

Wilderness Campsite Impacts: Do Managers and Visitors See Them the Same?

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ABSTRACT / Human-induced impacts from recreational use of wilderness continue to be a significant management chal-

lenge, threatening the integrity of the wilderness resource and the quality of visitor experiences. Campsite impacts are of particular concern to managers. One approach to this problem is the Limits of Acceptable Change (LAC) planning system, which focuses attention on the question, "How much change in wilderness conditions is acceptable?" The research reported here compares and contrasts wilderness manager and visitor perceptions of the *acceptability* of different levels of campsite impacts, *amount* of impact, and perceptual zoning of wilderness. The results reinforce previous findings regarding differences between managers and visitors. Management implications are discussed.

While the primary goals of wilderness management are to maintain the free operation of natural processes and to preserve qualities such as wildness and solitude, managers are also faced with the difficult task of administering areas "for the use and enjoyment of the American people" (Public Law 88-577).

The difficulty lies in the fact that recreational use inevitably results in changes to ecological (Cole 1981, 1982) and social conditions (Stankey 1973). Although use of many wilderness areas may be leveling off (Lucas and Stankey 1989), impacts resulting from recreational use, particularly at campsites, continue to be a significant management challenge. Washburne and Cole (1983) found that the managers of over 70% of all national forest wilderness and primitive areas considered impacts at campsites to be a problem.

Significant alteration resulting from recreational use is likely limited to only a small percentage of an area—Cole (1981) estimated less than 2% of the Eagle Cap Wilderness in Oregon. Yet this disturbance can be highly concentrated at popular destination areas, resulting in conspicuous evidence of human use and a serious problem of visual impact (Cole 1985a). Thus, while these impacts may not threaten the ecological integrity of an entire area, they may result in serious localized resource damage and certainly have the potential to affect the quality of visitor experiences.

Among the most prevalent campsite impacts are bare ground and tree damage (Cole 1983, 1985a) and campfire rings. Unlike a transient impact such as litter, damage to groundcover vegetation and trees is slow to

recover. While fire rings can be removed relatively easily, some impact remains, and they tend to reappear quickly, posing a serious management dilemma. Cole (1985a) stated that "proliferation of campsite impacts and excessive deterioration of campsites seriously compromise wilderness goals."

The Limits of Acceptable Change Approach

A recent approach to dealing with the problem of human-induced change at campsites and throughout wilderness is the Limits of Acceptable Change (LAC) planning system. As its name suggests, LAC concerns itself not with determining a permissible number of people, but with "deciding what kind of wilderness conditions are acceptable, then prescribing actions to protect or achieve those conditions" (Stankey and others 1985). The traditional recreational carrying capacity question of "how much use is too much?" is redefined to ask "how much change in wilderness conditions is acceptable?" Focusing on this question directs management attention away from numbers of users and toward management for desired social and ecological conditions (Stankey and others 1984).

Now the critical question arises—what constitutes "acceptable" conditions? Defining acceptability is ultimately a personal judgement, so whose definition do we use? Several studies (Lucas 1970, Peterson 1974, Hendee and Pyle 1971) have shown that managers' and users' perceptions of resource conditions can be quite different. Downing and Clark (1979) compared managers' and users' perceptions of dispersed recreation impacts (including litter and garbage, vandalism,

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fire danger, recreation conflicts, and human waste) on roaded forest lands and found that "managers tend to rate recreation impacts as more serious than do users." Moeller and others (1974) found that campers and boaters perceived and reacted to management problems differently than managers. Some differences between managers and users can probably be attributed to the different perspectives from which each group views the resource.

Although managers have ultimate legal responsibility for management, they should be aware that user perceptions may differ from their own. The perceptions of each should be only one of several criteria upon which standards are set. Standards based solely on visitor or manager perceptions might, in some cases, be too lax to achieve wilderness objectives or, in other cases, too strict to be realistic and achievable. Understanding how managers and visitors perceive campsite impacts and how such impacts influence the choice, use of, and satisfaction with a campsite are crucial if managers are to make intelligent decisions concerning the management of wilderness campsites.

Reported here is a study exploring the following questions: (1) Do managers and visitors differ in the *amount* of impact they perceive at wilderness campsites? (2) Do managers and visitors differ in their evaluations of the *acceptability* of campsite impacts? (3) Do managers and visitors differ in their *perceptual zoning* of wilderness as measured by the acceptability of impacts in different wilderness zones?

Past Research

When encountering a particular characteristic of a setting, different people will respond differently. The reasons for this are complex, but central to the issue is the concept of evaluative standards. An evaluative standard is an individual's personal definition of the acceptability of a particular characteristic or attribute. Shelby and Heberlein (1984) stated that "evaluative standards determine the level of an impact parameter that is tolerable (the maximum) or most desirable (optimum)" and go on to describe evaluative standards as "'yardsticks' for determining how much is too much."

Understanding visitors' specific tolerances of varying levels of attributes, and how they may differ from their own perceptions, becomes important for managers trying to set appropriate standards, or limits of acceptable change, for chosen indicators (attributes).

Research on perceptions of resource impacts has been limited. Shelby and Harris (1985) evaluated different methods of determining visitors' evaluative standards for bare ground and fire rings at back-

country campsites; in doing so, they were also able to explore visitor perceptions of those impacts. Several studies investigating visitor perceptions of crowding (Zuckert 1980, Womble and others 1980, Bultena and others 1981, Vaske and others 1982, Ditton and others 1983) found that perceptions of resource damage or environmental degradation are positively correlated with perceptions of crowding.

Other studies have found that perceived impacts to the resource can also negatively affect visitor satisfaction. Lucas (1980) found that visitor perceptions of environmental conditions were negatively correlated with trip satisfaction, accounting for 18%–49% of the variation in reported satisfaction. In a more recent study, Lucas (1985) found that perceptions of impacted resource conditions were negatively correlated with overall trip satisfaction more than any other measure, including number of parties met.

Results of several studies have shown that visitors zone wilderness perceptually. Lucas (1964) found that visitors to the Boundary Waters Canoe Area made distinctions between the interior and peripheral zones of the area, generally perceiving the interior as "wilderness" but usually not the periphery. Stankey (1971) hypothesized that visitors expect to encounter others more frequently in trailhead areas, "desensitizing" them to the effect of such encounters. He found that visitors were about eight times more likely to prefer to meet others in the periphery of the wilderness than in the interior.

Likewise, studies of river floaters (Shelby 1981, Titre and Mills 1982) have found that perceptions of crowding and visitors' encounter norms vary, depending on whether the encounter is at the river access point (the functional equivalent of a trailhead), on the river, or at campsites along the river bank.

The Study

This study was organized as a series of experiments, each designed to investigate a different aspect of visitor and manager perceptions of campsite impacts. A series of color illustrations (artistic representations) depicted campsites in undeveloped areas. A series of overlays was used to vary the type and level of impact present.

Bare ground, tree damage, and fire ring impacts were chosen because they are among the most prevalent impacts occurring at wilderness campsites and contribute to both the visual quality and biophysical integrity of the area. Bare ground and tree damage are representative of the soil and vegetation impacts

that are widespread on campsites (Cole 1985a). Fire rings were chosen to represent a visitor development type of impact that also has both visual and biophysical impacts. A set of color slides was produced from these color illustrations (black and white examples are shown in Figures 1 and 2).

This use of slides seems justified since Shelby and Harris (1985) found a 90% agreement rate between evaluations of photographs and on-site inspection of campsites in terms of the acceptability ratings for specific impacts. Illustrations have the advantage of allowing control of extraneous factors while gaining the ability to systematically vary the type and level of impact portrayed.

The sample population consisted of 186 respondents considered representative of wilderness visitors and 106 wilderness managers. The visitor population included persons who attended meetings of local wilderness user groups and students enrolled in forestry and recreation management classes at the University of Montana. Of these 186 respondents, 89% had visited a wilderness in the past two years. The manager respondents included both Forest Service and Bureau of Land Management managers with wilderness management responsibilities.

The first experiment was designed to measure visitors' and managers' standards of acceptability for each of the three impacts. Respondents viewed slides in which only one impact was present. Four levels (termed minimum, moderate, heavy, and extreme) of each of the three types of impacts were presented. (The respondents were not aware of these labels.) These labels were applied subjectively and used simply to refer to slides; no absolute equivalency is implied between moderate bare ground and moderate tree damage, and so on.

An additional slide showed the campsite with two fire rings, and one slide of the campsite in an undisturbed condition was included as a "control." All 14 slides were of the same campsite, in the same setting, with the same background; the only variables were the type and level of impact. The slides were randomly sorted and viewed for about ten seconds each. Responses to the slides were recorded using a three-point scale: desirable, acceptable but not desirable, and unacceptable.

The second experiment was designed to measure the perceived amount of impact present at a campsite. The same 14 slides were shown again, and respondents were asked to indicate the amount of impact they felt was present in each slide. Responses were recorded using a five-point scale: none, minimal, moderate, heavy, and severe. Only 75 visitor respondents but all the managers participated in this experiment.



Figure 1. Artistic representation of campsite with heavy soil impact.



Figure 2. Artistic representation of campsite with heavy tree damage.

The third experiment was designed to determine whether visitors and managers evaluated the acceptability of campsite conditions differently depending on the wilderness zone in which they were encountered. Four slides of campsites, different from earlier campsites and each exhibiting varying degrees of all three impacts, were shown. Respondents were instructed to rate the acceptability of each campsite (using the three-point scale) as if they had encountered it in the wilderness interior—defined as several days' hike or ride from the trailhead. Next, the same four slides were shown, and respondents were instructed to rate each campsite as if they had encountered it on the first day's hike or ride from the trailhead (the wilderness periphery). Comparisons of the two ratings for each slide made it possible to determine if respondents reacted differently to the same level of impact depending on the zone in which it was encountered. All

manager and visitor respondents participated in this experiment.

Results and Discussion

Acceptability of Impacts

It was thought that managers and visitors would have different standards of acceptability for campsite impacts, as measured by their evaluations of the campsite slides.

Taking each of the 14 slides individually, visitors were more likely than managers to evaluate the campsite conditions as unacceptable. On 11 of the 14 slides, a larger proportion of visitors than managers rated the campsite unacceptable. These differences were significant ($P < 0.05$) in 10 of the 11 instances (Table 1). All three of the slides that managers were more likely to rate unacceptable were of campsites with bare ground impact. Two of those three differences were significant.

Apparently visitors find tree damage and fire rings more objectionable than managers, but managers are more sensitive to the presence of bare ground. Although visitors and managers differed significantly in their evaluations of the campsites with minimal, moderate, and heavy levels of impact, they did not differ significantly in their evaluations of two of the three campsites with severe impacts.

Bare ground was found to be the least acceptable of the three impacts as depicted in the slides. Bare ground became unacceptable to a majority of managers at the moderate level of impact and to visitors at the heavy level. Tree damage became unacceptable to a majority of both groups when it reached severe, while the campsite with severe fire ring impact was still deemed acceptable by the majority of both groups.

Perceived Amount of Impact

It was felt that managers and visitors would also differ in their perception of the amount of impact present at a campsite. A chi-square statistic was calculated for each of the 14 slides, comparing the responses of visitors and managers. The two groups were found to differ significantly ($P < 0.05$) in their perceptions of the amount of impact portrayed in 10 of the 14 slides (Table 2). The slides on which they did not differ significantly were those of minimal, moderate, and heavy bare ground and of heavy tree damage. Managers apparently perceived similar amounts of bare ground as visitors but found those amounts less acceptable.

In an attempt to discover some possible influences on respondents' campsite evaluations, nonparametric correlations were performed between ratings of ac-

Table 1. Percentage of visitors and managers rating type and level of impact as desirable, acceptable, or unacceptable.^a

Campsite impact slide	Visitor ratings			X significance level	Manager ratings		
	D	A	U		D	A	U
Fire ring							
Severe	21	46	33	0.002	8	66	26
Multiple	19	65	16	0.001	36	62	2
Heavy	35	54	10	0.040	44	53	3
Moderate	41	53	5	0.034	49	51	0
Minimal	48	49	3	0.008	67	32	1
Tree damage							
Severe	10	30	60	0.161	5	39	56
Heavy	29	51	20	0.007	42	50	8
Moderate	68	27	5	0.000	91	8	1
Minimal	71	25	4	0.000	94	5	1
Bare ground							
Severe	7	14	79	0.157	2	15	83
Heavy	7	36	57	0.033	1	32	67
Moderate	9	43	48	0.046	4	34	62
Minimal	19	61	20	0.002	24	71	5
Pristine	73	23	4	0.000	92	7	1

^aD = desirable; A = acceptable, but not desirable; U = unacceptable.

ceptability and perceived amount of impact. Spearman's rho correlation coefficients ranged from -0.11 to -0.57 for visitors and from 0.03 to -0.37 for managers. Negative coefficients indicate that as perceived amount of impact increases, acceptability decreases. Gamma, a statistic measuring the amount of variance explained, was -0.41 overall for visitors, indicating that perceived amount of impact explained 41% of the variance in their acceptability evaluations. Gamma was -0.20 overall for managers. This suggests that factors other than amount of impact may affect managers' judgments more than visitors'.

Perceptual Zoning

It was also thought that managers and visitors would differ in their perceptual zoning of wilderness. Differences in evaluations by both visitors and managers of campsites presented initially as periphery campsites and later as interior campsites support past research suggesting that perceptual zoning occurs. Pairs of visitor and manager responses to slides of interior and peripheral campsite conditions were cross-tabulated to separate the responses of particular interest: those people who evaluated the same campsite as less acceptable in the interior zone than in the peripheral zone. Responses of those who found the campsite unacceptable in both zones were deleted from this analysis (Table 3).

On average, 40% of visitors rated the same camp-

Table 2. Percentage of visitors and managers rating perceived amount of impact in slides of 14 campsites.^a

	Visitor ratings					X significance level	Manager ratings				
	Sev	Hvy	Mod	Min	None		Sev	Hvy	Mod	Min	None
Fire ring											
Severe	9	35	48	8	0	0.019	2	21	62	14	1
Multiple	1	4	57	29	8	0.001	1	1	34	60	5
Heavy	1	12	47	39	1	0.000	0	2	24	69	5
Moderate	0	7	27	64	3	0.003	0	1	10	84	5
Minimal	1	3	27	65	4	0.021	0	1	10	85	4
Tree damage											
Severe	42	16	16	16	9	0.000	58	28	8	2	4
Heavy	3	17	43	21	16	0.257	3	18	49	24	6
Moderate	1	7	16	27	49	0.011	0	1	7	44	48
Minimal	1	4	9	24	61	0.043	0	0	3	24	73
Bare ground											
Severe	36	41	16	5	1	0.008	47	48	3	2	0
Heavy	23	55	21	1	0	0.536	24	61	13	2	0
Moderate	15	43	36	7	0	0.159	8	58	31	3	0
Minimal	0	15	44	37	4	0.196	0	6	53	39	3
Pristine	0	3	7	23	68	0.034	0	0	2	14	84

^aSev = severe, Hvy = heavy, Mod = moderate, Min = minimal.

Table 3. Evaluations of campsite conditions in the wilderness interior by managers and visitors, as a percent of total evaluations by each group.

Campsite evaluation	Visitors (N = 426 ^a)	Managers (N = 85 ^a)
Higher (more acceptable) in interior than in periphery	4	0
Evaluation equal for interior and periphery	56	55
Lower (less acceptable) in interior than in periphery ^b	40	45

^aMultiple evaluations by respondents; responses of those who evaluated conditions as unacceptable in both interior and periphery are not included.

^bEvaluation of particular interest.

site as less acceptable in the interior than in the periphery, and 45% of managers fell into this category. The difference between managers and visitors in this case is not statistically significant, but the results show that perceptual zoning occurs and that some campsite conditions may be less acceptable in the interior than in the periphery.

Summary of Findings

Wilderness managers and visitors were found to have different evaluative standards of acceptability for three campsite impacts. Visitors generally held more

restrictive standards than managers, although managers had stricter standards for bare ground impact. Visitors and managers also differed in their perceptions of the amount of impact present at most campsites. Visitors perceived greater amounts of fire ring and tree damage impact, while managers perceived greater amounts of bare ground.

Although there was disagreement between visitors and managers concerning the acceptability of certain levels of impacts, both groups agreed on the relative acceptability of the different types of impacts. Bare ground was found to be the least acceptable impact, while fire rings were the most acceptable. Bare ground became unacceptable at minimum to moderate levels of impact, while a majority of both groups found the campsite with severe fire ring impact at least acceptable.

Results of the experiment comparing evaluations of interior and peripheral campsites suggest that both groups show some inclination toward perceptually zoning wilderness. Managers seemed slightly more likely than visitors to find a campsite acceptable in the periphery but unacceptable in the interior, although this difference was not significant.

Management Implications

The finding that bare ground is least acceptable to people suggests its use as an indicator to monitor changes in the wilderness environment. The fact that bare ground is undesirable at minimal levels, and unacceptable at moderate levels, implies that the presence

of bare ground may have more of an effect than the actual *amount* of bare ground on perceptions of acceptability. Thus from the standpoint of visitor perceptions of resource conditions, and the resulting effect on visitor experiences, perhaps the number of campsites rather than the amount of bare ground at campsites should be considered when choosing indicators.

Ecological research has shown that a considerable amount of bare ground appears after only light use, and increased use does not increase the amount of bare ground proportionately (Cole 1982, 1985b). If this is the case, bare ground is likely to be at generally unacceptable levels at many campsites, unless use is both very light and skillful. Thus, although managers should continue education and other programs to control or reduce the amount of impact at individual campsites, it is at least as important to try to keep the number of impacted sites to a minimum.

Another implication of the acceptability of these three types of impacts, and of their relative importance, is that fire rings are probably not a good choice for an indicator. Fire rings were found to be the least objectionable of the three impacts, and even high levels of fire ring impact were not deemed unacceptable by most. These results suggest that management policy to remove fire rings should be based primarily on considerations other than concern for the effect on visitor experiences.

Differences between visitors and managers regarding the acceptability of impacts should warn managers not to assume that their views are necessarily congruent with those of visitors, a finding that reinforces the results of previous studies of the subject. This should be kept in mind particularly when managers are considering standards for indicators. Managers seemed to be more sensitive to bare ground impacts than visitors, but found tree damage and fire ring impacts more acceptable than did visitors. Perhaps, for fire rings at least, managers' evaluations of acceptability were influenced by the relative ease with which fire ring impacts can be reversed.

Some support was found for the concept of wilderness zoning. These results provide a rationale for varying standards for some indicators in different zones within a wilderness and lend further support to the creation of opportunity classes in several of the wilderness areas now employing the LAC planning approach. Again, this is a finding consistent with previous research on the social setting.

Further Research

This study examined visitor and manager prefer-

ences using artistic representations of real-world situations. While previous research has shown close correlation between photographs and on-site preferences, additional research on reaction to actual site conditions would be helpful to confirm these results. An obvious direction for future research is to experimentally create impacts at a campsite and gather visitor and manager evaluations. Such research could help determine quantitatively the biophysical conditions that both visitors and managers find desirable, acceptable, or unacceptable.

A second line of research could follow and build upon the concept of zoning, which we briefly explored here. Such questions as "what conditions are appropriate where?" continue to be important lines of inquiry.

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