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The Northeastern Recreation Research meeting seeks to foster quality information exchange between recreation and travel resource managers and researchers throughout the Northeast. The forum provides opportunities for managers from different agencies and states, and from different governmental levels, to discuss current issues and problems in the field. Students and all those interested in continuing education in recreation and travel resource management are particularly welcome.

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Compiled and Edited by:

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**CAMPSITE IMPACT MANAGEMENT:
A SURVEY OF NATIONAL PARK SERVICE
BACKCOUNTRY MANAGERS**

Jeffrey L. Marion

Research Scientist, National Park Service, Cooperative Park Studies Unit, Virginia Tech, Department of Forestry, Blacksburg, VA 24061-0324

Christopher J. Stubbs

Environmental Protection Specialist, Bureau of Land Management, Battle Mountain District, P.O. Box 1420, Battle Mountain, NV 89820

Though a central purpose for the creation and management of parks, visitation inevitably affects the natural resources of parks. This is particularly true at campsites, where visitation and its effects are concentrated. This paper presents partial results from a survey of National Park Service managers regarding general strategies and specific actions implemented by park managers to address campsite impact problems.

Introduction

The National Park Service (NPS) encourages backcountry recreational uses that promote visitor enjoyment through a direct association with park resources. Backcountry, the primitive, undeveloped portions of parks, is generally open to a variety of dispersed recreational uses. It is recognized that any recreational use will result in some level of impact to park resources. Examples of recreational impacts include trampling and loss of vegetative cover, tree damage, compaction and erosion of organic litter and soil, introduction of exotic vegetation, harassment and/or displacement of wildlife, and pollution of water resources (Hammit and Cole 1987, Marion and Merriam 1985, Ream 1980). Survey research also indicates that some of these impacts are perceived as significant by visitors and may degrade the quality of their recreational experiences (Lucas 1979, Roggenbuck et al. In Press).

NPS managers have responded to recreational impact problems with a considerable variety of visitor and resource management practices. These management approaches may be classified, for example, on the basis of their strategic purpose (Manning 1979). Strategies are broad, general approaches for addressing the basic causes of problems. Reducing recreational use or enhancing resource durability are examples of management strategies.

A second system of classifying backcountry recreation management practices focuses on tactics or actions. Tactics are specific actions implemented by managers to accomplish a management strategy (Cole et al. 1987). Restrictions on length of stay, differential fees, and permit quotas are examples of tactics designed to accomplish the strategy of reducing recreation use. Tactics can be classified according to the directness with which they act on visitor behavior (Peterson and Lime 1979, Lime 1979). Direct management practices regulate and restrict visitor behavior, leaving little or no freedom of choice. Indirect management practices attempt to influence the decision factors that lead to visitor behavior. For example, the objective of reducing backcountry campfire impacts might be achieved through a ban on campfires, a direct management approach, or through an educational program informing visitors of the undesirable

ecological and aesthetic impacts of campfires and encouraging the use of portable stoves, an indirect approach.

This paper reports results from a survey of NPS managers conducted to determine the type and severity of recreational impact problems in backcountry areas of the Nation's parks. The survey also documented general strategies and specific management actions applied by managers to resolve these problems. While the survey covered a wide range of backcountry recreation management problems relating to resource impacts and visitor experiences, this paper focuses on campsite impact problems and their management. Campsites, because they serve as a focal point for visitor activity, receive concentrated use and are usually the most heavily impacted areas in backcountry regions.

Methods

The survey included all NPS units with substantial backcountry resources. Backcountry was defined as those areas managed primarily for natural conditions and processes that are generally not accessed by visitors with standard passenger vehicles. The survey instrument was a mail-back questionnaire that solicited information on backcountry recreation management problems, implemented actions and their perceived effectiveness, carrying capacity, and resource and visitor monitoring.

The survey was sent to 103 park superintendents requesting that they be directed to appropriate backcountry managers or rangers for response. Ninety-three completed surveys were returned for a 90 percent response rate. Completed surveys were input into dBASE III+ databases for distribution to participating park units, and transferred to the SPSS-PC+ statistical package for analysis.

Results

Backcountry managers rated the perceived severity of eight types of campsite impacts using a Problem Severity Scale ranging from 0 (Not a problem) to 3 (A problem in most areas) (Table 1). For seven of the eight types of campsite impacts the most common rating was 1: "A problem in a few areas". Average ratings ranged from 1.3 for herbaceous vegetation and soil impacts to 0.6 for user-constructed facilities. For these impact types, managers perceived more pervasive problems with herbaceous vegetation and soil impacts; approximately one-third of the managers rated these items as being a problem in many or most backcountry areas. Such findings would imply that campsite impacts are generally confined to popular attraction areas rather than prevalent throughout backcountry areas. This finding would be expected given the results of visitor distribution studies that reveal markedly uneven use patterns in wilderness and backcountry areas (Lucas et al. 1971, van Wagtenonk 1981).

The remainder of this paper focuses on specific tactics or actions which backcountry managers have implemented to address campsite impact problems. For presentation, these actions are divided into four groups according to their general strategy: (1) actions to reduce backcountry use, (2) actions to redistribute or contain use, (3) actions to improve minimum impact behavior, and (4) actions to enhance resource durability.

A thorough review of the literature on backcountry and wilderness recreation management practices was conducted during survey development. This review resulted in a compilation of over 100 specific actions which park managers might employ to address backcountry recreation management problems. Managers were asked to review and add to this listing and check all actions that were currently in effect for all or some portion of their backcountry. An effort was made to distinguish between indirect actions (typically indicated by the terms "encourage" and "discourage") and more direct regulatory actions (typically indicated by the terms "require" and "prohibit").

Table 1. Severity of several types of campsite impact as perceived by National Park Service backcountry managers.

Type of Campsite Impact	Severity Scale ^a				Avg
	0	1	2	3	
	(No. of Parks)				
0 = Not a problem					
1 = A problem in a few areas					
2 = A problem in many areas					
3 = A problem in most areas					

Strategy 1: Actions to Reduce Backcountry Use
 The objective of this strategy is to reduce campsite impacts by reducing backcountry use, although other problems or concerns may be addressed by such actions. Of 63 parks that require visitors to obtain backcountry permits, 33 restrict permits by campsite availability (Table 2). Four parks prohibit overnight use. Less restrictive regulations include trip length of stay limits (47 parks) and campsite length of stay limits (58 parks). Indirect use reduction actions include limiting access by closing roads (29 parks) and trails (12 parks), and by reducing road maintenance (11 parks) and trail maintenance (17 parks).

Recreational ecology research indicates that use reduction may be an ineffective strategy for minimizing many types of campsite impacts (Cole 1982, Cole and Marion 1988, Marion and Merriam 1985). Campsite impact studies have consistently shown that the most dramatic changes occur with initial or low levels of site use. Thereafter, the relationship between amount of use and many types of resource impacts diminishes substantially. Consequently, site use reductions, unless substantial, will not significantly improve site conditions.

Table 2. Number of parks employing actions to reduce backcountry use.

33	Permits are restricted/rationed by campsite availability
47	Require trip length of stay limits
Backcountry access is made more difficult by:	
29	closing roads
11	reducing road maintenance
12	closing trails
17	reducing trail maintenance
58	limiting campsite length of stay
1	discouraging overnight use
4	prohibiting overnight use

Strategy 2: Actions to Redistribute or Contain Use

The objective of this strategy is to reduce campsite impacts through use redistribution or use containment. The most common action under this strategy was to discourage or prohibit camping in environmentally sensitive areas (50 and 43 parks, respectively) (Table 3). Prohibitions on camping in fragile ecosystem or vegetation types (24 parks) or near sensitive areas for camp (14 parks) are also fairly common, maintaining very light use on dispersed sites and encouraging the use of minimum impact camping practices (Cole and Benedict 1983).

Visitor concentration or containment is a more effective approach in areas where use is heavy or camping locations are limited. Most commonly, visitors are required to camp on designated campsites either parkwide (23 parks) or in certain areas (29 parks). Twenty-three parks restrict backcountry camping to designated geographic areas. An alternate, non-regulatory campsite selection approach to visitor containment encourages visitors to use moderately impacted sites and to avoid lightly and severely impacted sites (Cole and Benedict 1983). The objective of this approach is to encourage complete recovery on lightly impacted sites and a reduction of impacts on highly impacted sites. Few parks appear to have adopted this approach. Use of moderately impacted sites is encouraged or required by 9 and 2 parks, respectively. Use of lightly impacted sites is discouraged or prohibited by 11 and 4 parks, respectively, and use of heavily impacted sites is discouraged or prohibited by 17 and 9 parks, respectively.

Strategy 3: Actions to Improve Minimum Impact Behavior

The objective of this strategy is to reduce campsite impacts through educational or regulatory actions that encourage the adoption of minimum impact camping practices. Seventy-two of the surveyed parks indicated that minimum impact backcountry use practices are taught. A wide variety of communication mediums were used: low impact literature (46 parks), backcountry access bulletin board displays (48 parks), personal contact with backcountry rangers (64 parks), and video or slide programs (9 parks) (Table 4). It is difficult to assess the percentage of visitors reached by these efforts, however, 37 parks indicated that low impact literature is provided or shown to most or all backcountry visitors.

Educational approaches are also widely applied to address a number of specific visitor impacts. Nearly all (85) parks emphasize a "pack-it-in, pack-it-out" policy to reduce litter in the backcountry, 22 parks provide free litter bags. Most parks address human waste disposal by instructing visitors to bury fecal material (61 parks), although 13 parks instruct visitors to carry out human wastes (typically river parks). Impacts from campfires and wood gathering are addressed by discouraging the use of axes and saws (14 parks), campfire building (9 parks), and by encouraging the use of stoves (42 parks).

Table 3. Number of parks employing actions to redistribute or contain use.

	Discouraged	Prohibited
Camping in environmentally sensitive areas is	5	43
Camping in fragile ecosystem or vegetation types	26	24
Camping within a certain distance or sight of popular features	10	14
Camping in certain designated geographic areas	6	33
Camping within a certain distance or sight of roads/facilities	6	43
Camping within a certain distance or sight of trails	11	28
Camping within a certain distance or sight of other campsites	18	17
Camping within a certain distance of water	4	41
Camping on lightly impacted sites is	11	4
Camping on heavily impacted sites is	17	9
	Encouraged	Required
Camping in impact-resistant ecosystem/vegetation types	26	8
Camping on designated campsites parkwide	16	23
Camping on designated campsites in certain areas	11	29
Camping in certain designated geographic areas	11	23
Camping on sites with no evidence of use is	12	0
Camping on moderately impacted sites is	9	2
<u>32</u> Relocate campsites from fragile to more durable soils and/or vegetation types		
<u>37</u> Locate campsites/facilities on durable sites		

Regulatory actions designed to compel minimum impact behavior provide more direct options for implementing this strategy. For example, campfires are prohibited by 40 parks and backpacking stoves are required in 34 parks.

Strategy 4: Actions to Enhance Resource Durability

The objective of this strategy is to reduce campsite impacts through campsite maintenance and rehabilitation and the provision of facilities. Forty-six parks indicated that they perform general campsite maintenance and 25 parks seed and transplant vegetation on campsites (Table 5). Impacts are also reduced by concentrating or channeling use through the location of firepits or other facilities (40 parks). Resource protection facilities that reduce impacts by containing use include shelters (9 parks), tent platforms (12 parks), firegrates (28 parks), and tables (19 parks).

Discussion and Conclusion

The diversity of backcountry recreation management problems and potential management strategies and tactics results in considerable complexity for backcountry managers. A principal objective of this study was to gather, analyze, and share information about backcountry management problems and alternative solutions. The communication of this information will be facilitated by distributing survey results in

Table 4. Number of parks employing actions to improve minimum impact behavior.

<u>72</u> Teach minimum impact backcountry use practices		
<u>42</u> Teach minimum impact camping techniques		
<u>46</u> Low impact literature is available on request		
<u>45</u> Low impact literature is displayed at visitor centers and ranger stations		
<u>48</u> Low impact literature is displayed on bulletin boards at backcountry access points		
<u>37</u> Low impact literature is provided or shown to most or all backcountry visitors		
<u>64</u> Park rangers are instructed to convey low impact messages during backcountry visitor contacts		
<u>2</u> Low impact videos or slide programs are routinely shown at visitor centers		
<u>85</u> Emphasize "pack-it-in, pack-it-out" policy		
<u>22</u> Provide free litter bags		
<u>61</u> Visitors are instructed to bury human wastes		
<u>13</u> Visitors are instructed to carry out human wastes		
<u>53</u> Visitors are instructed to defecate away from all water sources		
<u>42</u> Backpacking stoves are encouraged		
<u>34</u> Backpacking stoves are required		
	Discouraged	Prohibited
Ground fires, parkwide, are	9	40
Ground fires, in certain park areas, are	9	44
Cutting standing dead wood is	7	77
Axes/saws are	14	17

Table 5. Number of parks employing actions to improve resource durability.

<u>40</u> Concentrate or channel use on sites through location of firepits or other facilities	
<u>46</u> General campsite maintenance	
<u>25</u> Seed/transplant vegetation on campsites	
<u>2</u> Provide shelters for visitor overnight use	
<u>12</u> Provide tent platforms	
<u>28</u> Provide firegrates	
<u>19</u> Provide tables	

both printed and electronic formats. Databases in dBASE III+ will allow parks to identify potential management alternatives and contacts at other parks who have had experience with various management strategies and actions. Encouraging technology transfer between parks can be an effective means for sharing the expertise of backcountry managers regarding both successful and unsuccessful approaches for addressing backcountry recreation problems.

Actions implemented by backcountry managers to address campsite impacts range from indirect lighthanded options to direct, authoritarian options. A common wilderness management principle is to apply the minimum action required to accomplish established objectives. Due to their "costs" to visitors, managers should evaluate and implement the most effective indirect controls to delay or minimize the imposition of direct controls (Hendee et al. 1990). While no effort was made to distinguish between backcountry versus wilderness management in this survey, the NPS draws few distinctions between its management of these two land classifications.

between its management of these two land classifications. Previous surveys of wilderness management practices have generally shown more reliance on regulations than nonregulatory alternatives (Washburne and Cole 1983, Fish and Bury 1981). This was particularly true for the NPS, as compared to the other wilderness management agencies. A review of Tables 2-4 supports the finding that direct actions are also used more frequently than indirect actions with respect to the mitigation of campsite impact problems in NPS backcountry areas.

NPS Management Policies (USDI 1988) direct managers to avoid unacceptable impacts on backcountry resources or adverse effects on visitor enjoyment of appropriate recreational experiences. In effect, managers must weigh recreational use against its associated resource impacts, implementing visitor management actions as necessary to maintain an acceptable balance. Direct regulations are both necessary and appropriate under certain circumstances, for example when recreational use threatens irreversible resource damage (camping in environmentally sensitive areas) or the safety of visitors and park wildlife (feeding bears). Additionally, McAvoy and Dustin (1983) cite self perception theory in arguing that direct regulations, in conjunction with indirect measures, can assist visitors in forming and internalizing attitudes and beliefs that support subsequent low impact behaviors.

Little formal data exists regarding the effectiveness of alternative management actions, although indirect actions are generally regarded as less effective than direct actions (Hendee et al. 1991, McAvoy and Dustin 1983). Perhaps the most significant shortcoming of NPS backcountry recreation management is that managers lack the means to evaluate the success or continuing need for implemented actions. For example, the accuracy and longevity of most campsite impact monitoring programs are insufficient to provide the data necessary for such analyses. Recent guidance provided by Cole (1989) and Marion (1991) may aid in the development of such programs. Monitoring can provide an objective record of resource conditions over time that permit early detection of problems, suggest effective mitigating actions, and enable evaluations of management action effectiveness.

Another fundamental shortcoming of NPS backcountry recreation management is that most parks lack a formal management framework to guide decision making necessary to balance recreational use and resource impacts. Several new frameworks evolved from and are currently replacing management approaches based on carrying capacities. Our survey revealed that an increasing number of parks are adopting these frameworks, which include the Limits of Acceptable Change (14 parks), Visitor Impact Management (2 parks), and the Carrying Capacity Assessment Process (1 park). The revised NPS Management Policies (USDI 1988) offers guidance to parks that, over time, should address these deficiencies: "The National Park Service will identify acceptable limits of impacts, monitor backcountry use levels and resource conditions, and take prompt corrective action when unacceptable impacts occur."

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