

Do Recreation Motivations and Wilderness Involvement Relate to Support for Wilderness Management? A Segmentation Analysis

TROY E. HALL

Department of Conservation Social Sciences
University of Idaho
Moscow, ID, USA

ERIN SEEKAMP

Department of Forestry
Southern Illinois University Carbondale
Carbondale, IL, USA

DAVID COLE

Aldo Leopold Wilderness Research Institute
Missoula, MT, USA

Surveys show relatively little support for use restrictions to protect wilderness experiences. However, such conclusions based on aggregate data could hide important differences among visitors. Visitors with more wilderness-dependent trip motives were hypothesized to be more supportive of use restrictions. Using survey data from visitors to 13 wildernesses, cluster analysis of motivations and wilderness involvement generated three clusters that differed in sensitivity to social conditions and support for use restrictions. The group with motives most aligned with the Wilderness Act was slightly more adversely affected by social conditions and more supportive of regulations. However, none of the groups supported use restrictions to protect opportunities for solitude.

Keywords cluster analysis, solitude, urban-proximate, wilderness experiences, wilderness zoning

The Wilderness Act of 1964 mandates the protection of wilderness character (Landres et al., 2005). In addition to protecting biophysical resources, opportunities for certain types of experiences are included, namely “outstanding opportunities for solitude or a primitive and unconfined type of recreation” (Wilderness Act, 1964, Section 2c). Over time, the management community has converged on approaches to mitigate some of the biophysical impacts caused by recreational use (Cole, Petersen, & Lucas, 1987). However, considerable debate remains about how best to protect high quality wilderness experiences, particularly where use is increasing (Cole, 2004; Cole, Watson, Hall, & Spildie, 1997). Although most visitors report that increased visitation reduces the opportunities for solitude (Hall, 2001a;

Received 5 August 2008; accepted 9 June 2009.

Address correspondence to Troy E. Hall, Department of Conservation Social Sciences, P.O. Box 441139, University of Idaho, Moscow, ID 83844-1139. E-mail: troyh@uidaho.edu

Hammitt & Rutlin, 1995), little consensus exists about when use levels become so high that something restrictive should be done. Wilderness managers have approached the problem quite differently. Some have argued that people who seek solitude can find it at times and in places that make restrictions unnecessary, while others have implemented entry quotas (Hall, 2001b).

The controversy over management of recreational use levels in wilderness is fueled by studies of visitors' reactions to high levels of use. Representative studies of visitors suggest that as use levels increase, there is a negative but often small effect on solitude and overall experience quality (Stewart & Cole, 2001). However, the research also shows low levels of support for restrictive management actions such as use limits that would protect opportunities for solitude (Manfredo, Driver, & Brown, 1983; Manning & Valliere, 1996; Virden & Schreyer, 1988a). This finding creates a dilemma for managers who want to provide optimum wilderness experiences but also want to avoid upsetting or displacing visitors through heavy-handed restrictions.

In considering how to interpret and use survey responses from wilderness visitors, most analyses are based on aggregate data (Cole, 2004). Although using aggregate data conforms to democratic principles (Manning & Lawson, 2002), average responses may mask important types of variability within the population (Kliskey, 1998; Shafer, 1969; Virden & Schreyer, 1988a). Wildernesses likely attract people with diverse motivations. If the majority of visitors are seeking experiences that are not dependent on isolation (e.g., exercise), their views could overshadow the views of others who are highly involved with wilderness and seek experiences that align more with the Wilderness Act. As evidence, Stankey (1973) employed a Wilderness Purism Scale to categorize wilderness visitors and found that people with higher purism scores tended to say they would be more satisfied in areas with fewer visitors. Similarly, Virden and Schreyer (1988b) found that highly specialized wilderness hikers, who rated hiking as central to their lives and had more experience, were slightly less tolerant of trail encounters and somewhat more supportive of use quotas. Likewise, Williams, Patterson, Roggenbuck, and Watson (1992) found that people who expressed greater attachment to wilderness were more sensitive to ecological impacts and encounters with other visitors.

Thus, segments of wilderness visitors may have their experiences compromised in areas receiving heavy visitation and may be more supportive of restrictions on use. If clear segments exist, managers may need to consider whether and how to meet the needs of the different user types (Hall, 2001b; Hall & Cole, 2000; Virden & Schreyer, 1988a). A case could be made based on the Wilderness Act to attend preferentially to the views of people who most seek solitude and freedom in wilderness (Hendee, Stankey, & Lucas, 1990; Shin & Jaakson, 1997).

Since the 1980s, studies have provided evidence that degree of involvement in an activity plays a role in understanding recreationists' motivations, preferences, and evaluations of settings or management (Young, Williams, & Roggenbuck, 1990). It is commonly believed that people who are strongly attached to wilderness are more inclined to support management actions that protect the values enshrined in the Wilderness Act. Therefore, we expect that people who take wilderness trips to obtain wilderness-dependent types of experiences, such as solitude, would be more likely than others to be adversely affected by encounters and more likely to support restrictions on use. Similarly, we expect people who are more highly involved with wilderness to be more likely to seek the kinds of experiences described in the Wilderness Act. They should also be more sensitive to the environmental conditions they encounter, reacting more negatively to high levels of use (e.g., Badger, 1975; Williams *et al.*, 1992).

Early researchers demonstrated that there were distinct motive segments among wilderness visitors. For example, Brown and Haas (1980) identified clear motive groups that

differed in orientation to risk taking and desire to be away from people. However, since those early studies, segmentation research in wilderness has been rare. Hence, the size of today's purist segment, if there is one, is unknown. Moreover, most segmentation research has stopped at examining motives and perceptions and has rarely explored whether segments differ in terms of management preferences. For example, Williams et al. (1992) found that visitors with stronger levels of attachment to wilderness were the most sensitive to ecological impacts and encounters with hikers or stock users. However, their study did not assess people's views on the appropriateness of different management practices. In one of the few studies to examine management preferences, Shafer and Hammitt (1995) divided Cohutta Wilderness visitors according to an index of purism. Although strong purists cared more about environmental impacts and solitude, they were not more supportive of management restrictions. However, evidence gathered to date is insufficient to draw firm conclusions.

Given the lack of research to understand how different segments of wilderness visitors react to social conditions and potential management actions, the purposes of our study were a) to determine if different segments of wilderness visitors exist based on their motivations to visit wilderness and personal involvement with wilderness, b) to examine whether segments react differently to social conditions they encounter in wilderness, and c) to determine whether the segments differ in their views about appropriate management of recreational use in wilderness.

Hypotheses

We hypothesized that visitors seeking more traditional wilderness experiences would have a greater attachment to wilderness (i.e., higher wilderness involvement) than visitors seeking less wilderness-oriented experiences and, therefore, that involvement would cluster meaningfully with motives. We further hypothesized that managerially meaningful segments would emerge when visitors were clustered on their motives and wilderness involvement. Third, we hypothesized that the most purist segment(s) would be more likely to say that crowded conditions adversely affect them and would be more supportive of management policies aimed to protect wilderness experiences (e.g., use limits in crowded places). Finally, we reasoned that people seeking certain outcomes (i.e., with certain motives) would desire settings they think will provide those outcomes and should support management actions that provide optimum setting characteristics (Brown & Haas, 1980). As Virden and Schreyer (1988a) noted, "users with different reasons for participation should differ in their preferences for management actions" (p. 49). Therefore, we hypothesized that more purist clusters would be more likely than others to support management restrictions on use. We recognize, however, that some prior research (e.g., Shafer & Hammitt, 1995) has not supported this hypothesis.

Methods

Study Area and Sampling

Many studies of wilderness visitors are confined to a single wilderness area. However, wildernesses vary in characteristics and use levels, and people's motivations to visit might differ (Virden & Schreyer, 1988a). Therefore, this study was conducted at 36 trailheads in 13 Forest Service wildernesses in Oregon and Washington. Three types of trailheads were selected based on visitation levels: nine were classified as very high use, used by an average of more than 20 groups per day during the summer; nine were classified as high use with 10–20 groups per day; and 18 were classified as moderate use trails with fewer

than 10 groups per day but at least 500 groups per year. Trails with lower levels of use were not sampled because the intensity of sampling that would have been required to generate adequately large samples for analysis would have been prohibitive.

For logistical reasons, trails were divided into sets of three with each set scheduled for two randomly selected nine-day blocks of time. During each block, assignment of sampling days to trails was random with the stipulation that each trail would be sampled on two to three weekend days or holidays and three to four weekdays. On sample days, researchers were present between six and eight hours, timed to match the hours when most visitors would be exiting the trailhead. They attempted to contact all visitors 16 years of age and older and asked them to complete a self-administered written questionnaire.

To maximize participation and avoid recall problems associated with mail surveys, the brief questionnaire was completed on site with two different versions. One focused on trip characteristics and what people experienced, and the other focused on management opinions. Both questionnaire versions shared questions about trip motives and wilderness involvement as well as respondent characteristics.

Segmentation Measures

Motivations for wilderness trips. We segmented wilderness visitors according to the types of experiences they were seeking on their wilderness visit and their level of wilderness involvement. For motives, we drew on the Recreation Experience Preference (REP) scales. Manfredo, Driver, and Tarrant's (1996) meta-analysis of REP studies identified 15 general recreation motive domains such as achievement, being with similar people, enjoying nature, introspection, social escape, and physical escape. The REP scales provide a well tested, reliable set of measures that encompass the types of experiences offered in wilderness. Researchers using REP items have found that wilderness visitors are highly motivated by experiencing nature, solitude, and escape (Love & Watson, 1992; Tarrant, Haas, & Manfredo, 1995; Virden & Schreyer, 1988a).

Other researchers have explored the phenomenological dimensions of wilderness experiences in considerable depth (Johnson, Hall, & Cole, 2005; Kaye, 2000; Patterson, Watson, Williams, & Roggenbuck, 1998). These studies confirmed that people associate feelings of solitude, challenge, remoteness, connection to nature, and escape from modernity with the wilderness environment. The studies suggested that such motives or experiences are likely to be important to wilderness visitors and would be useful dimensions upon which to segment the user population.

We drew on the findings of phenomenological research and REP research to identify 13 motives mostly associated with wilderness experiences. Some motives (e.g., learning), however, were not specific to wilderness. For each item, respondents indicated how much they had been seeking that experience on their present trip (1 = not at all, 7 = very much). They also reported on a 7-point scale how much they actually experienced each aspect.

Wilderness involvement. "Involvement" has been conceptualized to have several dimensions such as importance, pleasure, and self-expression (McIntyre, 1989; Selin & Howard, 1988). Conceptually, it shares features with purism and specialization (McIntyre & Pigram, 1992). All three constructs stress the centrality of an activity to one's life and a high level of personal interest and knowledge. However, specialization entails a developmental progression over time within specific activities (Virden & Schreyer, 1988b). In the wilderness context, purism has tended to be based on agreement about the physical attributes of wilderness as specified in the Wilderness Act (Shafer & Hammitt, 1995; Shin & Jaakson, 1997). Therefore, for our purposes, involvement seemed the most appropriate construct. Involvement is analogous to "wilderness attachment" as conceptualized by

Williams et al. (1992), and we selected three items used in past studies (Williams et al., 1992; Young et al., 1990). Respondents indicated how much they agreed with each item on a Likert-type scale from strongly agree (+3) to strongly disagree (−3).

Dependent Variables

Reactions to social conditions experienced during the trip were assessed in two ways. First, people indicated how many other groups they had seen in the wilderness on the day they were surveyed. They then indicated how much effect (added a lot = +3; detracted a lot = −3) the number of encounters had on four aspects of experience quality (enjoyment, sense of being in wilderness, solitude, and freedom). Correlational analysis was used to determine the impact of encounters on experience quality. Second, we computed the difference between the extent to which people said they had attained each of the 13 experiences and the extent to which they had been seeking it. These difference scores indicated whether the actual experience exceeded (i.e., positive values) or failed to meet people's desires (i.e., negative values).

Several measures of attitudes toward management were operationalized with 7-point Likert-type items. One of the questionnaire versions provided six statements regarding ways that urban-proximate and urban-distant wilderness might be managed and asked respondents the extent to which they agreed or disagreed. We included nine reasons that wilderness managers might restrict use and asked for reactions using the same agree/disagree response categories. The other questionnaire version asked respondents to indicate their support for five other wilderness management policies. We also asked people outright whether they felt a need for use to be limited in the wilderness where they were contacted.

To describe the respondents, we asked about gender and included three measures of wilderness experience: the annual frequency of wilderness trips, the number of wildernesses visited over the lifetime, and the percentage of total wilderness trips that consisted of day versus overnight trips.

Segmentation Analysis

Segmentation analyses have roots in market research but have been widely applied in recreation and tourism. Segmentation enables researchers to identify smaller, more homogeneous groups within a large heterogeneous population (Clatworthy, Buick, Hankins, Weinman, & Horne, 2005; Hair & Black, 2000). A common multivariate technique is cluster analysis performed on a set of variables such as activities (Sarigollu & Huang, 2005) or values (Noe, Hammitt, & Bixler, 1997). Cluster analyses are frequently performed on motivations (Beh & Bruyere, 2007; Brown & Haas, 1980; McCool & Reilly, 1993).

Because interpreting cluster analysis is necessarily subject to researchers' judgments, comparing the results of two different clustering algorithms on separate samples of the same population increases the reliability of the cluster solutions (Clatworthy et al., 2005; Hair & Black, 2000). This approach begins with hierarchical cluster analysis to identify the optimal number of clusters and the cluster centers. Then nonhierarchical, or K-means, cluster analysis can be applied to the second sample with the number of clusters specified from the hierarchical run and the hierarchical cluster centers used as the seed starts. Once the number of clusters and cluster membership are determined by the hierarchical analysis and confirmed by the K-means analysis, clusters are inspected for patterns and labeled accordingly. The clusters can be compared for differences among the dependent variables. In our case, this step involved comparing segments on their reactions to social conditions and their views on appropriate wilderness management policies.

We followed the suggested analytical sequence by analyzing one random 50% subsample with hierarchical clustering and using those results to specify the number of clusters

and seed starts in a K-means analysis of the remaining subsample. We applied Ward's method as the agglomerative algorithm and squared Euclidean distance as the distance measure in our hierarchical cluster analysis to identify the number of clusters. Analyses were performed with SPSS, using the 13 motive and three wilderness involvement items as clustering variables.

Because of the number of dependent variables and statistical tests, we first compared the clusters using multivariate analyses of variance (MANOVA) where we had batteries of attitudinal variables (i.e., difference scores for experiences and attitudes toward management). Where significant results were obtained (Hotelling's Trace, $\alpha = .05$), we conducted posthoc Bonferroni comparisons. For nominal data (e.g., past experience), we conducted chi-square tests. To determine if clusters differed in sensitivity to encounters, we compared the correlations between encounters and ratings of experience quality across clusters.

Results

Sample Characteristics

The two questionnaires used in this study were administered in conjunction with two other instruments with systematic rotating distribution. The response rate, which was recorded for all four instruments together, was 72%. The two versions of the questionnaire used in this analysis each provided approximately 1,450 surveys, although only those who answered all the questions included in segmentation analysis were used ($n = 2,085$). Only 2% of respondents were stock users and the rest were hikers (90%) or mountain climbers (8%). Two-thirds of participants were on day trips. Just over half (58%) were male, and the median age was approximately 35 years.

Visitor Segments

Examination of the agglomeration schedule from the hierarchical clustering indicated that a three-cluster solution was optimal since the distance coefficients dramatically increased between a three- and two-cluster solution. The means of the three clusters for motives and wilderness involvement were imported into the second analysis (K-means) as the seed starts. Convergence was reached after 13 iterations. The means of the initial cluster from the hierarchical analysis and the final clusters from the K-means analysis are shown in Figures 1 (motives) and 2 (wilderness involvement).

Although a few cluster means differed in the two runs, the overall patterns were the same. Cluster 1 had the lowest scores on all motive and involvement items, cluster 2 had intermediate scores, and cluster 3 had the highest scores. Though all clusters rated *being close to nature* as a highly important motive, many of the motives differed considerably among clusters. Cluster 3 was notably different from clusters 1 and 2 for several motives, although clusters 2 and 3 were more similar (with lower ratings) for motives relating to spiritual values and introspection.

Members of cluster 1 ($n = 561$; 27%) were overall neutral with respect to the centrality of wilderness. They were unlikely to be seeking opportunities for introspection. Even solitude and being away from crowds were only moderately important to this group. From these results, it appeared that visitors in this segment sought recreational experiences that were dependent on being close to nature but not dependent on wilderness character. That is, they sought general nature-based recreational experiences. Therefore, we labeled this segment "Access-oriented Generalists." Although cluster 1 scored lower on all the motives we measured, this group possibly was more highly motivated by factors such as exercise or socialization, which were not included in our instrument. Fifty-nine percent of the

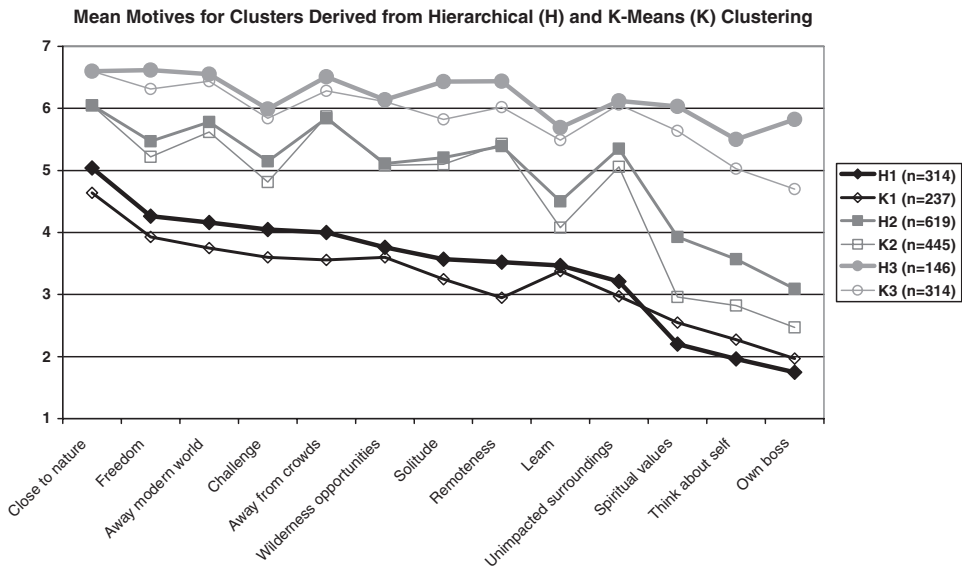


FIGURE 1 Mean motives for clusters derived from hierarchical (H) and K-means (K) clustering.

Generalists were contacted at very high use trails, with only 16% using the moderate use trails and 25% the high use trails.

Cluster 2 (n = 1,064, 51%) was moderately motivated by wilderness qualities. This group seemed especially to desire being away from crowds in a natural environment free of impacts. The major difference between this group and the Generalists was the higher priority on being away from the sights, sounds, and impacts of civilization. Because of their relative disinterest in reflection and learning, we labeled them “Nature-based Escapists.”

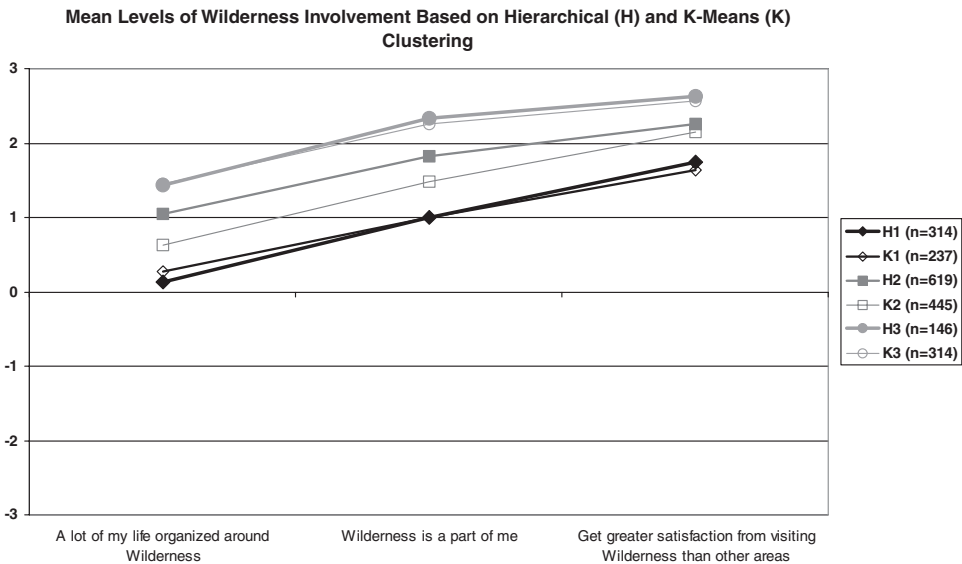


FIGURE 2 Mean levels of wilderness involvement based on hierarchical (H) and K-means (K) clustering.

TABLE 1 Cluster Differences on Wilderness Use

	Generalists	Escapists	Enthusiasts		
n	546	1057	456	χ^2	<i>p</i>
	Percent				
Frequency of wilderness trips				34.97	<0.0005
< Once/2 years	6.2	3.5	3.5		
< Once/year	6.2	2.9	2.4		
Once/year	8.2	9.9	6.8		
2–5 times/year	36.8	36.0	32.2		
6–10 times/year	18.9	19.2	23.0		
> 10 times/year	23.6	28.4	32.0		
Number of other wildernesses visited				15.48	0.12
None	0.9	1.0	1.8		
1–5	30.3	23.9	24.3		
6–10	25.4	26.4	21.7		
11–15	10.8	12.5	13.4		
16–20	7.9	8.8	8.8		
> 20	24.7	27.4	30.0		

While 44% of the Escapists were contacted at very high use trails, 30% were contacted at high use trails, and 26% had accessed wilderness via moderate use trails.

Cluster 3 ($n = 460$, 22%) scored highly on all motives and valued wilderness opportunities, solitude, and freedom more than a full point higher than either of the other two clusters. The emphasis on using the wilderness trip to reflect on values and personal thoughts was a sharp distinction between this group and the other two. We labeled this group “Wilderness Enthusiasts.” Nearly one-quarter (24%) of Enthusiasts were contacted at moderate use trails, 35% at high use trails, and 42% at very high use trails.

The clusters differed significantly in the frequency of their wilderness trips with Enthusiasts and Escapists both being somewhat more experienced than Generalists but not different from each other (Table 1). The clusters did not differ in the number of other wilderness areas they had visited. In all groups a large percentage of people had visited at least 10 different wildernesses. The percentage of women in each cluster differed significantly ($\chi^2 = 8.37$, $df = 2$, $p = 0.015$), with Generalists the least likely to be women (36% versus 42% of Escapists and 45% of Enthusiasts). The mean age ranged from 37.8 to 39.2 years and did not differ among clusters ($F = 1.76$, $df = 2$, 1989, $p = 0.17$). When asked about the percentage of their wilderness trips that were overnight versus day trips, Generalists were less likely to camp with 26% of trips being overnight compared to 32% for Escapists and 33% for Enthusiasts ($F = 8.24$, $df = 2$, 2042, $p = .0003$).

Sensitivity to Social Conditions

To determine whether clusters reacted differently to social conditions in wilderness, we correlated the number of encounters visitors reported with their evaluations of the impact encounters had on four aspects of trip quality. Large negative correlation coefficients would suggest high sensitivity to encounters. For Generalists, correlations between encounters and experience quality were not statistically significant (Table 2). For the other two clusters, increasing numbers of encounters adversely affected experience quality and particularly

TABLE 2 Pearson's Correlation (*r*) between the Number of Groups Encountered in Wilderness and Impact of Encounters on Aspects of Experience Quality

Aspect of experience quality	Cluster		
	Generalists	Escapists	Enthusiasts
Enjoyment	−0.03	−0.09	−0.14*
Sense of being in wilderness	−0.08	−0.14**	−0.24**
Solitude	−0.06	−0.10*	−0.14*
Freedom	−0.02	−0.09	−0.16*

p* < .05.*p* < .01.

the sense of being in wilderness. As expected, Enthusiasts exhibited the strongest and most consistently negative reactions to increasing encounters. Even among Enthusiasts, however, the effect of encounters on trip quality was weak.

A MANOVA on experience difference scores (i.e., scores for experiences achieved minus scores for experiences sought) produced a statistically significant main effect (Hotelling's $T^2 = 0.15$, Wilk's lambda = 0.86, equivalent multivariate $F(28, 3686) = 10.16$, $p < 0.0005$). Positive numbers indicate that people experienced a condition to a greater extent than they had been seeking to do, while negative numbers indicate that the experience did not fulfill desires. For all experiences, Generalists' goals were met or exceeded while virtually all of the experiences sought by the Enthusiasts were somewhat compromised (Table 3). Specifically, in this group, experiences related to introspective motives were slightly compromised, while those related to solitude and remoteness were substantially compromised (i.e., more than a 0.50 mean difference score). Both Escapists and Enthusiasts placed the most importance (Figure 1) on motives related to escape and

TABLE 3 Extent to Which Experiences Sought Were Attained

	Generalists	Escapists	Enthusiasts	<i>F</i>	<i>p</i>
To be near others who could help	0.47	0.48	0.63	2.14	0.12
To think about who I am	0.41 _a	0.26 _b	−0.03 _c	19.66	<0.0005
A sense of freedom	0.39 _a	0.06 _b	−0.23 _c	36.47	<0.0005
To be my own boss	0.39 _a	0.33 _a	0.06 _b	11.14	<0.0005
To learn about this place	0.36 _a	0.18 _b	0.00 _c	14.92	<0.0005
A sense that surroundings haven't been impacted by people	0.32 _a	−0.57 _b	−0.91 _c	88.13	<0.0005
Being away from the modern world	0.30 _a	−0.16 _b	−0.35 _c	47.73	<0.0005
A feeling of remoteness	0.27 _a	−0.48 _b	−0.58 _b	72.65	<0.0005
Wilderness opportunities	0.23 _a	−0.05 _b	−0.17 _b	26.63	<0.0005
A sense of challenge	0.20 _a	−0.04 _b	−0.29 _c	25.50	<0.0005
To develop personal, spiritual values	0.19 _a	0.09 _a	−0.10 _b	13.48	<0.0005
Closeness to nature	0.15 _a	−0.11 _b	−0.17 _b	21.77	<0.0005
Solitude	0.14 _a	−0.49 _b	−0.69 _b	43.70	<0.0005
Being away from crowds of people	0.06 _a	−0.73 _b	−0.82 _b	55.84	<0.0005

Note: Scores computed as "How much did you experience it?" – "How much were you seeking it?" (7-point scales). Numbers with different subscripts within the same row differ at $\alpha = .05$.

TABLE 4 Differences among Clusters in Support for Use Limits in Wilderness

	Generalists	Escapists	Enthusiasts
	Percent		
There should never be a limit	40.5	36.9	31.4
No limit is needed now, but impose limits if overuse occurs	46.2	49.7	42.3
Yes, a limit is needed now to hold use at the current level	10.3	12.6	22.6
Yes, a limit is needed to lower the current level of use	3.0	4.8	3.6

Note: Response to the question, “Do you feel a limit is needed on the number of people using this wilderness, recognizing that if a limit is enforced your own opportunity to visit may be reduced in the future?”

$$\chi^2 = 15.44, p = .02.$$

solitude (e.g., *being away from crowds of other people*, having a feeling of *remoteness*, and sensing that *the area had not been affected by people*), and these were compromised to the greatest degree.

Management Preferences

A general question asked whether respondents believed that use limits are needed in the wilderness they visited (Table 4). Enthusiasts were more likely to say yes, although only 26% of this segment supported one of the two types of limits. Several questions about specific management actions and reasons to limit use appeared in three separate batteries of questions. Three MANOVAs were performed with one for each battery of questions. All analyses revealed statistically significant differences among the clusters (for the items about restrictive wilderness management policies, $T^2 = .054$, $F = 2.63$, $p < .0005$; for the items about reasons to limit use, $T^2 = .065$, $F = 2.78$, $p < .0005$; and for the items about whether urban proximate and urban-distant wildernesses should be managed differently, $T^2 = .049$, $F = 4.02$, $p < .0005$). Given these findings, ANOVAs were performed for each item individually (Table 5). The primary differences in management preferences occurred between Generalists and the other two clusters. Where differences did occur, they followed the predicted pattern of Enthusiasts more supportive of restrictions and Generalists more tolerant of use.

No differences were found among clusters in opinions about specific restrictive policies that might be adopted to protect wilderness. All three groups opposed limits on day use (with only 23–34% support). Views on limiting overnight use were more neutral (39–42% support). The higher level of support for requiring camping at designated sites and prohibiting campfires (nearly 50% of each cluster supported each of these measures) may have reflected the preponderance of day users in the sample.

Differences between clusters were more pronounced for the nine reasons that use might be limited in wilderness, with the primary pattern being that the Generalists were distinct from the other two clusters. Enthusiasts were the only group that, on average, accepted limits *to avoid seeing other people* or *to avoid having to deal with inconsiderate people*. However, even within this group, support for those measures was not strong. Generalists did not accept avoiding encounters with other people as a reason to limit use. Conversely, all groups endorsed limits to avoid impacts to biophysical resources.

TABLE 5 Differences between Clusters in Mean Agreement with Wilderness Management Policies Related to Recreational Use

	Cluster			<i>F</i>	<i>p</i>
	Gen.	Esc.	Enth.		
<i>To protect the wilderness, the Forest Service should. . .</i>					
Limit the number of day users	-0.85 _a	-0.35 _b	-0.35 _b	6.37	0.03
Limit the number of overnight users	-0.14	0.06	0.05	0.63	0.53
Prohibit campfires	0.61	0.56	0.91	2.18	0.11
Prohibit dogs	-0.28	-0.45	-0.21	1.53	0.22
Require camping at designated sites	0.55	0.58	0.61	0.14	0.87
<i>Use limits should be imposed in wilderness to . . .</i>					
Avoid seeing lots of other people	-0.71 _a	-0.20 _b	0.19 _c	18.24	<0.0005
Avoid the need for frequent, intensive maintenance of trails and campsites	-0.03 _a	0.23 _{ab}	0.48 _b	5.90	0.003
Avoid the need to think about how your behavior affects other people	-0.84 _a	-0.76 _a	-0.35 _b	5.00	0.007
Avoid impact on wildlife	1.15 _a	1.44 _b	1.53 _b	5.02	0.007
Avoid having to worry about what other people are doing	-0.66 _a	-0.39 _b	-0.11 _b	7.21	0.001
Avoid having to deal with inconsiderate people	-0.59 _a	-0.04 _b	0.31 _b	18.99	<0.0005
Avoid lots of evidence of previous visitors	0.27 _a	0.63 _b	0.79 _b	6.81	0.001
Maintain the freedom to go and stop anywhere you want	-0.16 _a	0.10 _a	0.48 _b	7.22	0.001
Avoid impacts to soil and vegetation	1.11 _a	1.45 _b	1.48 _b	6.21	0.002
<i>Compared to remote wildernesses, in wildernesses close to cities. . .</i>					
It is OK to see more people	1.60 _a	1.46 _{ab}	1.25 _b	3.34	0.04
Access should be unrestricted to allow for relief from the city	1.15	0.98	1.09	1.10	0.33
It is OK to have more impact on vegetation from recreational use	0.21 _a	-0.24 _b	-0.44 _b	9.51	<0.0005
Visitors' behaviors should be more restricted	0.47 _{ab}	0.87 _b	0.83 _b	6.16	0.002
It is more acceptable to manipulate the environment to withstand recreational use	0.43	0.42	0.15	1.24	0.29
Use limits are more likely to be needed	0.67 _a	1.00 _b	1.32 _b	7.42	0.001

Note: Scale +3 (strongly agree) to -3 (strongly disagree)

*Bonferroni test; Numbers with different subscripts within the same row differ at $\alpha = .05$.

Overall, the three clusters agreed that it is acceptable for wildernesses close to cities, where use is high and access is easy, should have different policies from more remote areas. Where differences did occur, they tended to be small (i.e., <10%). Visitors agreed that it is acceptable to see more people in urban proximate wildernesses and that people should be allowed to visit these wildernesses whenever they want. At the same time, all three groups said that use limits are more likely to be needed in these areas.

Discussion and Implications

We hypothesized that wilderness involvement and trip motives would be related and that clustering on these variables would result in segments of wilderness visitors that differ in ways that are meaningful to wilderness managers. The results showed that the three clusters differed to a substantial degree in terms of several motives, although all scored positively on measures of wilderness involvement. Like Brown and Haas's (1980) study of Rawah Wilderness hikers, we found that one cluster ranked all motives as highly important, and one ranked all of them substantially lower. Unlike the Rawah study, though, where the primary differences were in orientation to risk taking and meeting other people, the primary differentiators in our study appeared to be introspective motives with differences of more than three points (>40%) on the 7-point scale.

The group we labeled Generalists (approximately one-quarter of the sample) placed relatively little emphasis on traditional wilderness experiences and seemed to be motivated by other experiences that we did not include in our study. Enthusiasts (22% of the sample) rated wilderness experiences especially highly and were notably different from the other two clusters in their desire for personal reflection. Escapists (51% of the sample) were intermediate in their motives. Escapists were like Generalists in their relative disinterest in reflection and spiritual values and like Enthusiasts in their desire to be away from crowds in a remote, undisturbed environment.

Differences among the clusters in their sensitivity to social conditions were generally as predicted. Generalists were unaffected by encounters with other groups, and Enthusiasts were negatively affected by encounters and somewhat less able to have the types of experiences they sought. These findings are similar to those reported in other studies of wilderness visitors (Virden & Schreyer, 1988b; Williams *et al.*, 1992). The groups also differed in management opinions. Enthusiasts differed most markedly from Generalists and were more supportive of use limits for all the reasons we asked about. Enthusiasts also differed from Escapists in being more supportive of use limits if needed to avoid seeing lots of people, to maintain the freedom to go and stop wherever one wants, and to avoid having to think about the effects of one's own behavior on others. Escapists differed from Generalists in being more supportive of use limits to avoid a variety of environmental impacts, as well as several types of social impact. Escapists and Enthusiasts were similar in their high level for support for limiting use to avoid environmental impacts, while Generalists were less supportive of any type of restriction.

Management Implications

In high use wilderness areas today, a primary management concern is increasing day use and crowding at popular destinations (Cole & Hall, 2007). In some of the locations we studied, it was not uncommon to encounter more than 200 other hikers on a pleasant summer weekend. Managers worry that they are not protecting outstanding opportunities for solitude in these locations, and the only realistic way to solve this problem is to bring use levels down (Hall, 2001b). In some locations, only limits on use would achieve this end.

In this context, wilderness managers might be heartened to learn that three-quarters of the wilderness visitors surveyed were seeking solitude, freedom, remoteness, and wilderness opportunities to a high degree (above 5.0 on the 7-point scale). These motives are quite consistent with the types of experiences described in the Wilderness Act. In addition, most people reported achieving these experiences to a high degree. However, the results also indicated that, on average, two segments of wilderness visitors were not completely able to have the experiences they most desired in wilderness related to remoteness and solitude.

This inability to be away from other people and their impacts, or to be able to experience solitude and a sense of remoteness, suggests that wilderness opportunities are currently being compromised to maintain access for visitors who are not motivated to experience wilderness as defined in the Wilderness Act and who may be just as satisfied recreating in a nonwilderness setting.

How managers should use these findings is not clear. Researchers have argued that the views of those seeking experiences most attuned to the purposes of wilderness should be given special attention (Hendee et al., 1990; Shin & Jaakson, 1997). However, this group (purists) did not make up a majority of our sample. By not including very low use trails in our sample we may have missed some purists, but by definition this group is probably only a small percentage of all wilderness users. If managers focus on protecting the experiences sought by this minority, they risk being challenged by the majority who do not support restrictions to protect experience quality, deeming them undemocratic or unfair.

Perhaps more problematic, though, is the relatively low level of endorsement for restrictions designed to protect opportunities for solitude and related experiences even among the most purist segment of visitors. The most commonly accepted wilderness management frameworks are premised on identifying experience indicators (e.g., encounters), setting standards, and monitoring conditions (Manning & Lawson, 2002). When standards are exceeded, management actions are required. This approach rests on an assumption that effective management actions are acceptable to the public. In our study, the majority of wilderness visitors in all clusters said they would accept some restrictions on campers' behavior, such as requiring *camping in designated sites* (54–56% support), and use limits if needed to *avoid lots of evidence of previous visitors* (52–67% support) or *avoid impact on wildlife* (74–81% support). However, such actions do not address the issue of protecting outstanding opportunities for solitude. Moreover, even Enthusiasts did not on average support limits on day use (i.e., the primary source of encounters), and they were neutral toward limits on overnight use. Even if managers were to attend differentially to the desired experiences of this group, they would not find support for the restrictions on use that might be required to provide desired experiences.

Managers may find it troubling to learn that visitors desire certain experiences such as solitude but do not endorse the actions that would be required to provide them. Although our study is more comprehensive than others in investigating the links between motives and support for management, it is not the first to show this pattern. For instance, Shafer and Hammitt (1995) found that wilderness purists cared more about the environment and solitude than other segments but were not more supportive of use restrictions. Another study by Manning and Valliere (1996) found that Breadloaf Wilderness visitors, even those with highly purist orientations, generally opposed use limits. When forced to choose, wilderness visitors including the most purist segment appeared to prioritize freedom and control over solitude. This conclusion emerging from contemporary research runs counter to assertions based on early wilderness studies that wilderness visitors are generally accepting of use restrictions (Hendee et al., 1990).

Our study focused on solitude, but the Wilderness Act also specifies unconfined recreation as a type of opportunity that should be protected in wilderness. The argument could be made that visitors' objections to use limits are founded on a strong value for lack of confinement, including the confinement created by regulations. Hall (2001b) called for a more open discussion of ways managers can and should protect both solitude and freedom in wilderness, and our study reaffirms that these values may be in conflict. An approach long advocated for wilderness, zoning, seems appropriate in this situation, and researchers have suggested that visitors support different management goals within and among wildernesses (Cole & Hall, 2005). Most of the current zoning practices, however, are based on the notion

that the same indicators should still apply in all zones, even though standards vary. For instance, many wilderness management plans have standards for the acceptable number of daily encounters, which vary from zero to around 20, depending on the zone. Our research suggests that zoning might need to be rethought to more explicitly value freedom from restrictions in some zones and opportunities for solitude in others.

Conclusion

This research was motivated by the questions of whether a segment of the visiting public, in contrast to the majority, is composed of people who seek wilderness-dependent experiences, have trouble achieving their goals in high use places, and are substantially more supportive of restrictions on use. Some researchers have argued that managers should limit use to protect opportunities for this user type, and we wanted to test the underlying assumptions. Our results revealed a segment that is more enthusiastic about wilderness-related types of experiences, although this was more a matter of degree than of having altogether different motives. Experiences for these people are compromised, but generally not to a great extent, as they still experience high degrees of solitude and other wilderness experiences even in very high use places. Moreover, this group is not generally supportive of restrictions to protect solitude. Overall, our findings challenge conventional wisdom regarding the management preferences of wilderness purists.

References

- Badger, T. J. (1975). *Rawah wilderness crowding tolerances and some management techniques: An aspect of social carrying capacity*. Unpublished master's thesis, Colorado State University, Fort Collins.
- Beh, A., & Bruyere, B. L. (2007). Segmentation by visitor motivation in three Kenyan national reserves. *Tourism Management*, 28(6), 1464–1471.
- Brown, P. J., & Haas, G. E. (1980). Wilderness recreation experiences: The Rawah case. *Journal of Leisure Research*, 12(3), 229–241.
- Clatworthy, J., Buick, D., Hankins, M., Weinman, J., & Horne, R. (2005). The use and reporting of cluster analysis in health psychology: A review. *British Journal of Health Psychology*, 10, 329–358.
- Cole, D. N. (2004). Wilderness experiences: What should we be managing for? *International Journal of Wilderness*, 10(3), 25–27.
- Cole, D. N., & Hall, T. E. (2005). *Wilderness visitors and experiences in Oregon and Washington: Trailhead surveys in thirteen Forest Service wildernesses*. Unpublished report. Missoula, MT: Aldo Leopold Wilderness Research Institute & University of Idaho.
- Cole, D. N., & Hall, T. E. (2006). Wilderness zoning: Should we purposely manage to different standards? In D. Harmon (Ed.), *People, places, and parks: Proceedings of the 2005 George Wright Society Conference on Parks, Protected Areas, and Cultural Sites* (pp. 33–38). Hancock, MI: The George Wright Society.
- Cole, D. N., & Hall, T. E. (2007). The “adaptable human” phenomenon: Implications for recreation management in high-use wilderness. In S. Weber & D. Harmon (Eds.), *Rethinking protected areas in a changing world: Proceedings of the 2007 George Wright Society Conference* (pp. 126–131). St. Paul, MN: George Wright Society.
- Cole, D. N., Petersen, M. E., & Lucas, R. C. (1987). *Managing wilderness recreation use: Common problems and potential solutions* (General Technical Report INT-230). Ogden, UT: USDA Forest Service, Intermountain Research Station.
- Cole, D. N., Watson, A. E., Hall, T. E., & Spildie, D. R. (1997). *High-use destinations in three wildernesses: Social and biophysical impacts, visitor responses, and management options* (Research Paper INT-RP-496). Ogden, UT: USDA Forest Service, Intermountain Research Station.

- Hair, J. F., & Black, W. C. (2000). Cluster analysis. In L. G. Grimm & P. R. Yarnold (Eds.), *Reading and understanding more multivariate statistics* (pp. 147–205). New York: American Psychological Association.
- Hall, T. E. (2001a). Hikers' perspectives on solitude and wilderness. *International Journal of Wilderness*, 7(2), 20–24.
- Hall, T. E. (2001b). Use limits in wilderness: Assumptions and gaps in knowledge. In W. A. Freimund & D. N. Cole (Eds.), *Visitor use density and wilderness experience: Proceedings of a workshop, June 1–3, 2000, Missoula MT* (Proceedings RMRS-P-20, pp. 39–48). Ogden, UT: USDA Forest Service, Rocky Mountain Research Station.
- Hall, T. E., & Cole, D. N. (2000). An expanded perspective on displacement: A longitudinal study of visitors to two wildernesses in the Cascade Mountains of Oregon. In S. F. McCool, D. N. Cole, W. T. Borrie, & J. O'Loughlin (Eds.), *Wilderness science in a time of change conference* (Proceedings RMRS-P-15-VOL-4, pp. 113–121). Fort Collins, CO: USDA Forest Service, Rocky Mountain Research Station.
- Hammit, W. E., & Rutlin, W. M. (1995). Use encounter standards and curves for achieved privacy in wilderness. *Leisure Sciences*, 17(4), 245–262.
- Hendee, J., Stankey, G., & Lucas, R. (1990). *Wilderness management*. Golden, CO: Fulcrum Press.
- Johnson, B. J., Hall, T. E., & Cole, D. N. (2005). *Naturalness, primitiveness, remoteness, and wilderness: Understanding and experience of wilderness qualities*. Moscow, ID: University of Idaho & Aldo Leopold Wilderness Research Institute.
- Kaye, R. (2000). The Arctic National Wildlife Refuge: An exploration of the meanings embodied in America's last great wilderness. In D. N. Cole, S. F. McCool, W. A. Freimund, & J. O'Loughlin (Eds.), *Proceedings, Wilderness Science in a Time of Change Conference*, May 23–27, 1999, Missoula, MT (Proceedings RMRS-P-15-VOL-2, pp. 73–80). Ogden, UT: USDA Forest Service, Rocky Mountain Research Station.
- Kliskey, A. D. (1998). Linking the wilderness perception mapping concept to the recreation opportunity spectrum. *Environmental Management*, 22(1), 79–88.
- Landres, P., Boucher, S., Merigiano, L., Barns, C., Davis, D., Hall, T., et al. (2005). *Monitoring selected conditions related to wilderness character: A national framework* (General Technical Report RMRS-GTR-151). Fort Collins, CO: USDA Forest Service, Rocky Mountain Research Station.
- Love, T. G., & Watson, A. E. (1992). *Effects of the Gates Park fire on recreation choices* (Research Note INT-402). Ogden, UT: USDA Forest Service, Intermountain Research Station.
- Manfredo, M. J., Driver, B. L., & Brown, P. J. (1983). A test of concepts inherent in experience based setting management for outdoor recreation areas. *Journal of Leisure Research*, 15(3), 263–283.
- Manfredo, M. J., Driver, B. L., & Tarrant, M. A. (1996). Measuring leisure motivation: A meta-analysis of the recreation experience preference scales. *Journal of Leisure Research*, 28(3), 188–213.
- Manning, R., & Lawson, S. R. (2002). Carrying capacity as “informed judgment”: The values of science and the science of values. *Environmental Management*, 30(2), 157–168.
- Manning, R. E., & Valliere, W. A. (1996). Environmental values, environmental ethics, and wilderness management: An empirical study. *International Journal of Wilderness*, 2(2), 27–32.
- McCool, S. F., & Reilly, M. (1993). Benefit segmentation analysis of state park visitor setting preferences and behavior. *Journal of Park and Recreation Administration*, 11(4), 1–14.
- McIntyre, N. (1989). The personal meaning of participation: Enduring involvement. *Journal of Leisure Research*, 21(2), 167–179.
- McIntyre, N., & Pigram, J. J. (1992). Recreation specialization reexamined: The case of vehicle based campers. *Leisure Sciences*, 14, 3–16.
- Noe, F. P., Hammit, W. E., & Bixler, R. D. (1997). Park user perceptions of resource and use impacts under varied situations in three National Parks. *Journal of Environmental Management*, 49(3), 323–336.
- Patterson, M. E., Watson, A. E., Williams, D. R., & Roggenbuck, J. W. (1998). An hermeneutic approach to studying the nature of wilderness experiences. *Journal of Leisure Research*, 30(4), 423–452.

- Sarigollu, E., & Huang, R. (2005). Benefits segmentation of visitors to Latin America. *Journal of Travel Research*, 43, 277–293.
- Selin, S. W., & Howard, D. R. (1988). Ego involvement and leisure behavior: A conceptual specification. *Journal of Leisure Research*, 20(3), 237–244.
- Shafer, E. L., Jr. (1969). *The average camper who doesn't exist* (Research Paper NE-142). Upper Darby, PA: USDA Forest Service, Northeast Forest Experiment Station.
- Shafer, C. S., & Hammitt, W. E. (1995). Purism revisited: Specifying recreational conditions of concern according to resource intent. *Leisure Sciences*, 17, 15–30.
- Shin, W. S., & Jaakson, R. (1997). Wilderness quality and visitors' wilderness attitudes: Management implications. *Environmental Management*, 21(2), 225–232.
- Stankey, G. H. (1973). *Visitor perception of wilderness recreation carrying capacity* (Research Paper INT-142). Ogden, UT: USDA Forest Service, Intermountain Forest and Range Experiment Station.
- Stewart, W. P., & Cole, D. N. (2001). Number of encounters and experience quality in Grand Canyon backcountry: Consistently negative and weak relationships. *Journal of Leisure Research*, 33(1), 106–120.
- Tarrant, M. A., Haas, G. E., & Manfredi, M. J. (1995). Factors affecting visitor evaluations of aircraft overflights of wilderness areas. *Society and Natural Resources*, 8, 351–360.
- Virden, R. J., & Schreyer, R. (1988a). Hiker diversity in backcountry areas—implications for planning and management. *Western Journal of Applied Forestry*, 3(2), 49–52.
- Virden, R. J., & Schreyer, R. (1988b). Recreation specialization as an indicator of environmental preference. *Environment and Behavior*, 20, 721–739.
- Wilderness Act of 1964, §16 U.S.C. §1131–1136. Pub. L. No. 88-577. (1964).
- Williams, D. R., Patterson, M. E., Roggenbuck, J. W., & Watson, A. E. (1992). Beyond the commodity metaphor: Examining emotional and symbolic attachment to place. *Leisure Sciences*, 14(1), 29–46.
- Young, J. M., Williams, D. R., & Roggenbuck, J. W. (1990). The role of involvement in identifying users' preferences for social standards in the Cohutta Wilderness. In D. Hope II. (Ed.), *Proceedings. 1990 Southeastern Recreation Research Conference* (pp. 173–183). Athens, GA: USDA Forest Service Southeastern Forest Experiment Station.