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Wilderness Management in The Southern Appalachians

Joseph W. Roggenbuck, Alan E. Watson, and George H. Stankey

ABSTRACT. Wilderness managers need information about visitor preferences and behavior if they are to protect wilderness experiences and resources. Linville Gorge, Shining Rock, and Joyce Kilmer/Slickrock wilderness users have somewhat different perceptions of wilderness problems, but too many people in certain places, a lack of information about use, litter, and destruction of vegetation are commonly mentioned. Wilderness users expect few contacts with other groups, especially with large groups and at campsites. Use controls are generally supported, and visitors favor unobtrusive management strategies over direct regulation.

The Wilderness Act of 1964 (PL88-577) established a National Wilderness Preservation System to protect certain lands in their natural state and to provide outstanding opportunities for solitude and an unconfined type of recreation. A 15-fold increase in wilderness use since the late 1940s makes these objectives difficult to achieve (Hendee et al. 1978). Use concentrations are generally highest in small areas located near population centers. This is a characteristic of most areas in the East.



Figure 1. Wilderness users dislike seeing large groups of people.

Several studies have also shown that certain trails and campsites tend to receive high use and impacts, while others are seldom used (Lucas 1964, Stankey et al. 1976, Lucas 1980). Finally, use tends to be concentrated during certain seasons of the year and days of the week.

The manager is thus faced with difficult decisions regarding the number and nature of use that wilderness can support while still meeting the preservation mandate of the Wilderness Act. Site hardening and facility development is generally considered inappropriate. Instead, wilderness managers must be managers of people. They must accomplish wilderness goals by modifying number of visits, length of stay, timing of use, distribution of use, party size, method of travel, activity, or visitor behavior (Lucas 1973).

People management requires knowledge of current visitors and their use of wilderness. This is especially the case if management is to be light-handed and unobtrusive (Lucas 1980). Light-handed management congruent with the legal mandate for challenge, freedom, and unconfined recreation in wilderness is preferred by many managers (Bury and Fish 1980, Hart 1980) and is

apparently favored by most users (Lucas 1980). Knowledge of visitor preferences and behavior is, however, sketchy (Lucas 1980), and to date virtually all wilderness user studies have been conducted in the western states. Wilderness managers in the East question the applicability of western findings to the areas under their jurisdiction (Cermack 1976). Yet the heavy use, small size, diversity, and resource disturbance typical of eastern wilderness make the need for information to facilitate management all the more desirable.

The 1978 study of Linville Gorge, Shining Rock, and Joyce Kilmer/Slickrock wilderness users' perceptions of resource problems, crowding, and preferences for management strategies reported here represents an initial effort to meet this informational need.

STUDY AREAS

The resource, use, and managerial setting of the three study areas differ somewhat. Linville Gorge is a 7,600-acre wilderness located in the Pisgah National Forest in western North Carolina. The

area includes a rocky gorge and 25 miles of trail. A permit system allows 130 visitors per day—100 day users and 30 overnight users. To disperse use, 50 day-use permits are allocated to each of the eastern and western sides of the wilderness. Users are restricted to a maximum stay of two nights per visit. Group size is limited to ten people. Even with these restrictions, use is heavy. In 1978, it was estimated at 23,158 visitor days, or 3.04 visitor days per acre.

Shining Rock Wilderness includes 13,400 acres located in the Pisgah National Forest of North Carolina. The area is mountainous and contains a 30-mile trail system. Wilderness permits are required for entry into the area, but they carry few use limitations. Party size is limited to ten, but there are no restrictions on number of permits available. In 1978, use reached an estimated 257,380 visitor days, or 18.9 visitor days/acre. This makes the area one of the most heavily used, if not the most heavily used, in the entire wilderness system.

The Joyce Kilmer/Slickrock Wilderness covers 14,033 mountainous acres in southwest North Carolina and eastern Tennessee. Its 47 miles of trail provide outstanding hiking opportunities. The 1978 estimated use of 19,900 visitor days, or 1.4 visitor days/acre, is light by eastern standards. At the time of the study, no wilderness use permit was required and there were no limitations on use.

STUDY METHODS

The samples of Linville Gorge and Shining Rock users were drawn in a systematic fashion after a

random start from the required use permits for the months of June through October. Because use permits were not required in the Joyce Kilmer/Slickrock Wilderness, study participants were contacted at the three trailheads that received an estimated 90 percent of the area's use. Sampling was stratified by month for the June–October season, and one weekend and one weekday cluster per month were randomly selected. In this fashion 319 Linville Gorge, 547 Shining Rock, and 436 Joyce Kilmer/Slickrock users were identified and mailed a multi-page questionnaire after their trip. Response rates were high: 77, 78, and 84 percent for Linville Gorge, Shining Rock, and Joyce Kilmer/Slickrock, respectively.

RESULTS

Perception of Management Problems

Because perceived problems probably influence user satisfaction and preferences for management strategies, approximately 40 possible management problems were included in the study questionnaire. Respondents were asked to indicate whether each was "no problem" or a "small, moderate, or big problem." A "don't know" category was included for those who had no opinion.

Table 1 contains the ten problems most commonly perceived as moderate or big by users. Many similar problems were perceived across the three areas. For example, litter, destruction of vegetation, fire rings, lack of information on when area is heavily used, and lack of information about

Table 1. Ten management problems perceived by Linville Gorge, Shining Rock, and Joyce Kilmer/Slickrock wilderness users.

Moderate or big problem ¹	Linville Gorge		Shining Rock		Joyce Kilmer/Slickrock	
	Percent	Rank	Percent	Rank	Percent	Rank
Litter	54	1	44	2	25	6
Too many people in certain places			47	1	32	1
Destruction of vegetation	39	2	34	5	23	10
Polluted streams	37	3				
Fire rings	36	4	35	3	23	9
Not enough wildlife	34	5			30	3
Too many people in whole area			34	4		
Lack of information on when area is heavily used	30	6	34	6	25	7
Not enough privacy			33	7		
Lack of information on where other users are			31	8	24	8
Lack of natural/cultural information	26	9	31	9	30	2
Lack of information on number of other users			30	10		
No supply of drinking water	29	7			29	4
Trails poorly marked	28	8			27	5
Lack of information on trail locations	25	10				

¹ Possible responses: Don't know
No problem
Small problem
Moderate problem
Big problem

the natural/cultural resources of the area were common problems. However, important differences also occurred. Problems at Shining Rock Wilderness were more frequently believed to be serious, and most involved too many people or the lack of information about those people. It was the only area where too many people in the area as a whole was viewed as a problem. While Linville Gorge is heavily used, only one problem, the lack of information on when the area is heavily used, directly involved too many people. Apparently, the trail system with its many access points, the assignment of half of the day use to each side of the wilderness, and the dense vegetation reduced contacts between groups and the feeling of crowding. On the other hand, the area does have serious problems of litter, destruction of vegetation, polluted streams, fire rings, and lack of wildlife. Joyce Kilmer/Slickrock, established most recently and having the lightest use, had the fewest number of serious problems. Users there did express concern about too many people in certain places, the lack of information about the natural and cultural resources of the area, and the lack of wildlife.

Perception of Crowding

High wilderness use does not necessarily mean that the area is crowded. The perception of a given level of use as being "crowded" is a matter of personal judgment, depending in part upon user expectations for the experience (Heberlein 1977). Also, past wilderness research has shown that the location and kind of contact with other groups are as important as the number of contacts in perceptions of crowding (Stankey 1973). In the study questionnaire we first asked the users for the number of groups and large groups (more than six people) they saw each day and the number of groups camped within sight or sound of their campsite each night. We then asked them if they had held any expectations about such contacts prior to their visit, and if they did, how the number of actual encounters compared with their expectations.

In general, wilderness users who encountered an average of 0 to 2 groups per day on their trip saw somewhat fewer than expected. Seeing three to five groups each day about equalled, and more than five exceeded expectations across all study areas (Table 2). The use distribution system at Linville Gorge appears to be effective for even though the area receives high use, few people saw more than five other groups and few saw more than expected. In contrast, 19 percent of the hikers in the Joyce Kilmer/Slickrock Wilderness, a lightly used area with no use dispersal system, saw six or more groups and felt this was too many. This percentage increased to 29 in the heavily used

Table 2. How number of groups seen on the trip compared with expectations for Linville Gorge, Shining Rock, and Joyce Kilmer/Slickrock users.

Groups seen per day ¹	Comparison with expectations					
	Linville Gorge		Shining Rock		Joyce Kilmer/Slickrock	
	N	Mean ²	N	Mean ²	N	Mean ²
0	40	3.8	14	4.0	15	4.1
1-2	96	3.4	89	3.1	112	3.3
3-5	57	2.8	129	2.6	135	2.7
6-10	9	3.0	66	2.4	45	2.2
11 or more			30	2.2	16	1.9

¹ A group is one or more people travelling together.

² Response format: 1 = far more
2 = more
3 = about what expected
4 = fewer
5 = far fewer

Shining Rock Wilderness, an area which also has no use dispersal program.

Study participants in all three study areas did not expect to see groups larger than six people (Table 3). When even one such group was seen, this exceeded expectations. As more large groups were seen, respondents generally reacted more and more negatively.

Wilderness users across all three study areas had similar expectations about their campsites (Table 4). Those who camped by themselves tended to say they were more alone than expected. Camping near one other group per night about equalled expectations. Beyond this level, the number of contacts far exceeded expectations.

Management Preferences

Given the typically heavy use of eastern wilderness areas, we asked user opinions on the need for use controls. While there were differences across the study areas (Table 5), controls to lower use or

Table 3. How number of large groups seen on the trip compared with expectations for Linville Gorge, Shining Rock, and Joyce Kilmer/Slickrock users.

Number of large groups seen per day ¹	Comparison with expectations					
	Linville Gorge		Shining Rock		Joyce Kilmer/Slickrock	
	N	Mean ²	N	Mean ²	N	Mean ²
0	99	3.8	63	3.6	137	3.8
1	56	2.7	123	2.7	95	2.7
2	8	2.4	50	2.5	11	2.4
3 or more	2	1.5	30	2.0	5	2.0

¹ Large groups—groups of six or more people.

² Response format: 1 = far more
2 = more
3 = about what expected
4 = fewer
5 = far fewer.

Table 4. How number of groups camped within sight or sound of their campsite compared with expectations for Linville Gorge, Shining Rock, and Joyce Kilmer/Slickrock users.

Number of groups camped nearby per night	Comparison with expectations					
	Linville Gorge ¹		Shining Rock		Joyce Kilmer/Slickrock ²	
	N	Mean ³	N	Mean ³	N	Mean ³
0	68	3.7	80	3.6	99	3.7
1	23	3.0	63	2.9	75	2.9
2	4	1.5	30	2.5	21	2.3
3-4			35	2.3	12	1.8
5 or more			24	2.2		

¹ No Linville Gorge respondents camped near three or more groups per night.

² No Joyce Kilmer/Slickrock respondent camped near more than four groups per night.

³ Response format: 1 = far more

2 = more

3 = about what expected

4 = fewer

5 = far fewer.

to hold use at its current level received considerable support. A large majority of Linville Gorge users wanted to hold use at its current level. Such support for the status quo by our respondents might be expected, since they had successfully gained access to the area. Had we included individuals who were denied access by the area's permit system, support for controls may have decreased. Slightly more than half of the Shining Rock hikers expressed a need to hold or lower use. Most of the Joyce Kilmer/Slickrock users felt that use controls were not necessary now, but might be in the future.

Two general approaches might be taken to regulate use: use limitations and use distribution. There was much variation in user support for

Table 5. Wilderness users' support for use controls.

Support for use control	Linville Gorge (N = 243)	Shining Rock (N = 408)	Joyce Kilmer/Slickrock (N = 342)
	Percent		
Controls are needed to lower use	9	24	11
Controls are needed to hold use at current level	68	29	29
Controls not needed now, but should be imposed in the future if overuse occurs	21	38	54
Controls not needed now or in the future	2	9	6

these two strategies (Table 6). Better information on use conditions was by far the most preferred method for dispersing users across all three study areas. This is congruent with the common perception that lack of information on use was a problem. About half of the Shining Rock and Joyce Kilmer/Slickrock users supported the construction of more trails, but there was less support among Linville Gorge users. Users across all three areas gave little support to the assignment of departure points and campsites. Indeed, campsite assignment was disliked as much as the most negative use-limitation technique, the charging of user fees.

Among the use-limitation strategies considered, limits on group size and advance reservations for a limited number of permits were the most favored. Limiting group size to ten, such as currently exists in Linville Gorge and Shining Rock, or even to five would not however lower overall use very much, because more than 70 percent of current use is by groups of four or fewer (Roggenbuck et al. 1979). Linville Gorge already has a permit system with advance reservations, and support for the program was very strong. About half of the Linville Gorge and Shining Rock users supported issuing permits on a first-come, first-served basis; the percentage of support was somewhat less among Joyce Kilmer/Slickrock visitors. Finally, the wilderness users did not accept allocating the permits by lottery and charging user fees.

Table 6. Support for various management strategies by Linville Gorge, Shining Rock, and Joyce Kilmer/Slickrock Wilderness users.

Management strategy ¹	Linville Gorge support ²	Shining Rock support ²	Joyce Kilmer/Slickrock support ²
	Percent		
Use limitations:			
First come, first served	50	52	41
Advance reservations	85	64	65
Lottery	15	8	10
Charge user fee	20	21	21
Limit group size	80	71	77
Use distribution:			
Better information on use	89	92	94
Build more trails	37	55	49
Assign departure points	23	23	27
Assign campsites	19	20	22

¹ Possible responses: Don't know
Strongly oppose
Somewhat oppose
Neither support or oppose
Somewhat support
Strongly support.

² Support represents a combination of the somewhat and strongly support categories.

MANAGEMENT IMPLICATIONS

Users do generally support the idea of management action to maintain wilderness values, but they favor the minimum necessary to accomplish these objectives. For example, where use is light, such as at Joyce Kilmer/Slickrock, visitors do not support overall use controls on the area. When controls become necessary, users want those controls to be targeted at the specific problem(s), to be as unobtrusive as possible, and they often want to actively participate in resolving the problem(s). For example, while Shining Rock Wilderness is heavily used and many visitors perceive crowded conditions throughout, more users see the problem limited to certain places. Also, litter, too many large groups, and too many groups camped in close proximity, are viewed as problems and likely contribute to the perception of crowding. Managers should address these specific problems first; only when such attempts fail should managers resort to rigid, overall area-use limits.

When managers select a strategy to reduce user impacts, they should choose those which are as light-handed as possible, *i.e.*, those which maintain the wilderness values of freedom, challenge, and spontaneity of movement. They should also take advantage of the desire of many wilderness users to meet the area on its own terms and to choose and take responsibility for their actions. Our study participants opposed the assignment of departure points and campsites as a strategy to reduce inter-party contacts, but they gave overwhelming support for the provision of information on amount, location, and time of visitor use. Also, recent research shows that information can be an effective visitor management tool. On the basis of information provided by managers, canoeists in the Boundary Waters Canoe Area avoided crowded areas and peak use periods (Lime and Lucas 1977), backcountry hikers selected lightly used trails in Yellowstone (Krumpe 1979), and campers dispersed from a scenic and heavily used meadow in Shining Rock Wilderness (Roggenbuck and Berrier 1981). In some areas, wilderness rangers have successfully implemented educational programs at trailheads to alter behavior and reduce impacts (Hart 1980). Finally, Muth and Clark (1978) have suggested a system of ranger contacts and incentives to control litter in the backcountry.

If light-handed management fails to accomplish its objectives in a given area and as a last resort more regulative strategies become necessary, our data suggest that they should be implemented

before rather than during the wilderness experience. For example, users generally supported limitations on group size and advance-reservation permit systems, but they opposed assignment of departure points and campsites.

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Joseph W. Roggenbuck is associate professor of forestry, and Alan E. Watson is graduate research assistant, Department of Forestry, Virginia Polytechnic Institute and State University, Blacksburg. George H. Stankey is a research social scientist, Intermountain Forest and Range Experiment Station, Missoula, Montana. The USDA Forest Service Intermountain Forest and Range Experiment Station provided financial support for this research.