limits of Acceptable Change (Stankey et al. 1985) and Visitor Experience and Resource Protection (National Park Service 1997, Manning 2001). The objective of this study was to help formulate soundscape-related indicators and standards of quality.

2.0 THE STUDY

The study was conducted at Muir Woods National Monument, California. Muir Woods was established as a unit of the national park system in 1908 to preserve an impressive stand of 1,000-year-old coast redwood trees. The park is small by national park standards (just over 500 acres), but is visited very intensively, accommodating over a million visits annually. The park offers six miles of trails, and visitors are required to stay on trails to help protect fragile soils, vegetation, and other resources. The park's main trail network, along Redwood Creek on the floor of the canyon, is hardened with paving or wooden boardwalks.

3.0 PHASE 1 RESEARCH

An initial phase of research was conducted in August 2003. The primary objective of this phase of research was to identify potential indicators of the quality of the visitor experience at Muir Woods. An exit survey of a representative sample of 406 visitors was conducted. A series of open- and close-ended questions was asked, including "What did you enjoy the most about your visit to Muir Woods?" and "What did you enjoy the least about your visit to Muir Woods?" Many respondents reported that soundscape-related issues were important in affecting the quality of their experience. For example, many respondents reported that they enjoyed the "quiet" and "peacefulness" of the park and "hearing the sounds of nature." Many respondents also reported that hearing human-caused noise in the park was the least enjoyable aspect of their experience. These findings suggest that soundscape-related issues are potentially important indicators of quality for Muir Woods.

3.1 Phase 2 Research

A second phase of research was conducted in July 2005. The primary objective of this phase of research was to identify indicators of quality for the soundscape of Muir Woods. A purposive sample of 280 visitors to Muir Woods was asked to participate in a "listening exercise." Visitors were asked to sit at selected locations in the park and, using a checklist provided, record the types of natural and human-caused sounds they heard. For each type of sound heard, respondents were asked to rate on a nine-point scale how pleasing (+4) or annoying (-4) they found these sounds.

Study findings are summarized in Figure 1, which plots the percentage of respondents who heard each type of sound by how pleasing or annoying that sound was evaluated. This figure is analogous to an importance-performance framework (Mengak et al. 1986, Hollenhorst and Stull-Gardner 1992, Hollenhorst et al. 1992, Hollenhorst and Gardner 1994). Sounds heard by large percentages of visitors and that are evaluated as highly annoying are good potential indicators because they can be important in influencing the quality of the visitor experience. Likewise, sounds heard by a large percentage of visitors and that are evaluated as highly pleasing are also good potential indicators. Data from Figure 1 suggest that sounds constituting the former group include visitor-caused noise such as strangers talking, conversations within large groups, and loud children. Sounds constituting the latter group include wind blowing through the trees, water rushing in Redwood Creek, and bird songs.

3.2 Phase 3 Research

A third phase of research was conducted in August 2005. The primary objective of this phase of research was to help identify standards of quality for soundscape-related indicators. Normative theory and related research methods were used for this purpose. Norms are a theoretical construct that have a long tradition and are widely used in sociology and the social sciences more broadly (Vaske and Whittaker 2004).

As the word suggests, norms represent what is considered "normal" or generally accepted within a cultural context (Johnson 2000). If visitors have norms about acceptable conditions in parks and related areas, then such norms can be used to help define standards of quality. Normative research in outdoor recreation has been widely used to study crowding in parks and related areas (Shelby and Heberlein 1986, Whittaker and Shelby 1988, Shelby et al. 1988, Patterson and Hammitt 1990, Williams et al. 1991, Vaske et al. 1996, Manning et al. 1996a, 1996b, Manning 1997, Manning et al. 1998, Jacobi and Manning 1999), and has also been used to study environmental impacts of outdoor recreation (Shelby et al. 1988, Manning et al. 2004), minimum stream flows (Shelby and Whittaker 1995), wildlife management (Zinn et al. 1998, Zinn et al. 2000, Wittmann et al.

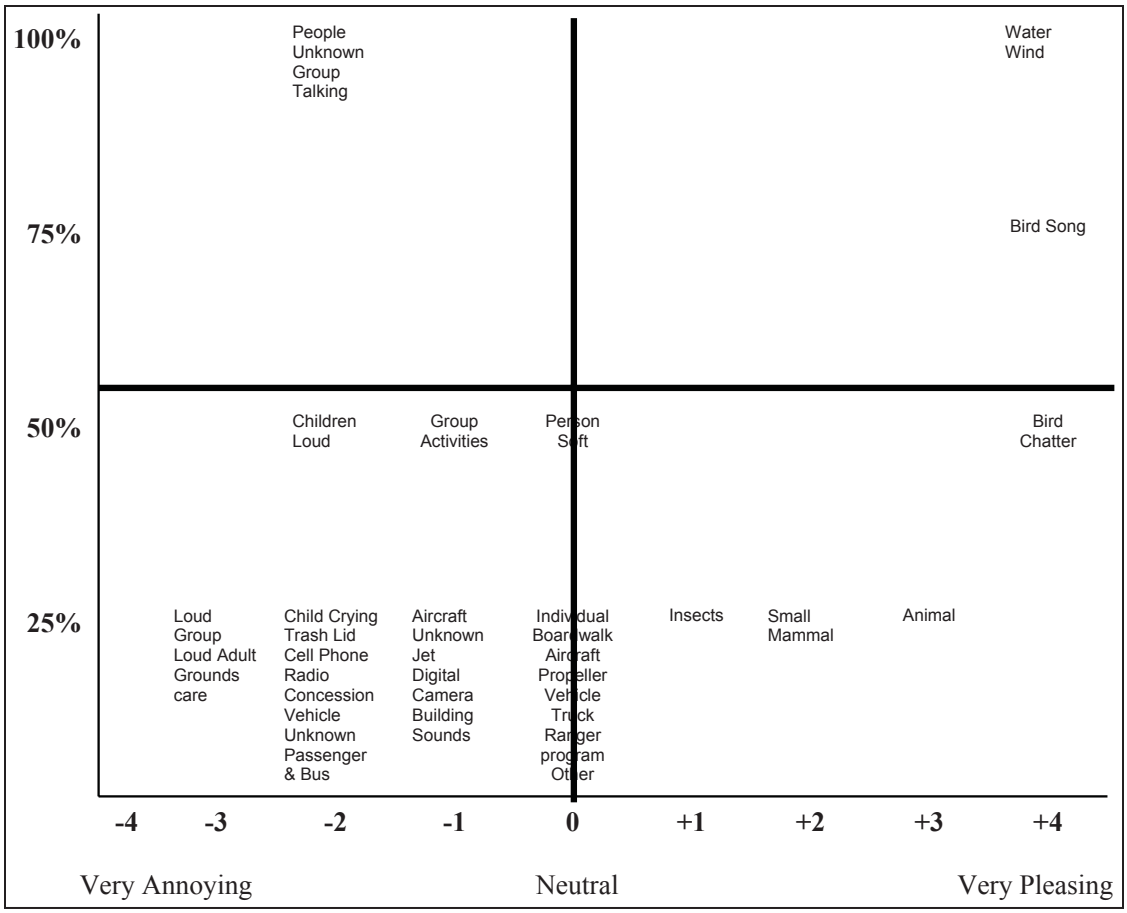

Figure 1.—"Importance-Performance" Analysis of Sounds Heard at Muir Woods.

1998. Whittaker 1997), and fire management policy (Bright et al. 1993, Kneeshaw et al. 2004).

To measure normative standards of quality for the soundscape-related indicators identified in Phase 2 research, a series of five 30-second tape recordings was prepared. These tapes were prepared using recordings of natural and human-caused sounds in the park. The first tape represented the park's natural soundscape of wind, water, and bird songs. The next four tapes overlaid tracks of increasing levels of visitor-caused sounds, including talking and boisterous behavior. These tapes were incorporated into a visitor survey by asking respondents to listen to each tape and evaluate their acceptability using a nine-point response scale anchored at "very unacceptable" and "very acceptable." The survey was administered to a representative sample of 298 visitors as they exited the park.

Resulting data were graphed as shown in Figure 2. This "social norm curve" plots the average acceptability rating for the sample for each of the five study tapes. Average ratings fall out of the acceptable range and into the unacceptable range between tapes 2 and 3, and this point may represent a threshold or minimum standard of quality. Selected sound metrics associated with each study tape are also plotted on the X axis of the graph.

A final question asked respondents to indicate which of the study tapes best represented the soundscape conditions experienced in the park. Findings are shown in Table 1 and suggest that human-caused noise in the park is approaching the threshold of normative acceptability identified in Figure 2.

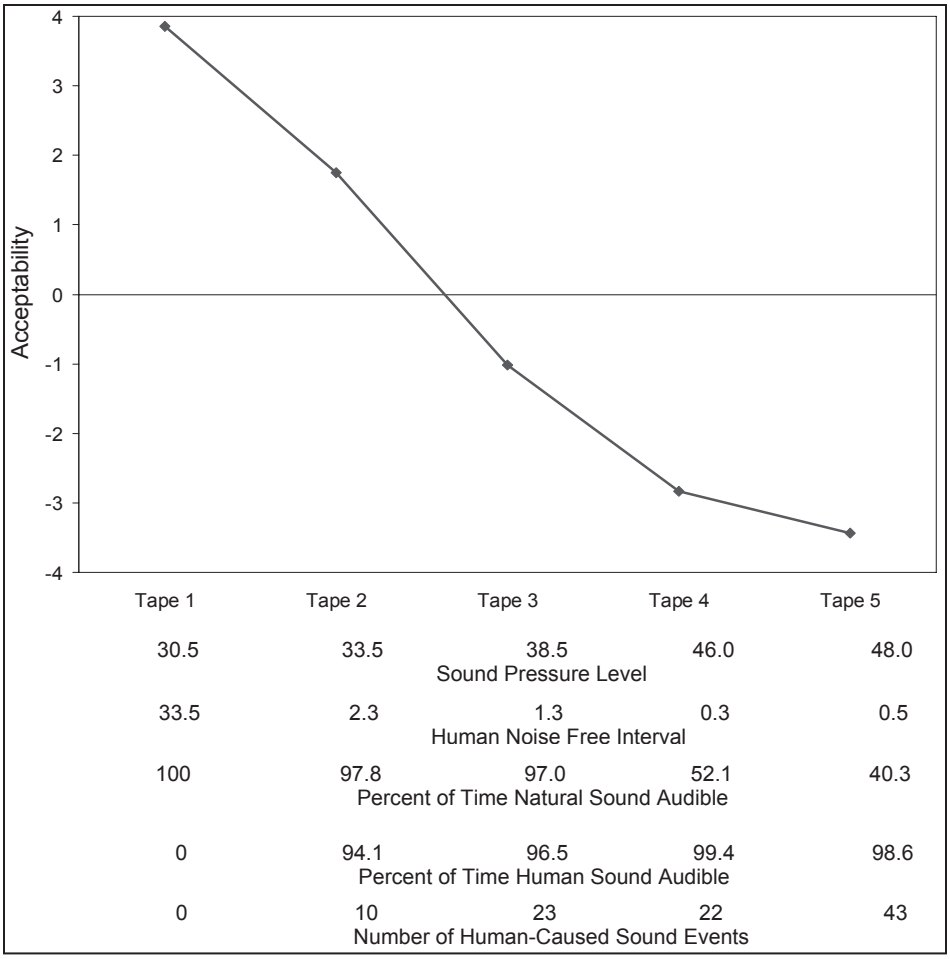

Figure 2.—Social Norm Curve for Sounds at Muir Woods.

4.0 CONCLUSIONS

"Natural quiet" is increasingly being recognized as an important and scarce resource in parks and related areas. Moreover, the ability to hear the sounds of nature without distractions of human-caused noise can affect the quality of the visitor experience.

Thus, soundscapes may be an important component of managing parks and outdoor recreation, and human-caused noise may be an important indicator of quality of park soundscapes. Study findings suggest that visitors have normative standards regarding the maximum acceptable level of human-caused noise in parks and that such measures may be useful in formulating soundscape-related standards of quality. Data from Muir Woods suggest that current levels of human-caused noise are approaching normative standards of acceptability.

Table 1.—Study tape that most closely represents the conditions experienced in the park

	Frequency	Percent
Tape 1	50	17.9
Tape 2	189	67.5
Tape 3	35	12.5
Tape 4	6	2.1
Tape 5	0	0.0

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MOTORIZED RECREATION IN PENNSYLVANIA

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Abstract.—Pennsylvania's Department of Conservation and Natural Resources (DCNR) has been developing management plans to deal with the growing popularity of motorized recreation in the Commonwealth. Two important segments of off-highway vehicle use in Pennsylvania involve all-terrain vehicles and snowmobile riding. A pair of needs studies for these recreationists provides a unique opportunity to compare and contrast their needs and activities. While there are many similarities between the two, snowmobiles have a longer history of activity, which is reflected in the availability of trails. Consequently, snowmobile riders express the greatest needs in terms of trail system maintenance. Conversely, ATV riders have fewer places to ride and identified new trails as their principal need.

1.0 INTRODUCTION

Motorized recreation is growing in popularity in Pennsylvania as well as in the rest of the United States. A pair of studies of the recreation needs of two motorized audiences offers a unique opportunity to compare and contrast two of the principal groups involved in these activities—snowmobile and all-terrain vehicle (ATV) riders.

This paper will examine the differences and similarities in the needs and characteristics of these two audiences. Contrasts will be presented only where they were both statistically significant and substantive.

1.1 Background

Pennsylvania has one of the largest rural populations in the U.S. Motorized recreation is an important activity in the state. Between 1990 and 2003, the number of participants grew by 50 percent from 1 million to 1.5 million people (PA Department of Conservation and Natural Resources 2004). Only wildlife viewing registered a greater increase during this period. Over 600,000 people identified themselves as ATV riders, while 400,000 indicated that they had ridden a snowmobile during 2003.

Act 68 of 2001 amended Chapter 77 of the Pennsylvania Vehicle Code to allow the Department of Conservation and Natural Resources (DCNR) to better regulate the use of ATVs and snowmobiles in Pennsylvania. In conjunction with this amendment, the Snowmobile and ATV Advisory Committee (SAAC) was created to advise DCNR on snowmobile and ATV recreation. Almost 174,000 ATVs and 46 thousand sleds were registered in the Commonwealth in 2003.

2.0 PROCEDURES

The two audiences were surveyed using a modified Dillman protocol (Dillman 1978). A six-page survey accompanied by a pre-addressed, postage-paid return envelope was sent to 3,000 ATV owners using a mailing list provided by DCNR during the first week of October 2003. Non-respondents were contacted two weeks later with a postcard reminder and again, two more weeks later with an additional mailing containing another copy of the survey. A similar procedure was followed for snowmobile owners, with the first mailing going out in September 2005.

3.0 RESULTS

A total of 1,357 usable returns was obtained from ATV owners (Lord et al. 2004). Net of undeliverable addresses, a response rate of 47 percent was obtained. Registered snowmobile riders returned 1,410 surveys for a response rate of 48 percent, net of undeliverables (Lord et al. 2006). In each case, the high response rate was credited to the quality of the mailing lists provided by DCNR and to the direct interest of the survey audience.

3.1 Rider characteristics

The average snowmobile household had 2.5 sleds and 2.8 riders, as compared to 1.6 ATVs and 2.5 riders in ATV households. Snowmobile households were more likely to have family incomes over $50,000 than were ATV households (70% vs. 57%) (Figure 1). Both audiences, however, had a bimodal age distribution with a main peak in the 40 to 49 year age range and a minor peak in

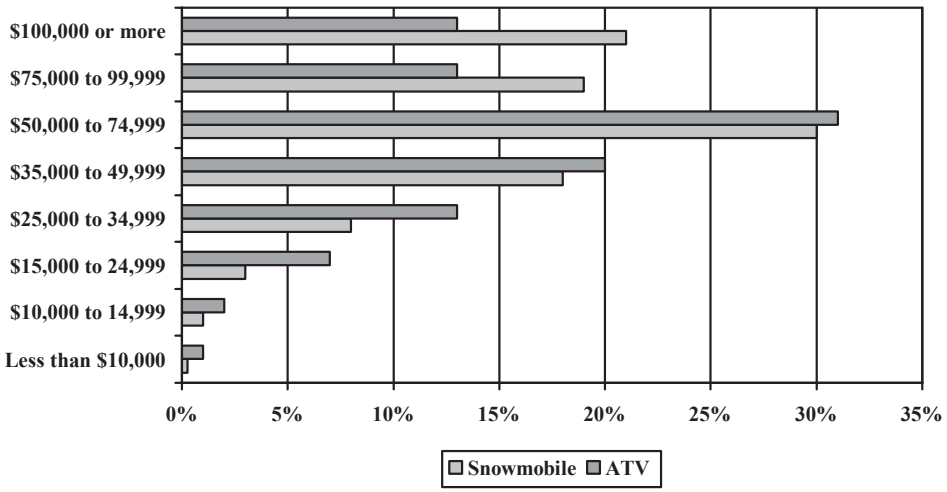

Figure 1.—Family income profiles of ATV and snowmobile households in Pennsylvania.

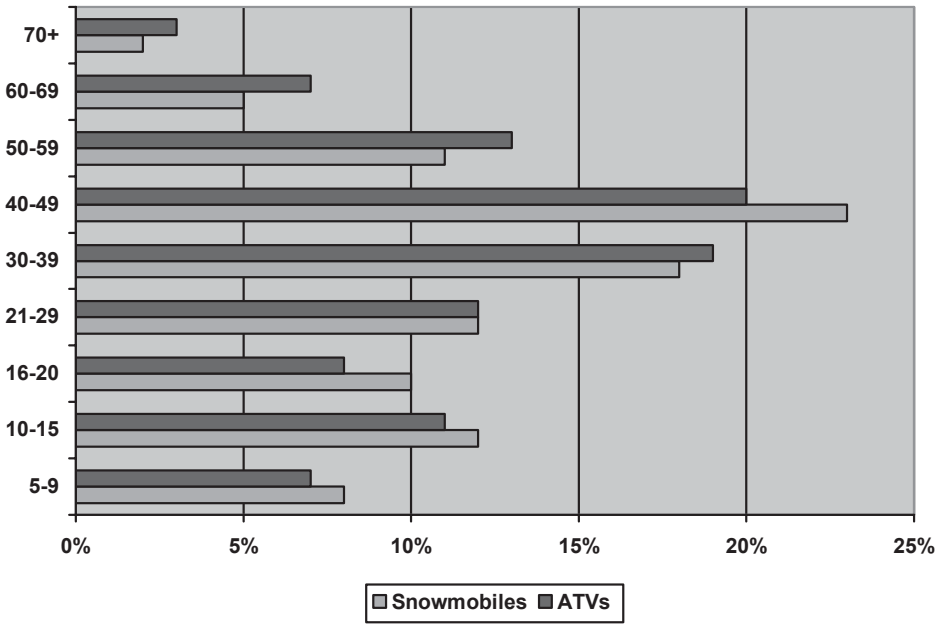

Figure 2.—Age profile of snowmobile and ATV riders in Pennsylvania.

the 10 to 15 year age range (Figure 2). This pattern was interpreted as an indicator of the family orientation of this activity for many users.

Perhaps reflecting the longer time their machines have been available, snowmobile riders had more years of experience. The median was 20 years for snowmobile owners and 9 years for ATV owners. One-quarter of snowmobiling owners had over 30 years of experience, as compared to 16.5 years of experience for ATV owners. At the other end of the spectrum, one-quarter of snowmobile owners had at most 8 years of experience, contrasting with less than four years for ATV owners.

The respondents were asked to identify the activities they participated in using their machines (Figure 3). ATVs were much more likely than snowmobiles to be used for hunting (58% versus 6%) and for utility and work (61% vs. 6%). ATV riders were less likely than snowmobile riders to identify themselves as participating in aggressive trail riding (21% versus 34%) or in sport riding (32% versus 42%).

When asked if they or family members had ever been involved in an accident with their machines, snowmobile riders had much higher incident rates than did ATV riders (Table 1). Respondents who owned snowmobiles

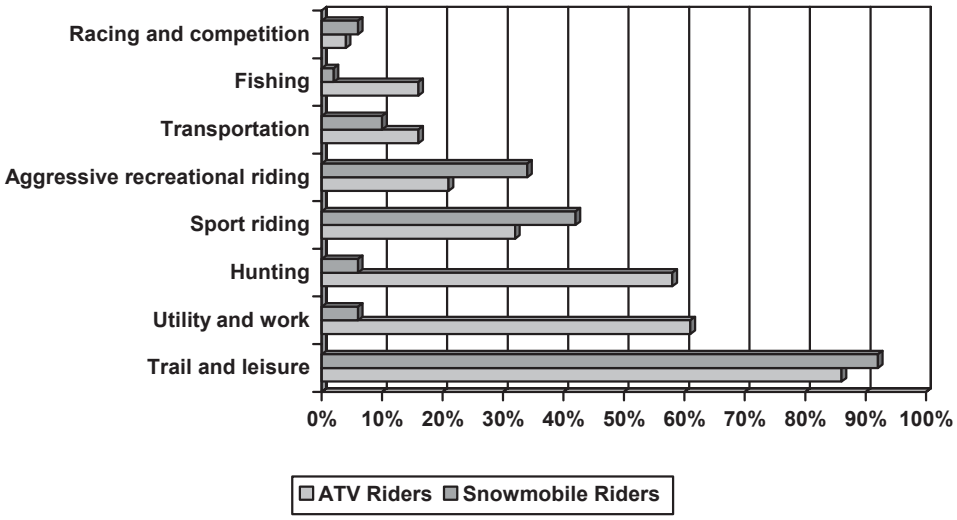

Figure 3.—ATV and snowmobiling activities in Pennsylvania.

Table 1.—Incidents while riding snowmobiles and ATVs in Pennsylvania

	ATV riders		Snowmobile riders	
	Respondent	Household Member	Respondent	Household Member
Overturn	29%	19%	42%	29%
Collision w/obstacle	17%	14%	25%	18%
Collision w/vehicle	3%	3%	6%	4%
Loading/ unloading	2%	2%	3%	2%

reported more overturns (42% vs. 29%), collisions with obstacles (25% vs. 17%), collisions with vehicles (6% vs. 3%), or accidents while unloading (3% vs. 2%). Reported incidents among household members followed a similar pattern, but were noticeably lower than what the respondents reported for themselves. For example, only 19 percent of ATV respondents reported that a member of the household had an overturn (vs. 29% of respondents) and 29 percent of snowmobile household members were reported to have had an overturn (compared to 42% of respondents).[1]

ATV owners were much less likely to be a member of a riding club or organization (8.5% of respondents) than snowmobile owners (45% of respondents), perhaps reflecting the success of snowmobile groups in organizing networks of trails across private lands and the length of time snowmobiles have been around.

3.2 Needs

The two user groups' responses to questions about their recreation needs reveal the current status of trail systems available to each group (Table 2). Of primary importance to ATV owners was the establishment of new trails, with 79 percent ranking it as important or very important on a five-point scale. Maintaining existing trails fell lower, with 73 percent ranking it as important or very important. While snowmobile riders felt that new trails were important (74%), they had greater needs for trail maintenance (90%), grooming (84%), and snow left alongside dual-use roads (78%).

When asked about the length of trails they prefer, both groups attached primary importance to long trails

[1]The author reflects upon his own youth, when he never told his father about any negative incident unless absolutely unavoidable.

Table 2.—ATV and snowmobile needs in Pennsylvania - trail amenities

Snowmobile	ATV
Maintain existing trails – 90%	New trails – 79%
Trail system enhancements – 86%	Trail system enhancements – 75%
Trail grooming – 84%	Access to secondary roads – 74%
Access to secondary roads – 84%	Maintaining existing trails – 73%
Snow along side roads – 78%	Support facilities – 56%
New trail systems – 74%	Increased maps, signage – 56%
Access to pipelines – 74%	Increased trail safety – 50%
Access to services – 73%	Trails with camping areas – 43%
Increase maps/signage – 70%	Camping areas at trailheads – 38%
Increased trail safety – 57%	Access to communities – 35%
Support facilities – 54%	
Increased law enforcement – 27%	

(68% of snowmobile riders and 60% of ATV riders). However, snowmobile riders' responses indicated that they were more used to traveling to ride than were ATV owners. Snowmobile owners did not rate trails close to home as highly as did ATV owners (84% vs. 74% important or very important). Snowmobile owners ranked weekend opportunities higher than day trips (67% vs. 56% important or very important), while ATV owners reversed the order (day trips—60%; weekend opportunities—50%).

3.3 Tourism

Questions about travel habits and expenditures show that snowmobile riders were more likely to travel in search of snow and riding opportunities than were ATV owners. Snowmobile owners average 4.3 day trips and 3.0 overnight trips out-of-state, while ATV owners reported 1.4 day trips and 1.1 overnight trips outside of the Commonwealth. These results then reflected in their annual gasoline purchases. Snowmobile owners reported buying an average of 84 gallons while out-of-state for their sleds and another 118 gallons to transport them while ATV owners indicated an average of 12 gallons purchased out-of-state for their machines and another 36 gallons to transport them.

The average trip out of state for ATV riding cost $500 per household. Snowmobile owners reported expenditures of over $900 per household (Table 3). With the exception of miscellaneous expenses, snowmobile riders had higher trip expenditures in every category. This trend continues with annual equipment purchases, where snowmobile riders spent an average of $4,000 on vehicles, while ATV riders averaged $3,000.

4.0 SUMMARY AND CONCLUSIONS

The two groups, while similar in many ways, displayed some distinct differences. Many of the differences seemed to be related to the length of time their activity had been established and the cost of participating, including the proclivity of snowmobile riders to travel in search of better snow.

Demographically, snowmobile owners tended to have higher incomes and have more experience in their sport. It was speculated that the latter contributed to the higher number of accidents reported by snowmobile riders. They also tended to own more machines than did the ATV owners. Both groups had strong family-related

Table 3.—Average snowmobile and ATV expenditures for out-of-state trips

Expense	Snowmobile	ATV
Gasoline or oil for snowmobile/ATV	$166.13	$45.12
Gasoline or oil for vehicle	$175.31	$124.95
Repairs or maintenance	$64.52	$30.64
Food	$185.99	$112.47
Lodging	$248.27	$161.23
Fees	$76.29	NA
Other	$16.23	$27.54
Total	$932.74	$501.95

demographics. ATV owners were less likely to be a member of an associated organization or club.

The concerns of snowmobile owners were centered around trail maintenance and grooming issues. Many of their trails involve joint use roads, so snowplowing and the amount of snow left on the side of the road are concerns for them. ATV riders, on the other hand, are much more concerned with the number and location of trails available for their use.

Finally, these results demonstrate the need to differentiate between the needs of the various segments of the off-highway vehicle audience. The differences highlighted above show that ATV and snowmobile riders have distinct needs in terms of trail features and amenities. It is important that managers treat each segment of the off-highway vehicle audience as a unique group with their own distinct characteristics.

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Contains articles and posters presented at the 2006 Northeastern Recreation Research Symposium. Contents cover tourism marketing, fish and wildlife, place meaning, leisure and gender, recreation resource allocation, nature-based tourism, methods, leisure motives, outdoor recreation management, tourism impacts, outdoor recreation among specific populations, leisure constraints, environmental attitudes and values, leisure cognition, environmental education and experimental learning, wildland-urban interface issues, and attribute evaluation and preference.

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Published by:
USDA FOREST SERVICE
11 CAMPUS BLVD SUITE 200
NEWTOWN SQUARE PA 19073-3294

August 2007

For additional copies:
USDA Forest Service
Publications Distribution
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Delaware, OH 43015-8640
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Manuscript received for publication 7 December 2006

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