

VISITOR SATISFACTIONS: BACKCOUNTRY AND WILDERNESS USERS IN THE WHITE MOUNTAIN NATIONAL FOREST

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Abstract: The opportunities and conditions sought by visitors in national forest backcountry and wilderness areas can affect the satisfaction they have with the experience. This study measured the recreation satisfaction ratings of hikers and backpackers during their trips to backcountry and wilderness areas in the White Mountain National Forest. Field interviews were conducted with 385 visitors to seven backcountry and wilderness areas during July 1, through September 4, 2000. An importance/satisfaction analysis compared satisfaction ratings with the important opportunities and conditions that were sought by visitors. Information about recreation resource management problems encountered by visitors was analyzed to provide comparisons with visitor satisfaction ratings. The study results indicate that: (1) hikers and backpackers rate similar opportunities and conditions as important across primitive and semi-primitive non-motorized Recreation Opportunity Spectrum areas; (2) hikers and backpackers achieve similar types and amounts of satisfaction across primitive and semi-primitive non-motorized Recreation Opportunity Spectrum areas; and (3) some differences in hiker and backpacker ratings of importance and satisfaction, plus problems perceived by users suggest the need for some additional indirect visitor management (e.g., information for visitors).

Introduction

Increasing recreational use in some backcountry and wilderness areas are a concern for managers, since crowding and more user-user encounters can negatively influence recreation visitor experiences and satisfactions. Furthermore, as a result of increased visitor use, some environmental and social conditions in backcountry and wilderness areas may be below the standards necessary to maintain Recreation Opportunity Spectrum (ROS) criteria

for primitive and semi-primitive non-motorized classification.

The ROS was designed as a regional, recreation planning tool to help planners and managers to conduct inventories, design target management standards, decide among alternative management actions, and provide a larger framework and context for multiple use recreation resource planning (Brown et al., 1978; Driver & Brown, 1978; Clark & Stankey, 1979a; Driver et al., 1987). These developments in the ROS concept lead to the adoption of the ROS by the USFS and subsequent publication of the planning concept in U.S. Forest Service planning and management documents, such as the "ROS Users Guide." The use of the ROS planning approach can help planners and managers to design management standards, decide among alternative management actions, and provide a larger planning framework and context for developing a continuum of backcountry and wilderness-related outdoor recreation opportunities. However, some would argue that use of the ROS has been superficial due to lack of understanding about its interaction with management actions and visitor experiences.

While the ROS has gained some use as a recreation planning and management tool among federal land managing agencies, visitor information related to ROS classifications is very limited. For example, the impacts of recreation activities and the acceptability of those impacts within the ROS classified areas have been studied (Clark & Stankey, 1979b) as well as the interactions of the ROS setting attributes and recreational activities in relation to user experiences (Virden & Knopf, 1989). A few other studies have investigated how campers' experiences affected their preferences for different ROS classes (Yuan & McEwen, 1989) and visitor preferences for ROS setting components (Heywood, 1991). Wallace and Smith (1997) conducted a study that measured the motivations, setting preferences, and preferred management actions of visitors to protected areas in Costa Rica; the study included "primitive", "semi-primitive motorized", and "roaded natural" areas and offers some insight into measuring related to the present study.

The objectives of this study are to measure: (1) the opportunities and conditions sought by hikers and backpackers in national forest backcountry and wilderness areas; (2) the satisfaction ratings of hikers and backpackers during their trips to backcountry and wilderness areas; and (3) the recreation resource management problems as perceived by hikers and backpackers during their trips to backcountry and wilderness areas.

Research Methods

The study design relied upon brief, on-site interviews of hikers and backpackers during their trips in seven wilderness and non-motorized, backcountry areas of the White Mountain National Forest (WMNF) in New Hampshire and Maine. This data collection technique ensured that visitor responses to survey questions reflected their actual on-site recreation experience. A survey

instrument was designed to gather most of the data in this study during a 15-minute interview in the field by a trained interviewer.

The interview sites and sampling schedule for the summer months were stratified based on the level of recreational use within each of the seven backcountry and wilderness areas of the WMNF. Some of the most important criteria used in selecting the study areas were: (1) estimated summer recreation use levels; (2) location of hiking trails and trailheads for day use or overnight use; (3) existing ROS classes and WMNF management units; and (4) whether recreation conflicts or overuse were reported and where management actions may be most needed to mitigate or prevent such problems. Seven study areas were selected (see figure 1) and categorized based on ROS classifications for the area: (1) *Primitive* areas included the Pemigewasset Wilderness and Wild River Backcountry; (2) the mixed *Primitive* and *Semi-primitive non-motorized* areas included the Presidential Range-Dry River Wilderness, Kilkenny Backcountry, and Sandwich Range Wilderness; and (3) *Semi-primitive non-motorized* areas included the Great Gulf Wilderness and Caribou Speckled Mountain Wilderness.

A total of 51 interview sites was selected in the seven areas (see Figure 1) with the number in each area ranging from six to 12 depending on the size of the area, number of public access points, and estimated visitor use. Each site was visited systematically three times during the 10-week sampling time from July 1 to September 4, 2000. However, some interview sites were dropped from the study after the first sampling session because a variety of factors that seriously limited the amount of use at that site (e.g., road access or parking lot limitations) during those weeks of sampling. Subsequently the remaining sites were sampled up to four times each.

Each day interview sessions were held for three hours at three different sampling locations: (1) a morning session starting at about 9 a.m. and ending about 12 noon, (2) an afternoon session starting about 1-2 p.m. and ending about 4-5 p.m., and (3) an evening session starting about 5-6 p.m. and ending about 8-9 p.m. The variability in starting and ending times related directly to the driving time necessary to move from one sampling location to the next between the three-hour interview blocks of time. Complete records were kept on the three-hour interview process to know the location, date, number of interviews, refusals to cooperate in the study, the number of visitors seen, and other factors during the three-hour period.

The on-site interview survey determined: (1) size and type of visitor group; (2) day or overnight type user; (3) recreation activities participated in by visitors while in that area during that trip; (4) visitor's perception of the importance of and satisfaction with 12 wilderness and back country recreation experience and setting attributes; (5) visitor preferences for 16 potential management actions that could be used in the WMNF to reduce recreation user impacts and/or conflicts; and (6) previous recreation experience in the WMNF by the visitor.

The survey instrument was based on previous research on the satisfactions of wilderness visitors (Dawson et al., 1998; Newman & Dawson, 1999; Dawson & Watson, 2001). The visitor's perception of the importance of and satisfaction with wilderness and back country recreation *opportunities* were measured with eight items:

1. Natural Environment -- enjoy the view from a mountain top; experience the scenic quality of nature; observe and hear wildlife; the tranquility & peacefulness of a remote area.
2. Physical Activity -- physical exercise and health; physical challenge.
3. Personal and Social Experiences -- get away from daily routines; develop a sense of self confidence; chance to think and solve problems; simplify daily needs.
4. Exploration and Remoteness -- an area free of man-made noises; remoteness from cities & people; an adventure & sense of discovery; feel like I was one of the first to experience this area.
5. Solitude -- a small, intimate group experience; isolated from other groups; privacy.
6. Connections with Nature -- get in touch with my true self; opportunity for self-discovery; develop a sense of oneness with nature.
7. Connection with Other Wilderness Users and Inspiration -- feel connected to a natural place that is important to me; celebrate wilderness as a symbol of naturalness; feel a sense of an earlier and rugged time in history.
8. Wilderness Skills -- improve wilderness travel skills; learn to travel to a remote destination and return successfully; a sense of self-sufficiency; recreation in a primitive environment.

The visitor's perception of the importance of and satisfaction with wilderness and back country recreation *conditions* were measured with four items:

1. No Litter and Waste -- amount of litter along the trails and at campsites; campfire rings.
2. Management Conditions -- condition of the trail system; publicized rules and regulations; the number of visible places where others have hiked and camped.
3. Information on Backcountry and Wilderness Area -- finding safe drinking water; information on where other users are likely to be; find an unoccupied campsite.
4. Numbers of users -- number of hikers you saw on trails; number of large groups you saw on trails; number of groups that camped near you.

Results

The 335 hours of interviewing resulted in 385 completed interviews (Table 1) with hikers and backpackers, and only 18 visitors refused to participate for a variety of reasons (e.g., too tired, rainy weather). Of the total, 228 interviews (59%) were held in the Primitive areas, 95 interviews (25%) were held in the mixed Primitive and Semi-primitive non-motorized areas, and 62 interviews (16%) were held in the Semi-primitive non-motorized areas (Table 1).

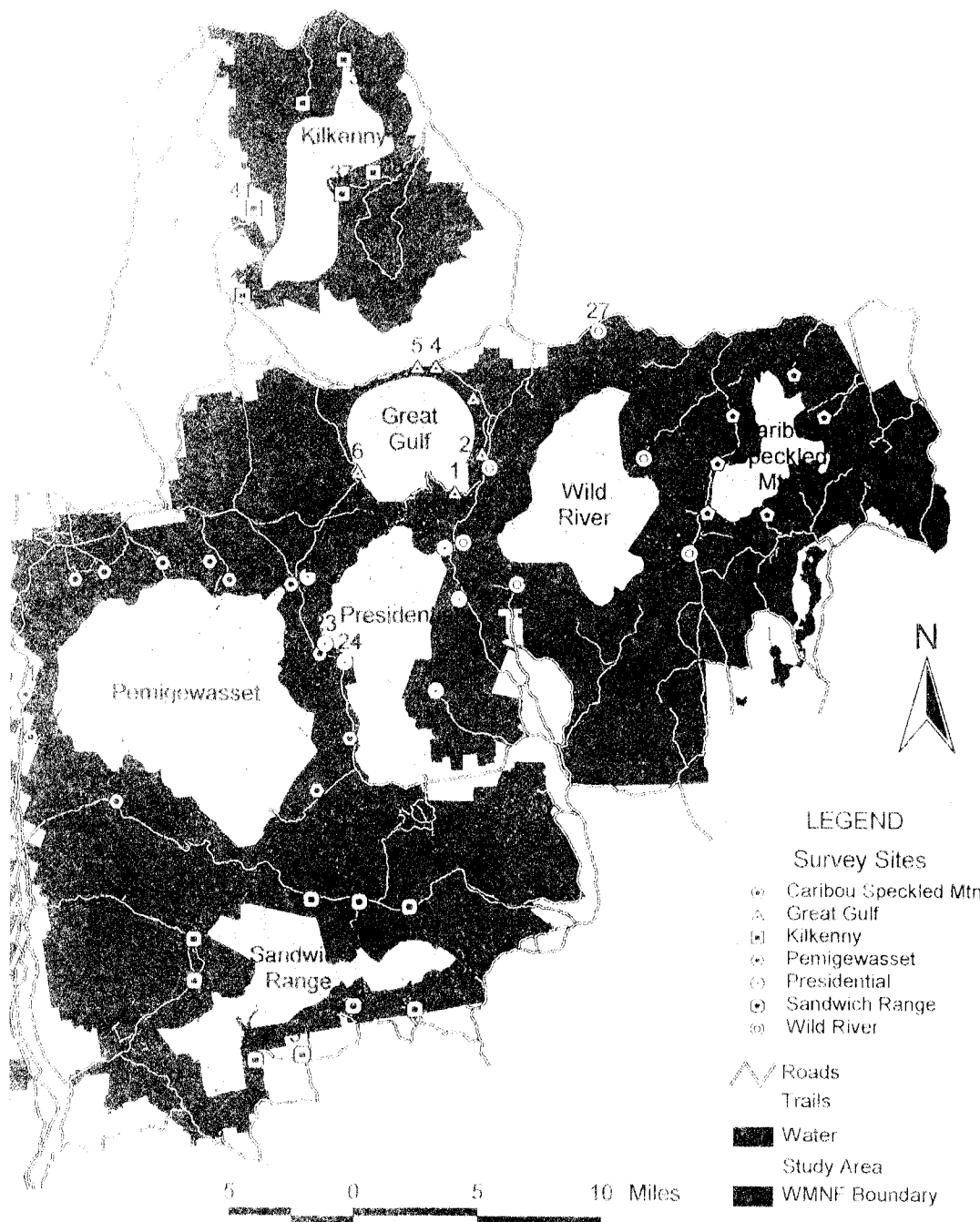


Figure 1. Location of Study Areas and Interview Sites in the White Mountain National Forest in the Summer of 2000

Table 1. White Mountain National Forest Backcountry and Wilderness Recreation Study Areas and Interviews in the Summer of 2000

RON Category for Backcountry and Wilderness Areas	Number of Sampling Sites	Interview Hours	Number of Interviews	Number of Interview Refusals
Primitive areas				
Pennigewasset Wilderness	12	90	171	6
Wild River Backcountry	6	51.3	57	2
subtotal	18	141.3	228	8
Primitive and Semi-Primitive non-motorized areas				
Presidential Range-Dry River Wilderness	6	45.1	60	0
Kilkenny Backcountry	6	19.6	3	0
Sandwich Range Wilderness	9	49.3	32	3
subtotal	15	112	95	3
Semi-Primitive non-motorized areas				
Great Gulf Wilderness	6	46.7	42	7
Caribou Speckled Mt. Wilderness	6	33.6	20	0
subtotal	12	80.3	62	7
TOTAL	51	335.6	385	18

The backcountry and wilderness visitors were day hikers in 62% of the cases and overnight backpackers in 38% of the cases (Table 2); somewhat greater percent were day hikers in the semi-primitive non-motorized areas and overnight backpackers in the primitive areas. The average overnight stay was 2.1 nights for those who stayed out on a backpack trip. Groups were most often made up of friends (41%) and family (43%) and averaged 3.2 adults and 0.7 children per group (table 2). Only 14% of those interviewed were on their first trip to the WMNF; one-third had made 1-5 previous trips and 23% had made 21 or more trips to the WMNF (table 2). Day hikers were more somewhat

experienced on average than backpackers (Chi-square=22.8, 4 df, p=0.001) with 56% of day hikers taking 6 or more previous trips compared to 41% of backpackers.

Backcountry and wilderness hikers and backpackers reported engaging in many other recreational activities while on their trip to the WMNF (Table 3). The top recreational activity was viewing scenery, an activity reported by 78% of those interviewed. Other common activities in the WMNF were: photography, backpack camping, Appalachian Trail hiking, and picnicking.

Table 2. Characteristics of Backcountry and Wilderness Recreation Users Interviewed in the Summer of 2000 on the White Mountain National Forest

	ROS Categories			
	Primitive	Primitive and Semi-primitive	Semi-primitive non-motorized	Total
Type of User	Percent			
Day user	55	68	76	62
Overnight user	45	32	24	38
	Average Nights			
Overnight length of stay	2.1	2.0	2.1	2.1
Group Type	Percent			
Friends	44	31	42	41
Family	41	51	39	43
Organization	13	11	10	12
Group Size	Average Number			
Adults	3.2	3.4	2.7	3.2
Children	0.9	0.3	0.5	0.7
Previous Experience in WMNF	Percent			
None	16	12	13	14
1-5 trips	33	42	32	35
6-10 trips	17	14	8	15
11-20 trips	12	10	15	12
21 or more trips	22	23	32	23

Table 3. Percent of Backcountry and Wilderness Users Interviewed by Reported Recreation Activity in the Summer of 2000 on the WMNF

Typical Recreation Activities	ROS Categories			Total
	Primitive	Primitive and Semi-primitive	Semi-primitive non-motorized	
Viewing scenery	80	79	66	78
Photography	50	41	31	45
Backpack camping	32	33	32	32
Appalachian Trail hiking	30	20	13	25
Picnicking	22	24	15	21
Swimming	17	21	23	19
Camping in a campground	18	19	11	17
Nature study	13	6	13	11
Fishing	1	4	2	2
Boating/canoeing	0	4	5	2
Other activity	7	8	8	8

The hikers and backpackers interviewed rated the eight wilderness and backcountry opportunities and four conditions according to how *important* an influence they were on the quality of their trip. The response categories for trip importance were: 0 = not important, 1 = slightly, 2 = somewhat, 3 = moderately, 4 = very, and 5 = extremely important. Three opportunities were highly important on trips: natural environment, physical activity, and personal and social experiences (Table 4). One condition was highly rated: lack of litter and waste. Overall, the average ratings for all 12 opportunities and conditions were above the moderate importance category. While five of the 12 opportunities and conditions ratings for importance had a statistically significant difference (ANOVA statistical test with $p=0.05$) between the three ROS categories, the actual

difference between means was too small (e.g., 0.3) as to lack significance for differentiating management by the three ROS categories (i.e., these differences in mean scores do not necessarily warrant differences in management approaches).

When considered separately, overnight backpackers were statistically more likely than day hikers to report somewhat higher importance for exploration and remoteness, wilderness skills, natural environment, and information on the wilderness area (T-test statistic, $p<0.05$). The only significant difference in importance between visitors with higher levels of experience (more than 6 previous trips) and less experience was those with more experience more often reported that physical activity was important.

Table 4. The Importance Ratings of Backcountry and Wilderness Recreation Users Interviewed in the Summer of 2000 on the WMNF

Wilderness and backcountry opportunities and conditions	Importance Ratings ^b by ROS Categories			
	Primitive	Primitive and Semi-primitive	Semi-primitive non-motorized	Total
Opportunities				
Natural environment	4.6	4.3	4.5	4.5 ^a
Physical activity	4.2	4.1	4.5	4.2 ^a
Personal and social experiences	4.1	4.0	4.2	4.1
Exploration and remoteness	4.0	3.7	3.9	3.9
Solitude	3.7	3.4	4.0	3.7 ^a
Connections with nature	3.7	3.7	3.7	3.7
Connection with other wilderness users & inspiration	3.3	3.2	3.3	3.3
Wilderness skills	3.3	3.2	3.5	3.3
Conditions				
No litter and waste	4.3	4.5	4.6	4.4 ^a
Management conditions	3.6	3.5	3.7	3.6
Information on backcountry & wilderness areas	3.2	3.2	3.1	3.2
Numbers of users	3.3	2.9	3.2	3.2 ^a

^a Statistically significant difference between ROS categories using ANOVA test with $p<0.05$.

^b Importance rating: 0 = not important, 1 = slightly, 2 = somewhat, 3 = moderately, 4 = very 5 = extremely important.

The hikers and backpackers interviewed rated the eight wilderness and backcountry opportunities and four conditions according to how *dissatisfied or satisfied* they were with these on their trip. The response categories for trip dissatisfaction or satisfaction were: -2 = very dissatisfied, -1 = dissatisfied, 0 = neutral, 1 = satisfied, and 2 = very satisfied. Respondents indicated that they were very satisfied with three opportunities: physical activity, natural environment, and personal and social experiences (Table 5). One condition was rated as very satisfying: lack of litter and waste. Overall, the average ratings for 10 opportunities and conditions were above the satisfied category, only information on the wilderness and backcountry areas was rated less than an average score of satisfied (1.0). Only three items had 5% or more of those interviewed reporting either being dissatisfied or very dissatisfied: solitude (5%), exploration and remoteness (6%), and number of other users (7%). While five of the 12 opportunities and conditions ratings for satisfaction had a statistically significant difference (ANOVA statistical test with $p < 0.05$) between the three ROS categories, the actual difference between means was so small (e.g., 0.2) as to lack significance for differentiating management by the three ROS categories (i.e., these differences in mean scores do not necessarily warrant differences in management approaches).

Comparisons of respondent satisfaction ratings by whether they were interviewed at a high, moderate, or low use trailhead (level of use estimated by WMNF staff) revealed only a few statistically significant differences (ANOVA

statistical test with $p < 0.05$). Respondents at low use trailheads more highly rated their satisfaction with solitude, available trail information, and opportunities to use wilderness skills than did those at moderate or high use trails. Respondents at low and moderate use trailheads more highly rated their satisfaction with number of other users than did those at high use trails.

When considered separately, overnight backpackers were statistically more likely than day hikers to report somewhat higher satisfaction with information on the wilderness area (T-test statistic, $p < 0.05$). No significant differences in satisfaction were found between visitors with higher levels of experience (more than 6 previous trips) than those with less experience.

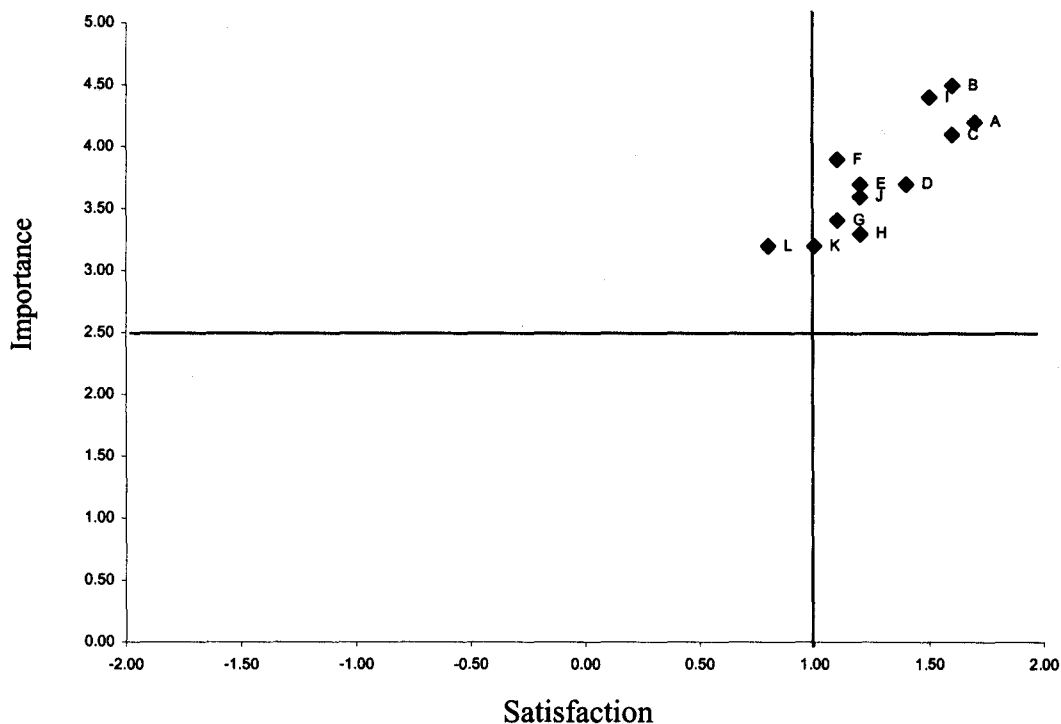
The average importance and satisfaction scores were graphically displayed (Figure 2) to summarize the overall respondent differences and suggest the items that need management attention (these plots are similar to the importance-performance plots used in management evaluations). All 12 items were labeled as well above moderate importance and only two items were at or below the 1.0 average satisfaction level: number of users and information on wilderness and backcountry areas. Therefore, the ratings on the other ten items suggest that management is *generally* doing well from the perspective of the hikers and backpackers. However, some trailheads had lower satisfaction ratings, suggesting issues like crowding and litter needed management attention.

Table 5. The Satisfaction Ratings of Backcountry and Wilderness Recreation Users Interviewed in the Summer of 2000 on the WMNF

Wilderness and backcountry opportunities and conditions	Satisfaction Ratings ^b by ROS Categories			
	Primitive	Primitive and Semi-primitive	Semi-primitive non-motorized	Total
Opportunities				
Physical activity	1.6	1.7	1.9	1.7 ^a
Natural environment	1.6	1.6	1.7	1.6
Personal and social experiences	1.5	1.7	1.7	1.6 ^a
Connections with nature	1.4	1.4	1.4	1.4
Solitude	1.1	1.3	1.6	1.2 ^a
Exploration and remoteness	1.1	1.0	1.4	1.1 ^a
Connection with other wilderness users & inspiration	1.1	1.2	1.2	1.1
Wilderness skills	1.2	1.2	1.4	1.2
Conditions				
No litter and waste	1.5	1.5	1.6	1.5
Management conditions	1.2	1.2	1.2	1.2
Numbers of users	0.9	1.0	1.2	1.0 ^a
Information on backcountry & wilderness area	0.9	0.9	0.7	0.8

^a Statistically significant difference between ROS categories using ANOVA test with $p < 0.05$.

^b Satisfaction rating: -2 = very dissatisfied, -1 = dissatisfied, 0 = neutral, 1 = satisfied, 2 = very satisfied.



Opportunities	Conditions
A. Physical activity	I. No litter and waste
B. Natural environment	J. Management conditions
C. Personal and social experiences	K. Information
D. Connections with nature	L. Numbers of users
E. Solitude	
F. Exploration and remoteness	
G. Connection/inspiration	
H. Wilderness skills	

Figure 2. Importance-Satisfaction Analysis for the White Mountain National Forest Survey of Backcountry and Wilderness Recreation Users in 2000

The hikers and backpackers interviewed were asked to indicate how much they perceived 16 conditions were problems for them during their wilderness or backcountry trip in the WMNF. The response categories for perceived problems were: 0 = not a problem, 1 = slight problem, 2 = somewhat of a problem, 3 = moderate problem, 4 = very much a problem, and 5 = extreme problem. All 16 items averaged less than the 1.0 slight problem category (Table 6). The top four listed problem items by those interviewed were related to the two lowest rated satisfaction items: number of users and information on wilderness and backcountry areas. While six of the 16 perceived problem ratings had a statistically significant difference (ANOVA statistical test with $p < 0.05$) between the three ROS categories, the actual difference between means was so small (e.g., 0.2) as to lack significance for differentiating

management by the three ROS categories (i.e., these differences in mean scores do not necessarily warrant differences in management approaches). The perceived problem items did not appear to be important; they were rated either "very much a problem" or an "extreme problem" by less than 5% of the respondents. The highest percentage in these two combined response categories were: too many people on the trails (4%), too many people at campsites and shelters (4%), and too many large groups of users (3%). Overall, the low problem ratings indicate support for the relatively high satisfaction ratings reported by those interviewed. While these low problem scores suggest that overall users perceive problems as slight, there are some trailheads where higher levels of concern were indicated for some problems (e.g., too many people on trails, too many large groups).

Table 6. The Perceived Problem Ratings of Wilderness and Backcountry Opportunities and Conditions by Backcountry and Wilderness Recreation Users Interviewed in the Summer of 2000 on the White Mountain National Forest

Possible problems.	Problem Ratings ^b by ROS Categories			
	Primitive	Primitive and Semi-primitive	Semi-primitive non-motorized	Total
Too many people on the trails	0.9	0.4	0.4	0.7 ^a
Trails poorly marked	0.5	0.6	0.5	0.5
Too many people at campsites and shelters	0.6	0.4	0.3	0.5
Too many large groups of users	0.6	0.2	0.3	0.5 ^a
Litter along trails or at campsites	0.3	0.5	0.2	0.4 ^a
Not enough information on amount of use	0.3	0.3	0.2	0.3
Not enough information on campsites	0.2	0.6	0.4	0.3 ^a
Too many heavily impacted campsites	0.4	0.3	0.2	0.3
Rowdy or loud people	0.5	0.2	>0.1	0.3 ^a
Too much evidence of human waste	0.3	0.2	0.1	0.3
Dogs not under control or on a leash	0.4	0.1	>0.1	0.3 ^a
Too many restrictions and regulations	0.3	0.4	0.2	0.3
Not enough information to plan a trip	0.2	0.2	0.1	0.2
Too many fire rings from campfires	0.2	0.3	0.2	0.2
Too many cell phones and other electronic equipment used by other visitors	0.3	0.3	0.1	0.2
Too much Forest Service presence	>0.1	>0.1	0.0	>0.1

^a Statistically significant difference between ROS categories using ANOVA test with $p=0.05$.

^b Problem rating: 0 = not a problem, 1 = slight problem, 2 = somewhat of a problem, 3 = moderate problem, 4 = very much a problem, 5 = extreme problem.

Comparisons of respondent problem ratings by whether they were interviewed at a high, moderate, or low use trailhead (level of use estimated by WMNF staff) revealed only two statistically significant differences (ANOVA statistical test with $p<0.05$). Respondents at high use trailheads more highly rated too many people on trails as a problem than did those at moderate or low use trails. Respondents at low use trailheads more highly rated dogs not on a leash as a problem than did those at moderate and high use trails.

When considered separately, overnight backpackers were statistically more likely than day hikers to report somewhat higher ratings of problems with not enough information on campsites, trails poorly marked, too many firerings from campfires, too many people at campsites and shelters, and too many restrictions and regulations (T-test statistic, $p<0.05$). No significant differences in reported problems were found between visitors with higher levels of experience (more than 6 previous trips) and those with less experience.

Implications and Discussion

The study results indicate that hikers and backpackers rate similar opportunities and conditions as relatively highly important across primitive and semi-primitive non-motorized Recreation Opportunity Spectrum areas of the WMNF. The relatively homogeneous importance ratings across these ROS areas, suggest that the respondents did not measurably differentiate their use of these areas based on the important conditions they seek in backcountry and wilderness areas and on their past experiences in the

WMNF. Simply put, these areas may appear generally very similar to the visitors. Similarly, hikers and backpackers achieve nearly the same types and amounts of satisfaction across primitive and semi-primitive non-motorized Recreation Opportunity Spectrum areas in the WMNF. This study was designed to characterize user responses across the WMNF and the ROS classes, but not to evaluate management of the areas.

Some of the results in hiker and backpacker ratings of importance and satisfaction, plus user perceived problems, suggest additional indirect visitor management actions (e.g., information to visitors about trail conditions and solitude) should be considered. Information before and during their trips appears to be a central visitor concern. Similarly, better management of crowding or high levels of user-user encounters in some areas and at some trailheads could facilitate visitor satisfactions; however, beyond suggesting that some locations are reportedly crowded, the number of interviews at any one site is not adequate to evaluate each site where interviews were conducted. At this time, direct management (e.g., limit visitor use) does not appear to be generally necessary across the seven WMNF areas studied based on this user self-reported information. However, this information must be evaluated in combination with other recreation management information that is being measured and monitored on the WMNF (e.g., user counts on trails, environmental impacts from recreational use) and in the context of the ROS standards and goals for the social, environmental, and management conditions established for these areas.

Elsewhere in this proceedings, Johnson and Dawson (2002) express concerns about the relatively high satisfaction ratings by hikers and backpackers and how to monitor these psychological and social indicators in the future. High hiker and backpacker satisfaction levels may be possible even while social and environmental conditions are degrading because visitors may use various physical and cognitive coping behaviors (e.g., physical displacement, temporal displacement, product shift, and rationalization) to maintain high satisfaction levels. Therefore, the information presented here should be used in planning and management decision-making only with other monitored information on the social, environmental, and management conditions in the WMNF.

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