

Conflicting Goals of Wilderness Management: Natural Conditions vs. Natural Experiences¹

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Abstract: Beliefs and attitudes underlying wilderness visitors' support for use restrictions were studied. Some evidence shows that in overused places visitors cite both protection of the resource and the wilderness experience as reasons for supporting restrictions. The research reported here provides the opportunity to assess the relative contribution of each of these reasons, and others, to visitor support for use restrictions at three wildernesses in Oregon. Support for reducing the total amount of use was best predicted by crowding measures for day visitors and by a combination of crowding and physical environment impact (dominated by physical impacts) for overnight users. This knowledge has implications for other situations involving conflicting demands on natural resources.

To manage our great wealth of natural resources in the United States, managers often face conflicting goals and difficult decisions in the allocation of resources because of competing interests. These conflicting goals may be related to conflicting consumptive uses of a resource, such as using wood fiber for building material or for firewood. Or this conflict may be between consumptive and nonconsumptive values of the resources, such as between use of the trees for building or for firewood versus the value of those trees to recreation or watershed protection.

As the USDA Forest Service implements a strategy for ecosystem management, conflict and compromise are going to be integral components of decisions about resource management. Ecosystem management practices have continuously been described as those practices that are socially acceptable. While the components of acceptability have been outlined by Brunson (1993), the method of determining acceptability and how social acceptability will be incorporated into specific decisions is not clear.

One previously unrecognized value of the National Wilderness Preservation System is the idea of a laboratory within the context of ecosystem management. The scientific and educational value of wilderness preservation should provide substantial returns for our public servants' forethought to create such a system. It provides a means in which management goals can be clearly specified within the authorizing legislation: and the American people substantially

recognize the values of those goals. The values have been clearly specified: substantial investment has already been made to provide understanding of visits, visitors, and attitudes toward wilderness; and substantial discussion has already occurred about how to handle necessary compromises.

The Wilderness Act, which was enacted in 1964, posed a challenge to those eventually responsible for administering the more than 500 units of the current National Wilderness Preservation System. The need for compromise was set in motion by specifically mandating conflicting goals for wilderness management. Several statements in the Act mention preserving and protecting lands in their natural condition. Yet, in most of these same sentences it is also emphasized that these areas are for use and enjoyment by people for recreation participation.

In section 2(c) of the Wilderness Act, the recreation potential for wilderness is more specifically defined as "outstanding opportunities for solitude or a primitive and unconfined type of recreation." Hendee and others (1990) interpret the Act's elaboration on preservation and recreation values as an indication that the criteria of naturalness and solitude are the distinguishing qualities of classified wilderness. They also believe naturalness and solitude to be the principal criteria to guide the management of wilderness.

This interpretation presents a dilemma for managers. One of the primary threats to both naturalness and solitude in wilderness is the number of people. Their behavior in the wilderness and interactions with various biological elements and other visitors affect impact levels. In addition, visitor traffic volume along trails, at campsites, and at other heavily used sites poses a severe threat to providing wilderness conditions. In these high-use cases, restrictions of numbers of visitors may serve to protect the resource and the solitude aspect of the experience. To many, however, these restrictions reduce feelings of primitiveness, spontaneity, freedom, and unconfinement.

The Limits of Acceptable Change (LAC) planning system was developed in response to the need to balance the conflicting goals of recreational use and maintaining natural conditions (Starkey and others 1985). A fundamental premise of the LAC process is that primary attention is focused on wilderness conditions and the actions needed to protect or achieve acceptability for key parameters (Stankey and others 1985). Cole (in press) clarifies that two conflicting goals cannot be maximized, but through the LAC process the compromise between goals is optimized. Adopting a limited use permit system is one resource management technique used to protect wilderness conditions and experiences, with optimal cost to visitor experiences.

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The purpose of this paper is to examine visitor acceptance of a new permit system and the potential of limiting recreational use at three Oregon wildernesses, even though these limits will compromise available recreation opportunities. Understanding how visitors decide on acceptability of a management technique based on compromise is likely to provide insight into other conflicting demand situations.

Background

In 1980, a total of 69 wildernesses had permit systems. Of these 69, only 17 limited the number of permits available (Washburne and Cole 1983). Today, only about 50 wildernesses issue permits. The number of wildernesses with use limits has increased from 17 to about 25.

Permits for wilderness use may vary in the following ways: (1) they may be self-issued or issued only by agency personnel or their representatives; (2) they may be limited (as part of a use limitation system) or unlimited; and (3) they may be required for all users or only some visitors (e.g., overnight users only, or overnight users only during high-use times, such as summer weekends).

Despite personal disagreement among scientists on the value of use limitation systems (Behan 1974, Hendee and Lucas 1974), results of previous research on visitor reaction to permit systems that limit use has suggested that restricting numbers when an area is being used beyond its capacity is strongly supported by visitors (Lucas 1980). In a 1972 study of visitors to the Desolation Wilderness in California, 90 percent of respondents supported restrictions if capacity was exceeded (Lucas 1980). In a 1990 study, 93 percent of a sample of those acquiring permits to the Desolation Wilderness found restrictions desirable if capacity was exceeded. Even 67 percent of a sample of those in the wilderness without permits supported use restrictions in 1990 (Watson 1993). Similarly, Stankey (1979) found 81 percent of unsuccessful permit applicants supported restrictions at the San Gorgonio and San Jacinto Wildernesses in California. In eight other study areas, Lucas (1980) found about 75 percent of respondents felt it was desirable to limit use if capacity was exceeded, while only 10 or 12 percent said it would be undesirable. Lucas (1985) also found a high level of support for limiting use in studies conducted in 1970 and 1982 at the Bob Marshall Wilderness in Montana. Interestingly, he also noted that the question would be hard for visitors to disagree with; but, the more interesting question would be to understand visitors' definition of "beyond capacity."

Few studies have examined why visitors support use restrictions. In a study of why visitors supported use restrictions at the San Gorgonio and San Jacinto Wildernesses in 1973 (82 percent did support it), Stankey found that "protecting the resource" and "protecting experiences" dominated visitor responses. Neither these findings, nor subsequent research, however, suggest why visitors so readily support limiting use given the potential of a personally costly compromise. Some visitors appear willing to relinquish some

positive wilderness experiences, such as unconfinement, spontaneity, and freedom, to maintain naturalness and solitude opportunities for those who are fortunate enough to obtain access. The research reported here was intended to further understand the strength of the relationship between support for use limitation systems and visitor perceptions of threats to naturalness and solitude.

Methods

This study was conducted in 1991 at three Forest Service wildernesses in Oregon--Three Sisters, Mt. Washington, and Mt. Jefferson. That year marked the reintroduction of a permit system that had existed before 1982, but had been dropped during the intervening years. Beginning in 1991, permits were again required for both day and overnight users. While day-use permits could be obtained at trailheads, overnight permits had to be obtained from agency offices or other designated outlets. The number of permits was not limited, though it is anticipated that in 1995 use limits will be applied for at least some heavily impacted areas.

A sample of 1,450 permit holders (1,096 day, 354 overnight) was obtained through a stratified (based on strata of entrance points varying in use intensity), systematic sample of permits. The mail survey assessed users' reactions to the new permit requirement and their attitudes toward potential use limits implemented through restrictions on the number of permits issued. An overall response rate of 82 percent was obtained for the 11-page mailback questionnaire after three mailings.

The possibility of limiting use was introduced in a slightly different way than previously discussed by Lucas (1980, 1985) and Watson (1993). Still hypothetical, the question more closely approximated the questioning Stankey (1979) posed to unsuccessful permit applicants. The exact question posed to visitors in the current study was: "Do you feel that a limit is needed on the number of people using this wilderness, recognizing that your own opportunity to visit this wilderness may be limited in the future?" Responses related to future visits to the specific area, and they related to conditions previously witnessed by the visitors to that area. Visitors could respond that they supported limiting use immediately, to either (1) reduce use or (2) to hold use at the current level. They could also respond that they (3) supported limiting use, but only at that time in the future when overuse occurred, or (4) that they felt limits would never be appropriate at any time.

Analysis

To statistically identify independent variables that explain support of a use limitation system, discriminant analysis was used to classify respondents into two categories: those that believed overuse had occurred and those that believed use limits were unacceptable. Initial efforts with four separate categories found little discriminant ability between those

who supported immediate limits to hold use at the current level and those that supported limits in the future when overuse occurred. For that reason, only two categories of users were used in the discriminant analysis.

Seven independent variables were entered into the discriminant analysis. Three variables measured how present conditions compared to what they expected. Specifically, the items dealt with expectations about number of encounters with others, number of places impacted by previous visitors, and number of managers' strategies to correct impacts by previous visitors. Another variable measured whether the visitor generally felt crowded during the trip. Two variables measured how enjoyment of the visit was influenced by numbers of people and amount of physical damage from other visitors. The number of years since a visitor first visited the wilderness was also entered as a potential predictor variable.

A bootstrap approach was used in preliminary model building to better understand the stability of the model specification and the classification results. The bootstrap process involved randomly generating five sets of data for model building and five sets of data for model testing. For all users, and then for overnight visitors only, the following four-step process was used:

1. A stepwise discriminant analysis (PROC STEPDISC) (SAS 1987) was conducted to identify model specification.
2. From the stepwise results two model specifications were identified--one consisting of variables which were found to be statistically significant in each of the five stepwise models, and another consisting of variables which were found significant in at least three of the five stepwise models.
3. The model specification leading to the best classification results when applied to the model testing data was chosen to be the best model specification (both a good predictor and identifier of consistent variables).
4. Coefficients and classification results (PROC DISCRIM) (SAS 1987) were generated from the five model-building and five model-testing databases for each of the models chosen from #3 above.

Based on the information derived from the bootstrap analysis, final model specifications and classification results were generated for all users (day use and overnight) and for overnight users separately.

Results

Nearly two-thirds (63 percent) of day hikers and 44 percent of overnight campers did not consider the permit requirement inconvenient, with overnight campers more likely than day users to consider the permit requirement a slight or major inconvenience (*table 1*). Even though a substantial number thought the requirement of a permit only to learn about use levels and use distribution was an inconvenience, only 10 percent of day users and 12 percent of campers thought it was not justified (*table 1*).

Twenty percent of campers supported restrictions-even though they may be refused access at some point in the future-to reduce use from current levels; 20 percent supported maintaining use at its current level; 47 percent supported limits at some time in the future if overuse occurs; and 14 percent felt there should never be use limits (*table 1*). Day users were slightly less supportive of lowering the current level of use, with only 11 percent supporting a forced decrease in use; 21 percent supported limits to maintain use at its current level; 52 percent supported limits at some time in the future if overuse occurs; and 16 percent felt there should never be use limits (*table 1*).

These results are comparable to those compiled by Lucas (1980, 1985). For overnight users, for example, 87 percent indicated support of limits if overuse occurs. This percentage can be broken down into three groups: (1) those who believe overuse is already occurring (lower immediate use); (2) those who believe overuse is near occurrence (maintain use at this level); and (3) those who believe overuse may occur at some time in the future (limit use at that time).

Not only did support vary between day users and overnight campers, but discriminant analysis produced different results when day and overnight users were examined

Table 1-Response of Oregon wilderness visitors to new permit system and potential for use limits

Response	User	
	Day hiker	Overnight
	----- percent -----	
Permit no inconvenience at all	63	44
Permit is not justified to learn about use	10	12
Initiate use limits:		
To reduce use from current level	11	20
To hold use at its current level	21	20
At some time in the future if overuse occurs	52	47
Never	16	14

together or when overnight users were analyzed separately (tables 2, 3). For all users (dominated by day users), perceptions of crowding (CROWDED) during the visit was the only significant predictor to emerge from the stepwise discriminant analysis (table 2). The discriminant function enabled correct classification of more than two-thirds (69 percent) of all respondents into supporters or opponents of use limits.

When only overnight users were included in the discriminant analysis, crowding (CROWDED) was again a significant predictor ($p < 0.004$) (table 1). However, perception of physical impacts to trails and campsites (IMPACTS) also made a significant contribution ($p < 0.0009$). The overall classification of overnight visitors into the two response categories was 78 percent. Considerable improvement in classification was achieved within the group that advocated immediate reduction of use; correct classification increased from 47.5 percent to 75.5 percent.

Discussion

A large majority of wilderness visitors indicated they support limiting use to maintain the qualities of the wilderness. Day users and overnight users differed about when they

thought use limits should be applied. Twenty percent of overnight campers felt use restrictions should be initiated immediately. Only 11 percent of day users, however, supported immediate reduction of use. The majority of all visitors believed that overuse had not occurred at these sites, indicating they supported use-levels when capacity was reached.

The methods we used could not discriminate between the two groups who supported use limits but did not think capacity had been met or exceeded. None of the measures explained differences in these responses. Given these results, it may be difficult for managers to convince visitors that setting use limits to reduce use from the current level is the right action. In all cases, it appears that the most prevalent reason for supporting use limits is when visitors express general feelings of being crowded.

The amount of visitors' experience at the wilderness was not a significant predictor of support for use limits in this study. In contrast, results of an earlier study (Frost and McCool 1988) found familiarity with Glacier National Park related to support for restrictions on visitor behavior during eagle migration. Discrepancies between visitor expectations and what they encountered was another set of variables that were not significant predictors of support for use limits. This difference is somewhat contrary to some research on recreation

Table 2 -Discriminant model and group-level classification results for all users of the three Oregon wildernesses¹

Variable	Coefficients		Final F-value	Level of significance
	Group 1 ²	Group 2 ³		
CROWDED	.89	.45	65.071	0.0001
Constant	-2.49	-1.05	--	--

¹Wilks' Lambda = 0.824; F = 65.0709; Level of significance = 0.0001; Overall predictive power = 68.7 percent.

²Initiate immediate use limits to reduce use.

³Never limit use.

Table 3 -Discriminant model and classification results for overnight users of the three Oregon wildernesses¹

Variable	Coefficients		Final F-value	Level of significance
	Group 1 ²	Group 2 ³		
CROWDED	.71	.35	8.727	0.0040
IMPACTS	1.37	.40	11.902	0.0009
Constant	-2.93	-1.27	--	--

¹Wilks' Lambda = 0.705; F = 18.5904; Level of significance = 0.0001; Overall predictive power = 78.3 percent

²Initiate immediate use limits to reduce use.

³Never limit use.

visitor satisfaction which suggests that for nonconsumptive recreationists, satisfaction with a visit is higher for those with more readily achievable goals (Williams 1989).

The best predictors of whether campers support use limits to reduce use or do not support use limits are a combination of general feelings of being crowded and perceptions of impacts along trails and at campsites by previous users. Physical impacts appear to be the most important predictor when considering only overnight users, though it is the combination of feeling crowded and physical impacts that allows high classification success. When the entire sample of users (dominated by day use) was examined, only the crowding perception variable predicted whether or not someone supported use limits. For the entire population of users, most thought that simply the numbers of other visitors was the factor to determine support for use limits. If visitors felt crowded, they were more likely to support limits to reduce use.

Increasing use of some wildernesses will pressure managers to consider adopting permit systems as a use restriction tool. The type of research reported here can help managers anticipate visitor responses to management tactics aimed at maintaining ecosystem integrity and minimizing conflict. However, this approach will necessitate human value compromises. Support for use limitation systems that reduce recreational access appears to be dependent upon a combination of visitor perceptions that the area has too many people and that visitor impacts have reached unacceptable levels. However, beliefs underlying support vary by the user type. Support of overnight campers for reducing use depended on their extended stay and exposure to physical resource impacts. Day users were more influenced by numbers of people.

Conclusion

The study results offer insight into the challenges of managing wilderness as well as other resource areas where conflicting goals are common. Although visitors overwhelmingly accepted a technique that would compromise their ability to recreate in the wilderness, the majority of respondents did not think overuse had occurred yet. Researchers were unable to predict support based on various potential predictors that had previously been identified as important to the wilderness experience. This provides important insight into how public opinion on other important resource issues may evolve. A minority of the visitors consider current conditions unacceptable and support immediate action to provide balance to the conflict. The majority, however, do not perceive the constraining variable a problem to the extent that movement to protect conditions is

warranted. This research failed to provide much information about this group and possibly a similarly positive, yet reluctant, public response will likely be a serious challenge to policymakers in other resource management issues. If future research could offer a better understanding of this "cautiously supportive" group, managers could better predict their response to future management activities.

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